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(71) Applicant: **Spanjers, Joseph**
5685 BA Best (NL)

(72) Inventor: **Spanjers, Joseph**
5685 BA Best (NL)

(74) Representative: **Dorna, Peter et al**
Algemeen Octrooi- en Merkenbureau
P.O. Box 645
5600 AP Eindhoven (NL)

(54) System for a suspended ceiling

(57) The invention provides a system for a ceiling in a room having a main ceiling, which system comprises a ceiling of a cloth-like ceiling material stretched below the main ceiling in the room, a ceiling device, such as a lighting element or an air inlet/outlet element fitted in a hole in the ceiling, and a mounting element located above the hole, which mounting element is constructionally connected to the room, to which mounting element the ceiling device is connected, wherein the mounting element comprises a base mounting element that is constructionally connected to the room, an adjusting mounting element connected to the base mounting element, to which adjusting mounting element the ceiling device is connected, as well as adjusting means to enable adjustment of the adjusting mounting element with respect to the base mounting element in a direction perpendicular to the ceiling, wherein the base mounting element comprises a first tubular part and a fixing part extending from the first tubular part, perpendicularly to the central axis thereof, which fixing part extends parallel to the main ceiling of the room and which comprises means of attachment for constructionally fixing the base mounting element to the main ceiling via the fixing part, and wherein the adjusting mounting element comprises a second tubular part as well as a contact surface that joins a lower a circumferential edge of the second tubular part for abutment against the upper side of the stretched ceiling, wherein the first tubular part and the second tubular part surround each other and wherein the tubular parts surrounding each other are connected by means of screw thread.

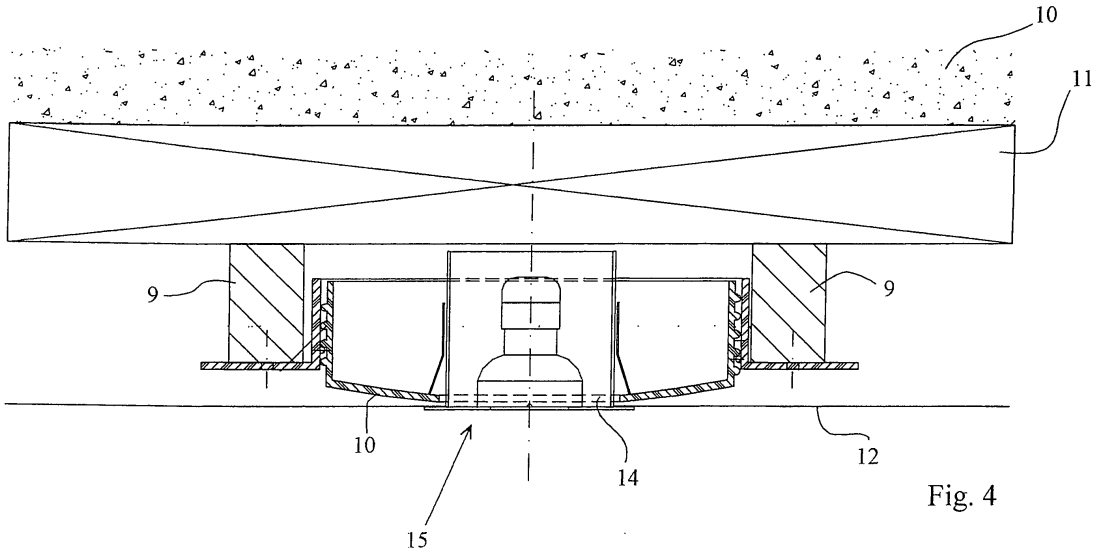

Fig. 4

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Description

[0001] The present invention relates to a system for a ceiling in a room having a main ceiling, which system comprises a ceiling of a cloth-like ceiling material stretched below the main ceiling in the room, a ceiling device, such as a lighting element or an air inlet/outlet element fitted in a hole in the ceiling, and a mounting element located above the hole, which mounting element is constructionally connected to the room, to which mounting element the ceiling device is connected.

