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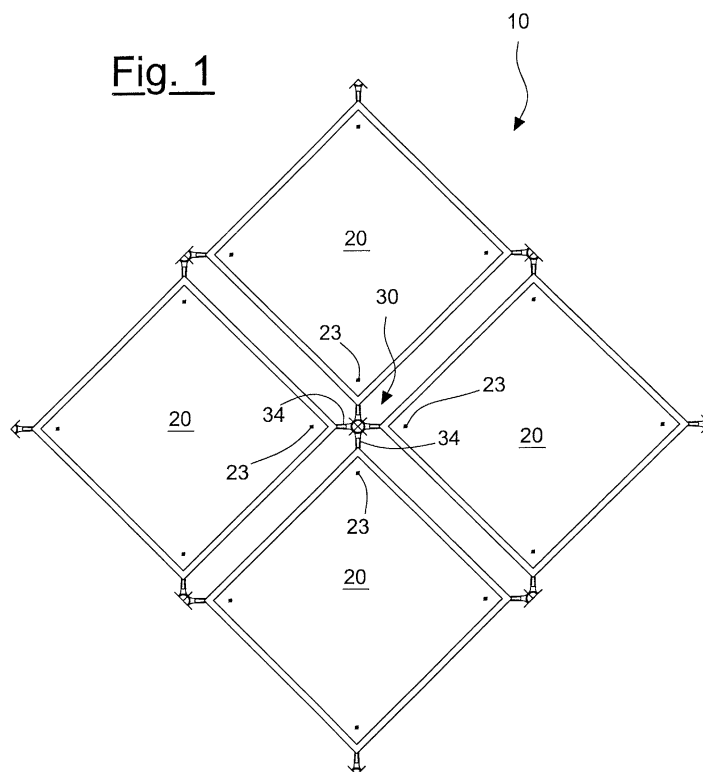
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(54) False ceiling with multifunctional modular elements

(57) A false ceiling with multifunctional modular elements, of the type comprising panels (20) connected to a ceiling (12) with supporting devices (40), wherein the panels (20) have a regular polygon-shaped perimeter and are arranged with the facing sides parallel to each other, and wherein the sides of said panels (20) are at a distance from each other, the panels (20) being connected to each other by means of connecting ele-

ments (30) arranged between vertexes of the panels (20) concurrent with each other, whereby the connecting elements (30) are fixed to the ceiling (12) by means of said supporting devices (40) and have at least one arm (34) hooked to at least one panel (20), at least one of these panels (20) and at least one of these connecting elements (30) being both or alternately associated with light sources or other accessories (37).

Fig. 1



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Description

[0001] The present invention relates to a false ceiling with multifunctional modular elements.

[0002] False ceilings are light horizontal structures, generally hanging from an overlying loft, or vault, destined for creating a new ceiling for environments covered by said loft or vault.

[0003] False ceilings are conceived with the function of creating a flat regular surface, where structural building elements, such as for example loft beams, disturb the aesthetic appearance of the environment.

[0004] False ceilings have subsequently become of great importance.

[0005] They are in fact currently used mainly for creating, between the supporting structures and the ceiling, a space destined for housing a whole series of equipment such as air-conditioning and discharge pipes, pipes for lighting equipment or for heating radiators.

[0006] Furthermore, the material of which false ceilings are made can exert specific functions such as acoustic absorption and thermal insulation.

[0007] False ceilings consist of a series of panels arranged side-by-side forming a flat continuous surface.

[0008] The panels generally hang from the loft by means of wires or are fixed to a supporting structure situated under the loft.

[0009] Lighting and other environmental accessories, such as air-conditioning inlets, fire-sprinklers, smoke detectors and other sensors, are arranged and fixed below the false ceiling, creating connection openings with the respective electric cables or feed pipes, situated above the false ceiling.

[0010] Alternatively, for aesthetic reasons and for recovering useful space for the environment, the lighting and other accessories can be inserted in openings situated in the false ceiling.

[0011] The arranging of a false ceiling consequently involves the insertion of openings in the panels both when the lighting and other accessories are fixed below the false ceiling and also when they are inserted inside the false ceiling.

[0012] These openings are preferably produced on the panels before they are hung or constrained to the supporting structure, and consequently in a preparation phase which precedes the placing of the false ceiling.