[0002] Such a system is known from Dutch patent NL 1003163. Said document describes a system for a suspended ceiling of a cloth-like ceiling material, wherein use is made of a lamp mounting element for mounting a lamp, such as a downlight, in the ceiling. Said lamp mounting element comprises a square plate, which is provided with four attachment blocks near its corner points, via which the plate is fixed to the main ceiling of the room by means of screws. Then the ceiling cloth is stretched under the lamp mounting element, whereupon a hole is formed in the cloth opposite a hole that is present in the centre of a cup-shaped, downwardly extending indentation in the square plate. Subsequently a lamp system is connected to the square plate via said hole by means of springs. In order to prevent a downwardly or upwardly extending indentation being formed in the ceiling cloth at the location of the lamp system, so that the cloth will noticeably not be taut any longer, it is very important that the attachment blocks are so dimensioned that the bottom side of the cup-shaped indentation abuts against the upper side of the ceiling cloth precisely without any tension. This requires a high level of skill and precision upon installation of the ceiling system.

[0003] French patent applications FR-A1-2647139, FR-A1-2688867 and FR-A1-2699648 describe devices for mounting a downlight in a suspended ceiling. A common feature of the devices described in said documents is the fact that they require a considerable installation height, which renders their use in private environments problematic. Moreover, the known devices are of complex construction, comprising a large number of different components, whilst they do not leave the space centrally above the downlight clear but rather use it for attachment to the main ceiling of the room in question.

[0004] The object of the present invention is to provide a system for a suspended ceiling as referred to in the introductory paragraph which requires a significantly less high degree of precision upon installation as regards the operations for fitting a ceiling device in the cloth-like ceiling material thereof than is the case with the prior art, but in which furthermore the drawbacks of the systems according to the aforesaid French patent applications no longer play a role, or at least to a significantly smaller degree. In order to accomplish that object, the mounting element comprises a base mounting element that is constructionally connected to the room, an adjusting mounting element connected to the base mounting element, to which adjusting mounting element the ceiling device is connected, as well as adjusting means to enable adjustment of the adjusting mounting element with respect to the base mounting element in a direction perpendicular to the ceiling, wherein the base mounting element comprises a first tubular part and a fixing part extending from the first tubular part, perpendicularly to the central axis thereof, which fixing part extends parallel to the main ceiling of the room and which comprises means of attachment for constructionally fixing the base mounting element to the main ceiling via the fixing part, and in that the adjusting mounting element comprises a second tubular part as well as a contact surface that joins a lower a circumferential edge of the second tubular part for abutment against the upper side of the stretched ceiling, wherein the first tubular part and the second tubular part surround each other and wherein the tubular parts surrounding each other are connected by means of screw thread. These characteristic features of the invention make it possible to adjust the distance between the mounting element and the upper side of the ceiling by adjusting the adjusting mounting element with respect to the base mounting element after the mounting element has been constructionally connected to the room. Said adjustment may take place before the stretching of the cloth-like ceiling material, anticipating the expected final height of the cloth-like ceiling material in stretched condition, but preferably it takes place after the stretching of the cloth-like ceiling material, so that it is possible to start from the actual position of the ceiling cloth. According to the invention, the fixing part may abut flat against the main ceiling and be connected thereto by means of screws extending into the main ceiling via holes in the fixing part. Alternatively, the fixing part of the base mounting element may also extend at the bottom side of the first tubular part, in which case the fixation of the base mounting element to the main ceiling takes place by means of attachment blocks similar to those described in NL 1003163. It may furthermore be advantageous in that case, in particular for production reasons, if the screw thread means on the base mounting elements are only provided on a lower part of the height of the tubular part of the base mounting element, which does not necessarily have an adverse effect on the functionality thereof. The system according to the invention furthermore makes it possible to reduce the number of main components and to use components of simple design, for example injection-moulded components. Moreover, the space centrally above the ceiling device can be kept clear, for example for realising a passage for an electrical lead or a pipe through the main ceiling. The threaded connection makes it possible to position the adjusting mounting element with respect to the base mounting element in a continuously variable and precise manner, using constructionally simple means.

[0005] Fixation of the base mounting element to the main ceiling will be easy in particular if the fixing part is made up of a flange part that extends outwards from the

first tubular part.

[0006] Quite preferably, the threaded connection is located centrally above the ceiling device. Thus, adjustment of the adjusting mounting element can take place via the hole in the cloth-like ceiling material, which has been formed therein for the purpose of accommodating the ceiling device.

[0007] Preferably, the contact surface is spherical in shape, thus preventing the presence of acute transitions in the ceiling material, which might be visually objectionable.

[0008] Furthermore, the contact surface preferably extends within the diameter of the second tubular part. This achieves that the adjusting mounting element can be screwed into the base mounting element in its entirety, whilst in addition the production of such an adjusting mounting element can be realised in a simpler and thus cheaper manner.

[0009] In order to be able to accommodate lines that connect to a ceiling device, such as an electrical lead, in a desirable manner it is preferable if the screw thread means on the base mounting element comprise an interrupted screw thread, with a passage for an electrical lead or a pipe connecting to the ceiling device being provided between the inner side and the outer side of the screw thread at the location of at least one interruption in the screw thread. The electrical lead or pipe in question extends through the passage, which takes up a spatially fixed position after the base mounting element has been fixed to the main ceiling, and which consequently is not affected upon adjustment of the adjusting mounting element with respect to the base mounting element. Although it is possible within the framework of the present preferred embodiment to interrupt the screw at one position only, it may also be very advantageous to interrupt the screw thread at a number of positions, making use of a number of passages, so that the base mounting element can in principle be constructionally connected to the room in any orientation thereof, after which the most suitable passage is selected for passing an electrical lead or a pipe therethrough.

[0010] The present invention further relates to a method for using the system according to the invention as described above. The method according to the invention comprises the steps of

- constructionally connecting the base mounting element to the room,
- connecting the adjusting mounting element to the base mounting element,
- installing the ceiling by stretching the cloth-like ceiling material in the room,
- forming a hole in the stretched ceiling material under the adjusting mounting element,
- adjusting the adjusting mounting element with respect to the base mounting element via the hole, in such a manner that the bottom side of the adjusting mounting element will be positioned just above the stretched ceiling material,
- mounting the ceiling device to the adjusting mounting element via the hole, so that the ceiling device will be accommodated in the hole.

[0011] The important advantage that is obtained by using the method according to the invention is the fact that it is no longer necessary to take the eventual height of the stretched ceiling of cloth-like ceiling material into account already when constructionally connecting the mounting element to the room, but that instead the mounting element, or more specifically the adjusting mounting element thereof, can be adjusted after stretching of the cloth-like material has taken place, so that the mounting element will take up the most optimum position just above the cloth-like ceiling material.

[0012] The present invention will be explained below by means of a description of a preferred embodiment thereof, in which reference is made to the following figures:

Figures 1 a and 1b are a plan view and a vertical cross-sectional view, respectively, of a base element forming part of a system according to a preferred embodiment of the present invention;
Figure 2 is a perpendicular view of an adjusting ring for use in combination with the base element that is shown in figures 1 a and 1 b;
Figures 3a-3c are views of the system according to the preferred embodiment of the invention, showing the adjusting ring in three different positions thereof;
Figure 4 is a vertical cross-sectional view of the system according to the preferred embodiment of the present invention, used in combination with a downlight.

[0013] Figures 1a and 1b show a base element 1 of plastic material, which mainly consists of a square flange plate 2 with a circular hole 3 centrally provided therein, and a ring 4 joining the hole 3, which is internally provided with six equally spaced screw cams 5. Fixing holes 6 for fixing the base element 1 to the surrounding structure are provided in the square flange plate 2 near the corners thereof.

[0014] Figure 2 shows an adjusting ring 7 which is externally provided with screw thread 8, which screw thread 8 is to mate with the screw cams 5, so that the adjusting ring 7 can be screwed into and out of the ring 4 of the base element 1. The adjusting ring 7 has a spherical closing end face 10 at the bottom side thereof. The adjusting ring 7 is intended for the eventual fitting of a ceiling device therein, as will be explained in more detail yet with reference to figure 4.