[0013] The fact still remains, however, that if a light or accessory is to be added, or if its position is to be modified, new openings must be produced in the assembled false ceiling, making it necessary to operate in uncomfortable positions.

[0014] Furthermore, once the element has been moved, the stripped opening must be covered and it is not easy to obtain aesthetically acceptable results, unless the whole panel or panels in question are replaced.

[0015] An objective of the present invention is to avoid the drawbacks mentioned above and in particular to produce a false ceiling which allows the rapid installation of

light sources and other multifunctional accessories with which the false ceiling is provided.

[0016] Another objective of the present invention is to produce a false ceiling which allows a considerable flexibility, so as to be able to easily vary the arrangement of light sources or other accessories, as well as to facilitate the addition or removal of said elements.

[0017] A further objective of the present invention is to produce a false ceiling which is particularly reliable, simple, functional and at relatively low costs.

[0018] These and other objectives according to the present invention are achieved by the production of a false ceiling with multifunctional modular elements as described in claim 1.

[0019] Further characteristics are included in the subsequent claims.

[0020] The characteristics and advantages of a false ceiling with multifunctional modular elements according to the present invention will appear more evident from the following illustrative but non-limiting description, referring to the schematic drawings enclosed in which:

figure 1 is a partial plan view from below of a false ceiling with multifunctional modular elements, according to the present invention;

figure 2 is a partial plan view from above of the false ceiling of figure 1, rotated with respect to this by 45°; figure 3 is a section of figure 2, effected according to the track III-III indicated in figure 2;

figures 4 and 5 are schematic views of other embodiments of a false ceiling with multifunctional modular elements, according to the present invention.

[0021] With reference to the figures, a false ceiling is illustrated, indicated as a whole with 10, hanging from a loft 12, and comprising modular elements, such as panels 20 and connecting elements 30.

[0022] In the preferred and illustrative but non-limiting embodiment, shown in figures 1, 2 and 3, the panels 20 are square.

[0023] They are fixed from below to a square perimetric frame 22, for example produced with a tubular structure with a quadrangle section made of light alloy. A second panel 20 can be positioned above the frame 22.

[0024] The panels 20 are attached to the frame 22 with fixing elements, such as screws 23. The frame 22 can also be covered on the external side by four corners 24, for example with a "C"-shaped section.

[0025] The panels 20 are sustained by the connecting elements 30.

[0026] As can be seen in figure 3, the connecting elements 30 have a central body 32, for example cylindrical, from which from one to four hooked arms 34 extend outwards, depending on the specific necessity and composition to be obtained.

[0027] These arms 34 extend in directions offset from each other by 90°.

[0028] Each of the arms 34 has a free end 36, which is attached near a vertex of the panel 20, for example by means of any fixing or hooking device, such as a screw 38 screwed in correspondence with a hole 28 situated above the frame 22, close to each of the four vertexes of the square.

[0029] Above the central body 32 of the connecting elements 30 there is an eyelet 39. One end of a wire 40, connected at the other end to a dowel 42 inserted in the ceiling 12, is hooked into said eyelet.

[0030] Below the central body 32 there can be an accessory 37, such as a light source.

[0031] After this presentation of some of the characterizing elements of the present invention, a more detailed description is provided of how it is assembled and used.

[0032] The dowels 42 are first arranged on the ceiling 12, in such positions as to create a square-meshed network on the ceiling 12, having one side equal to the sum of the side of the frame 22 and double the distance of the free end 36 of the arm 34 from the axis of the connecting element 30.

[0033] In this way, once the connecting elements 30 are hung from the dowels 42, they can be fixed to each connecting element 30 up to four frames 22, previously equipped with panels 20.

[0034] Alternatively, the arms 34 of the connecting elements 30 can be connected to the frames 22, this structure being assembled on the ground. It is then hoisted up to the ceiling, hanging the connecting elements 30 to the dowels 42. The panels 20 are then assembled.

[0035] Each connecting element 30, in addition to acting as a structural support of the frames 22 and consequently of the panels 20, can be equipped underneath with an accessory 37 such as a light source with the relative components in its central body 32. Alternatively, the components are housed in a remote place such as a separate feed box. The element 30 therefore also becomes a lighting apparatus.

[0036] Alternatively, the connecting element 30 can be used to receive, again beneath its central body 32, other accessories 37, such as a smoke detector, a presence sensor, a light sensor, a fire-sprinkler, a colour temperature sensor, a temperature sensor, a humidity sensor, etc.

[0037] The panels 20 made for example of a sound-proof material, as already mentioned, are fixed, or inserted in a perimetric frame 22.

[0038] Alternatively, two panels 20 made of a transparent or diffusing material, are fixed below and above the frame 22.

[0039] In this configuration, a fluorescent tube or halogenous source or LED diodes or another light source is situated above the two panels 20, or on a part of the frame 22 facing the panels 20. In this way, a direct and indirect light diffusing apparatus is formed, i.e. the light emission can be directed solely upwards or solely downwards or a combination thereof.

[0040] Again alternatively, light sources are inserted between the two panels 20, made of a diffusing material, with the relative components and optics, thus creating a direct and indirect diffusing light apparatus, i.e. the emission can be directed solely upwards or solely downwards or a combination thereof.

[0041] In addition, the panel 20 can be partially used as a diffuser and partially as a false ceiling, thus creating a luminous strip or circle or square, or yet other figures. In these cases, the light source with the relative reflector and components can be arranged in the frame 22 or between the diffusing panels 20.

[0042] In short, the present invention does not only relate to square-shaped panels 20 such as those illustrated in the figures.

[0043] The panels 20 can in fact have any regular geometric polygonal shape, for example, an equilateral triangle or regular hexagon, as shown in figures 4 and 5 respectively.

[0044] Said panels 20 are arranged with facing sides parallel to each other.

[0045] In these cases, the connecting elements 30 must have not more than from one to four arms 34, but from one to six for an equilateral triangle and from one to three for a regular hexagon, respectively.

[0046] Said arms 34 are arranged on a round angle so that between the arms there are 34 angles equal to or multiples of $360^\circ/n$, wherein n indicates the maximum number of regular polygons, having the same panel 20 shape, which can surround, flanking their respective sides, the panel 20 itself.

[0047] In practice, in the case of an equilateral triangle, there are angles equal to or multiples of 60° , whereas in the case of a regular hexagon, angles equal to or multiples of 120° .

[0048] In this way, the sides of said panels 20 are at a distance from each other and the panels 20 are connected to them by means of the connecting elements 30, arranged between vertexes concurrent with each other of said panels 20.

[0049] The characteristics of the false ceiling with multifunctional modular elements, object of the present invention, are evident from the description provided, as also the relative advantages, among which the following can be mentioned:

- rapid assembly;
- easy maintenance;
- great flexibility in the positioning of light sources and other accessories with which the false ceiling is equipped;
- after assembly, for example if the use of the environment must be changed or if there are new necessities, simple variations in the arrangement of the light sources and other accessories are possible;
- the panels and connecting elements are modular elements with particularly satisfactory aesthetic re-

sults.

[0050] Finally, numerous modifications and variations, all included in the scope of the invention, can obviously be applied to the false ceiling with multifunctional modular elements thus conceived; furthermore all the details can be substituted by technically equivalent elements. In practice, the materials used, as also the dimensions, can vary according to technical demands.

Claims

1. A false ceiling with multifunctional modular elements, of the type comprising panels (20) connected to a ceiling (12) with supporting devices (40), wherein said panels (20) have a regular polygon-shaped perimeter and are arranged with the facing sides parallel to each other, **characterized in that** the sides of said panels (20) are at a distance from each other and said panels (20) are connected to each other by means of connecting elements (30) arranged between vertexes of said panels (20) concurrent with each other, whereby said connecting elements (30) are fixed to the ceiling (12) by means of said supporting devices (40) and have at least one arm (34) hooked to at least one panel (20), at least one of said panels (20) and at least one of said connecting elements (30) being both or alternately associated with light sources or other accessories (37).
2. The false ceiling according to claim 1, **characterized in that** said arms (34) extend outwards from a central cylindrical body (32) of the connecting element (30) and are arranged on the round angle according to angles equal to or multiples of $360^\circ/n$, wherein n indicates the maximum number of regular polygons, having the same shape as said panel (20), which surround, flanking their respective sides, the panel (20) itself, said arms (34) each having a free end (36) which is attached close to a vertex of at least one of said panels (20) by means of hooking devices (28, 38).
3. The false ceiling according to claim 1, **characterized in that** said panels (20) are fixed to a perimetric frame (22) which is equipped with freely removable hooking devices (28, 38) with free ends (36) of said at least one arm (34) of the connecting elements (30).
4. The false ceiling according to claim 3, **characterized in that** said panel (20) is attached below the perimetric frame (22) by means of fixing elements (23).
5. The false ceiling according to claim 3, **character-**

ized in that two panels (20) are fixed on said perimetric frame (22), one above and one below.