[0015] Figures 3a-3c show the adjusting ring 7 in the position in which it is screwed into the ring 4 of the base element 1. The base element 1 is screwed down to girders 9 via fixing holes 6, which girders are in turn fixed to a fixed ceiling 10 via girders 11 extending perpendicularly

to girders 9, as is shown in figure 4. After the base element 1, with the adjusting ring 7 screwed therein, have been fixed to the girders 9, a stretch ceiling 12 is stretched below the adjusting ring 7, for example as described in Dutch patent NL 1003163. The manner in which the stretching of the stretch ceiling 12 takes place is not relevant within the context of the present invention.

[0016] As figure 3a shows, the adjusting ring 7 is screwed into the base element 1 to such a limited extent that the bottom side of the end face 10 is in contact with the upper side of the stretch ceiling 12, pressing it downwards. It will be understood that this is not a desirable situation if the object is to realise a flat ceiling 12.

[0017] Figure 3b shows the situation in which the stretch ceiling 12 is flat, which has been realised by screwing the adjusting ring 7 further upwards into the base element 1, to such an extent even that a small spacing 13 is present between the bottom side of the end face 10 and the upper side of the stretch ceiling 12. The presence of such a spacing 13 is undesirable as well, since there is a risk that the stretch ceiling 12 will be pulled in the direction of the adjusting ring 7, as indicated by the broken line 12', when a ceiling device is connected to the adjusting ring 7, which would also lead to a visually unacceptable situation.

[0018] Figure 3c shows the optimum situation, in which the bottom side of the end face 10 just abuts against the upper side of the entirely flat ceiling 12. If it should appear after installation of the stretch ceiling 12 that the situation according to either one of the figures 3a and/or 3b rather than the situation shown in figure 3c has been obtained, the adjusting ring 7 can be easily engaged and turned within the ring 4 via a hole 16 to be provided in the stretch ceiling 12 for that purpose, which whole 16 is in any case needed for the fitting of a ceiling device, so that the adjusting ring 7 can be adjusted in vertical direction until the situation shown in figure 3c is obtained.

[0019] Subsequently, a central hole 14 can be formed in the end face of the adjusting ring 7 via the hole 16, after which a ceiling device, such as a downlight 15 as shown in figure 4, can be connected to the adjusting ring 7 via the hole 16 in the stretch ceiling 12 and the hole 14 in the end face 10, with the stretch ceiling 12 remaining fully flat. An important advantage that is achieved in this manner is that only a low degree of precision is required upon installation of the combination of the base element 1 and the adjusting ring 7, because it is not directly necessary for the bottom side of the end face 10 to abut against the upper side of the stretch ceiling 12.

[0020] Countless variants are possible within the framework of the present invention. Thus it is pointed out in the first place that it would also be possible to form the hole 14 before the adjusting ring 7 is screwed into the base element 1 and/or before stretching of the stretch ceiling 12 takes place. Furthermore it is possible to use the base element 1 in upside-down position, i.e. with the flange plate 2 at the upper side thereof, in which case the base element 1 is directly attached to the fixed structure, such as the fixed ceiling 10, without the use of intermediate elements, such as the girders 9, 11. It is desirable in that connection that the screw cams 5 extend over a larger part of the height of the ring 4 or that the screw cams 5 be provided at the end of the ring 4 remote from the flange plate 2. Especially, but not exclusively, in the latter variant it is furthermore preferable that one or a number of openings be provided in the ring 4 for passing wires from the ceiling device in question outside the ring 4.