6. The false ceiling according to claim 1, **characterized in that** said supporting devices (40) consist of wires (40) which join each connecting element (30), having an upper eyelet (39), to a dowel (42) inserted in the ceiling (12).
7. The false ceiling according to claim 3, **characterized in that** at least one of said panels (20) is made of a material at least partially transparent and that on one side of said panel (20) there is a light source.
8. The false ceiling according to claim 1, **characterized in that** at least one of said connecting elements (30) is equipped beneath with a light source.
9. The false ceiling according to claim 1, **characterized in that** said other accessories (37) consist of a smoke detector, a presence sensor, a light sensor, a fire-sprinkler, a colour temperature sensor, a temperature sensor or a humidity sensor.
10. The false ceiling according to claim 3, **characterized in that** said perimetric frame (22) has an aluminum tubular structure.
11. The false ceiling according to claim 1, **characterized in that** said panels (20) are square-shaped and said connecting elements (30) each have from one to four arms (34), off-set with respect to each other by angles equal to or multiples of 90° .
12. The false ceiling according to claim 1, **characterized in that** said panels (20) have the shape of an equilateral triangle and said connecting elements (30) each have from one to six arms (34), off-set with respect to each other by angles equal to or multiples of 60° .
13. The false ceiling according to claim 1, **characterized in that** said panels (20) have the shape of a regular hexagon and said connecting elements (30) each have from one to three arms (34), off-set with respect to each other by angles equal to or multiples of 120° .

Fig. 1

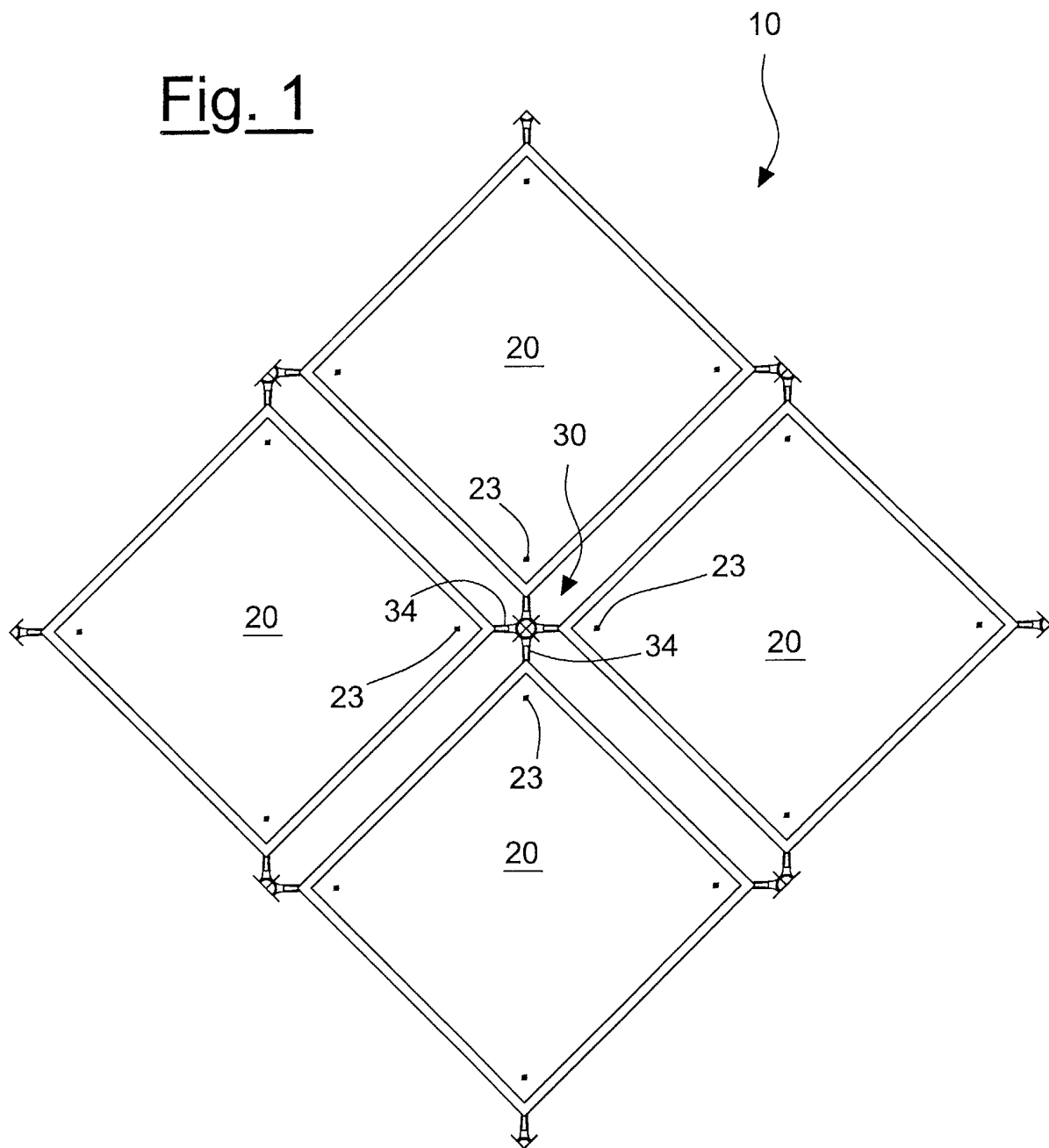


Fig. 2

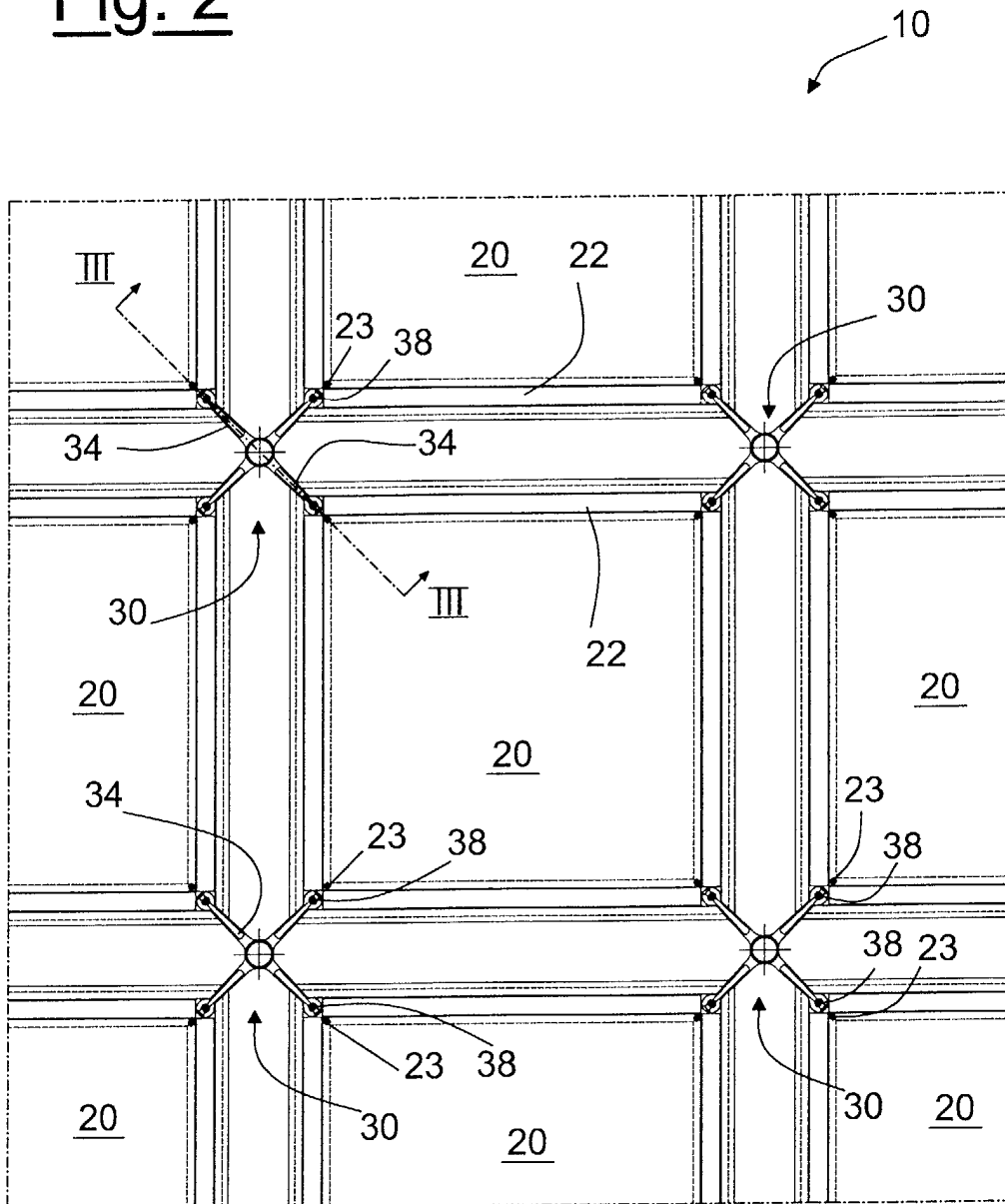