Claims

1. A system for a ceiling in a room having a main ceiling, which system comprises a ceiling of a cloth-like ceiling material stretched below the main ceiling in the room, a ceiling device, such as a lighting element or an air inlet/outlet element fitted in a hole in the ceiling, and a mounting element located above the hole, which mounting element is constructionally connected to the room, to which mounting element the ceiling device is connected, **characterised in that** the mounting element comprises a base mounting element that is constructionally connected to the room, an adjusting mounting element connected to the base mounting element, to which adjusting mounting element the ceiling device is connected, as well as adjusting means to enable adjustment of the adjusting mounting element with respect to the base mounting element in a direction perpendicular to the ceiling, wherein the base mounting element comprises a first tubular part and a fixing part extending from the first tubular part, perpendicularly to the central axis thereof, which fixing part extends parallel to the main ceiling of the room and which comprises means of attachment for constructionally fixing the base mounting element to the main ceiling via the fixing part, and **in that** the adjusting mounting element comprises a second tubular part as well as a contact surface that joins a lower a circumferential edge of the second tubular part for abutment against the upper side of the stretched ceiling, wherein the first tubular part and the second tubular part surround each other and wherein the tubular parts surrounding each other are connected by means of screw thread.

2. A system according to claim 1, **characterised in that** the fixing part is made up of a flange part that extends outwards from the first tubular part.

3. A system according to claim 1 or 2, **characterised in that** the threaded connection is located centrally above the ceiling device.

4. A system according to any one of the preceding claims, **characterised in that** said contact surface is spherical in shape.

5. A system according to any one of the preceding claims, **characterised in that** said contact surface extends within the diameter of the second tubular part.

6. A system according to any one of the preceding claims, **characterised in that** the screw thread means on the base mounting element comprise an interrupted screw thread, with a passage for an electrical lead or a pipe connecting to the ceiling device being provided between the inner side and the outer side of the screw thread at the location of at least one interruption in the screw tread.

7. A method for using a system according to any one of the preceding claims, **characterised by** the steps of

- constructionally connecting the base mounting element to the room,
- connecting the adjusting mounting element to the base mounting element,
- installing the ceiling by stretching the cloth-like ceiling material in the room,
- forming a hole in the stretched ceiling material under the adjusting mounting element,
- adjusting the adjusting mounting element with respect to the base mounting element via the hole, in such a manner that the bottom side of the adjusting mounting element will be positioned just above the stretched ceiling material,
- mounting the ceiling device to the adjusting mounting element via the hole, so that the ceiling device will be accommodated in the hole.