Fig. 3

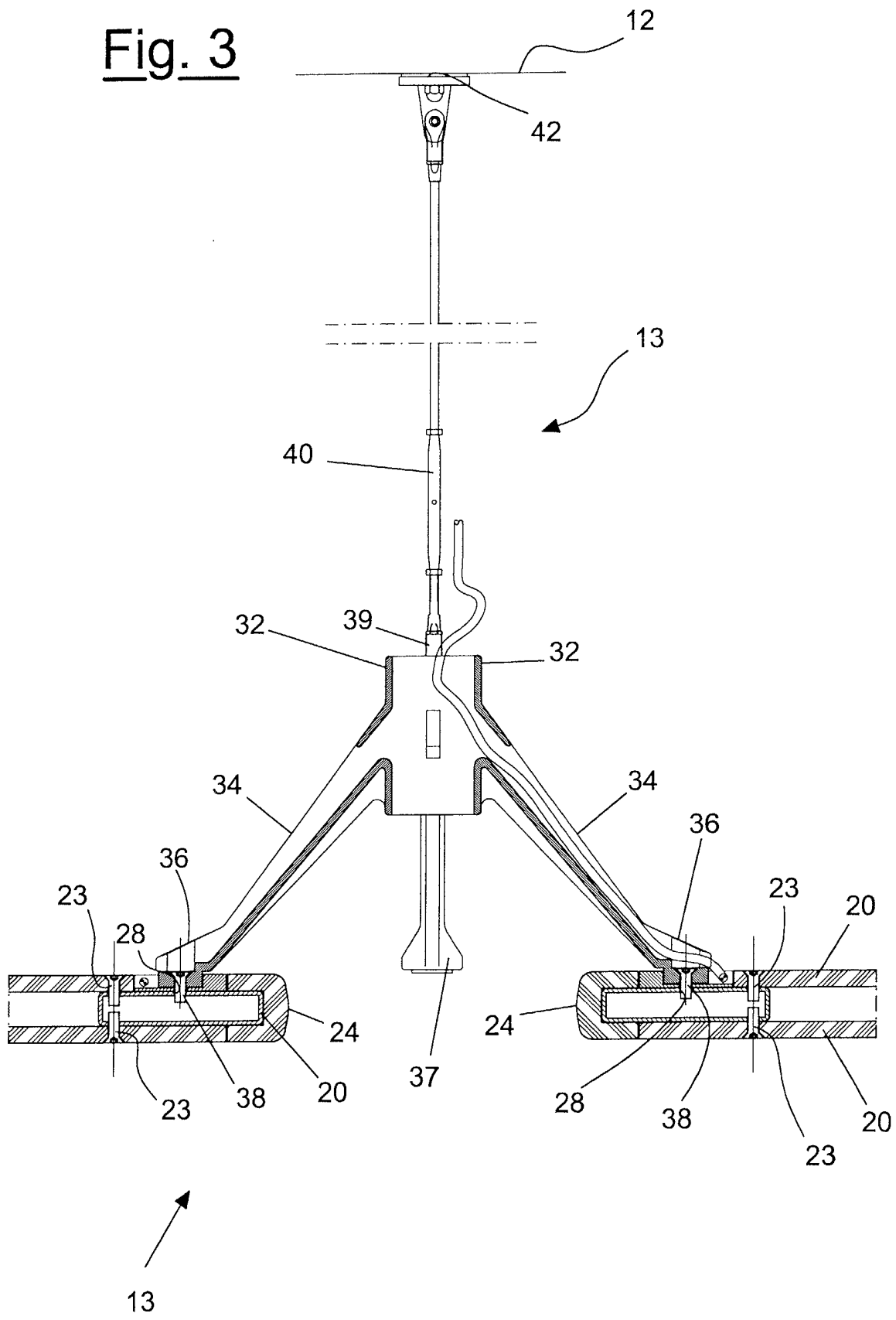


Fig. 4

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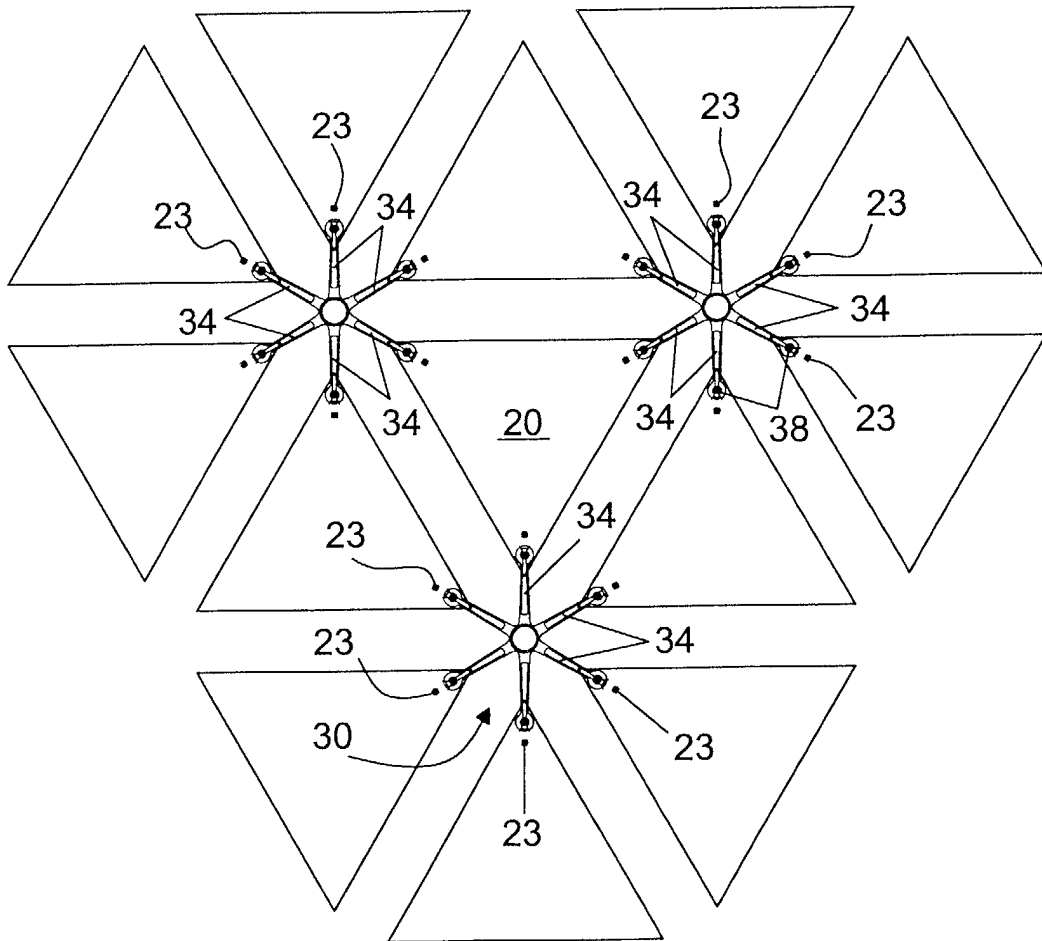


Fig. 5