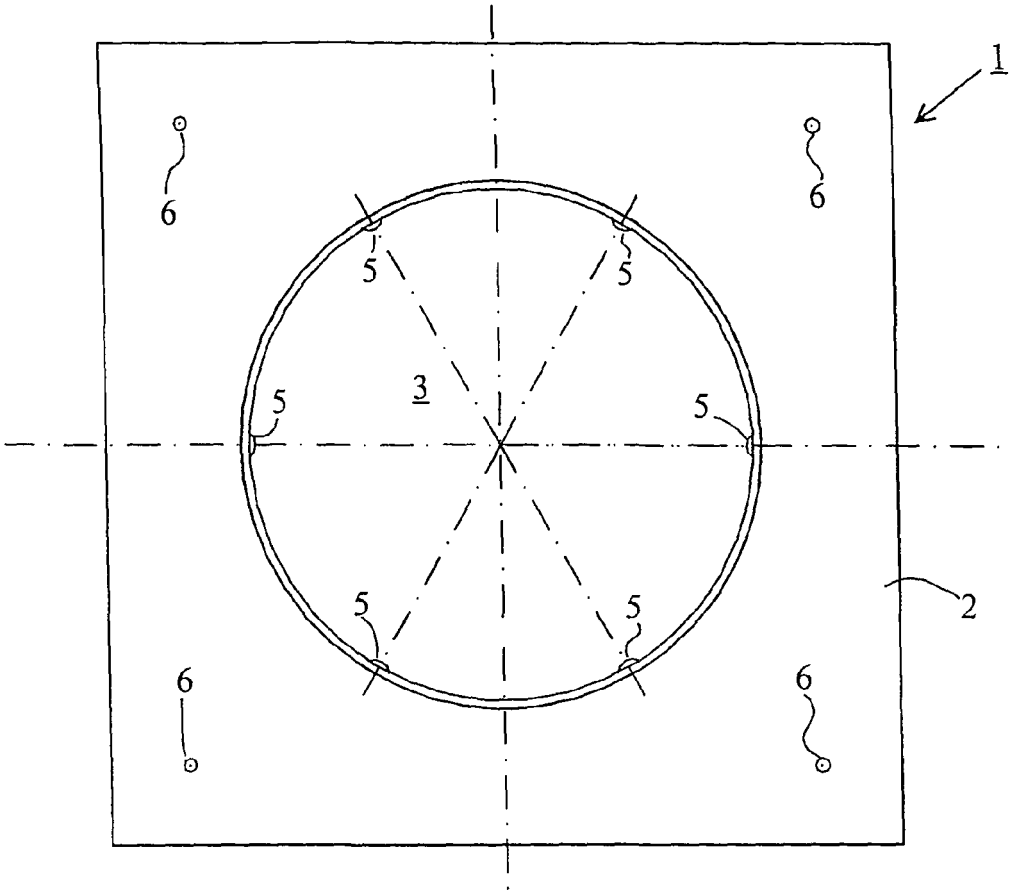

Fig. 1a

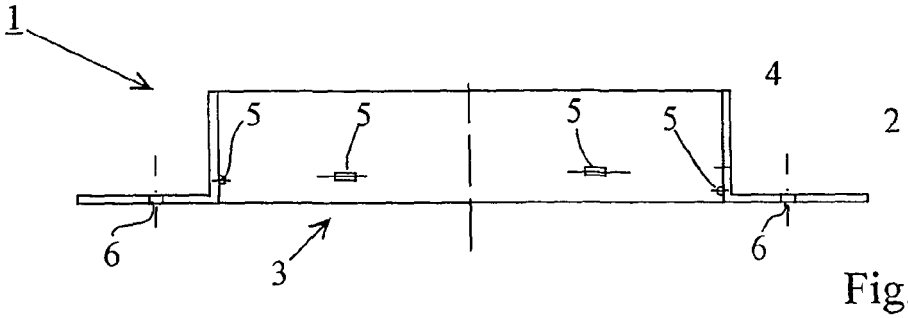

Fig. 1b

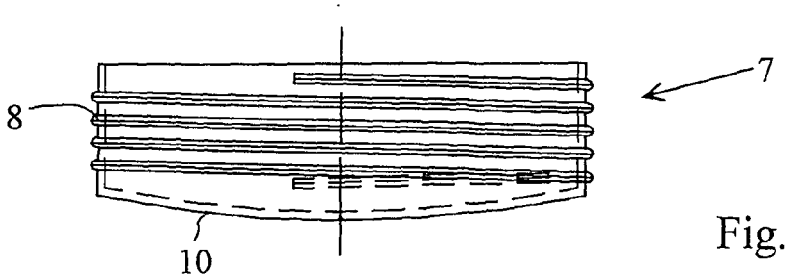

Fig. 2

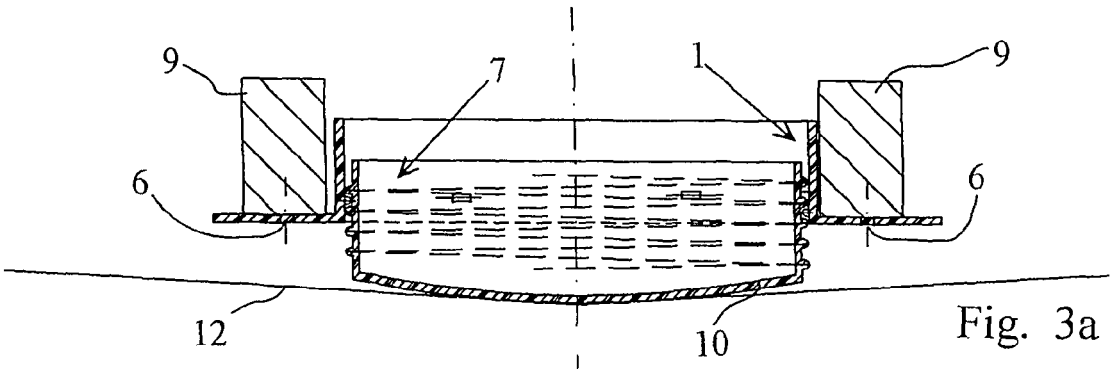

Fig. 3a

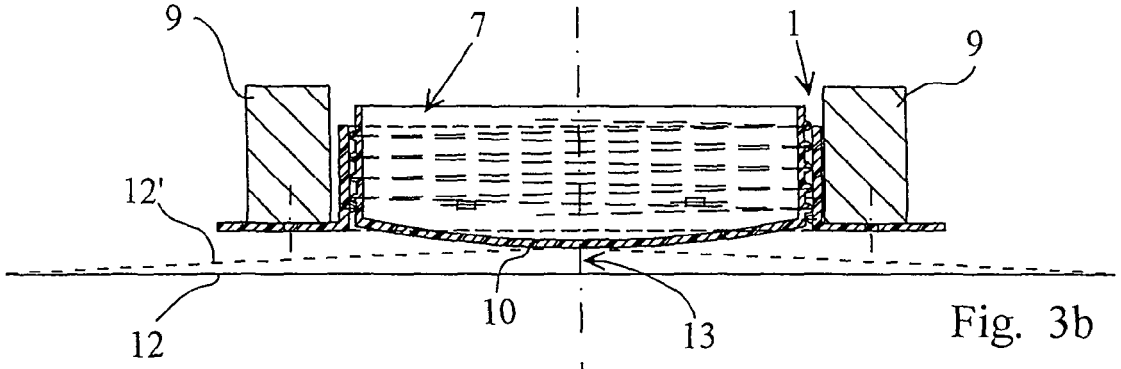

Fig. 3b

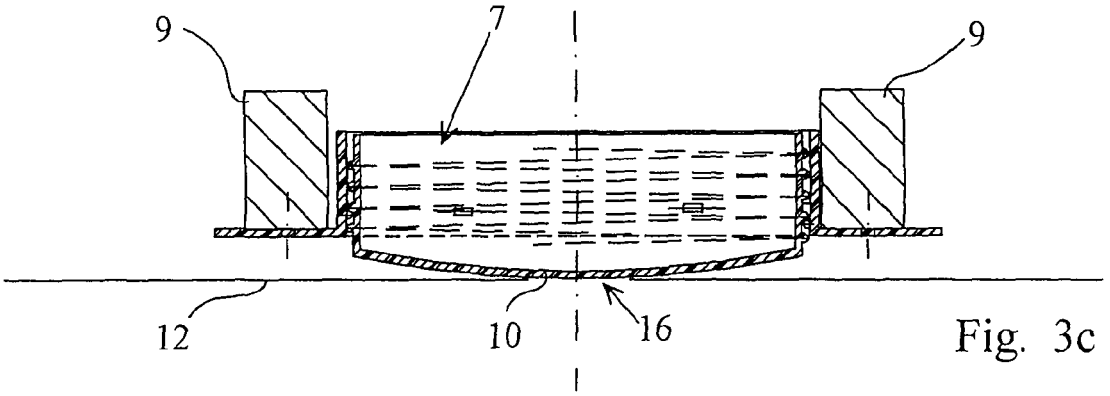

Fig. 3c

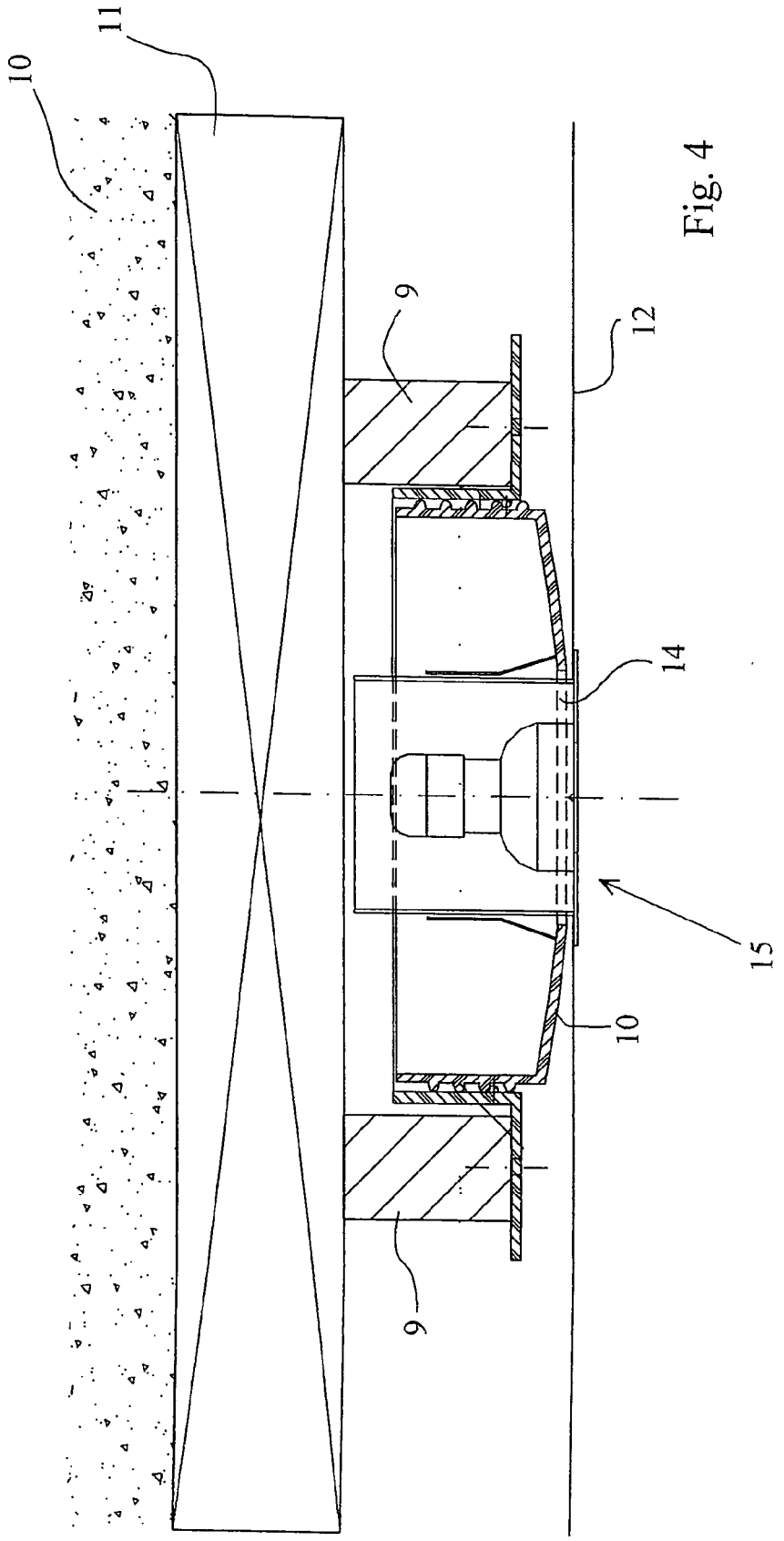

Fig. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 01 3342

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	FR 2 699 648 A (MONTANARO SALVATORE) 24 June 1994 (1994-06-24) * the whole document * -----	1,3,5,7	INV. F21V21/04 E04B9/00
X	FR 2 688 867 A (DAVID FRANCIS) 24 September 1993 (1993-09-24) * page 3, line 2 - line 9; figures * -----	1-3,7	
X	FR 2 647 139 A (FMS) 23 November 1990 (1990-11-23) * page 5, line 36 - page 6, line 4; figure 1 * * page 6, line 18 - line 21 * -----	1-3,5	
			TECHNICAL FIELDS SEARCHED (IPC) F21V E04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	9 October 2006	Demeester, Jan

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 01 3342

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09-10-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2699648 A	24-06-1994	NONE	
FR 2688867 A	24-09-1993	NONE	
FR 2647139 A	23-11-1990	NONE	

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- NL 1003163 **[0002] [0004] [0015]**
- FR 2647139 A1 **[0003]**
- FR 2688867 A1 **[0003]**
- FR 2699648 A1 **[0003]**