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(54) Device for facilitating the movement of pieces of furniture or the like, with very simple application to pieces of furniture

(57) A device (1) for facilitating the movement of pieces of furniture or the like, comprising an enclosure (2) which can be associated, by means of one of its sides, with the side of the piece of furniture to be directed toward the floor. The enclosure (2) defines internally a receptacle (3) for a resting element (4) which protrudes, in at least one active condition, from an opening (5) which is defined on the side of the enclosure (2) which lies opposite with respect to the side which can be associated with the piece of furniture. The resting element (4) can move with respect to the enclosure (2) from a movement position, in which it protrudes partially from the enclosure (2) through the opening (5) and constitutes an elastically yielding rest for the piece of furniture or the like on the floor, to a static position, in which it is at least partially retracted into the enclosure (2) with respect to the movement position for substantially rigid resting of the piece of furniture on the floor, and vice versa. The resting element (4) can move from the movement position to the static position in contrast with the action of elastic means (6) accommodated within the enclosure (2). The resting element (4) is crossed by at least one passage (7) for a tool for operating at least one connecting element (9), which is associated with the side of the enclosure which lies opposite the opening (5) and can engage the piece of furniture.

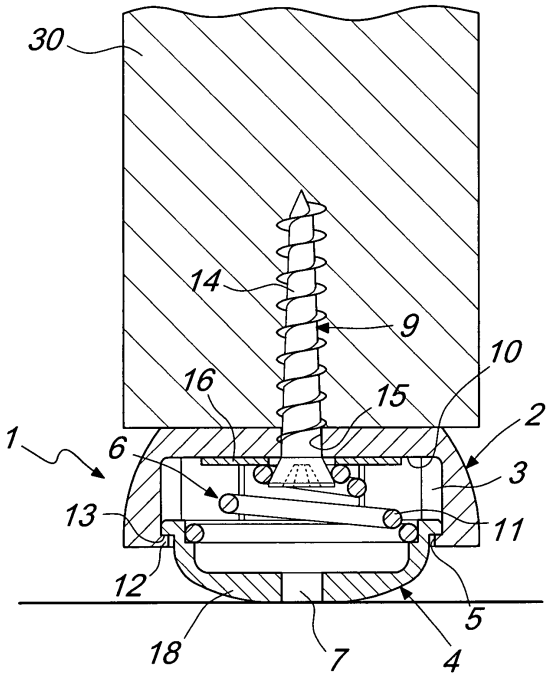

Fig. 5

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Description

[0001] The present invention relates to a device for facilitating the movement of pieces of furniture or the like.

[0002] As is known, moving pieces of furniture, particularly in the case of rather heavy items, is a tiring and awkward operation due to the friction and small differences in level which hinder the sliding of the piece of furniture on the floor.

[0003] To make this operation easier, devices have been proposed, such as for example the device disclosed in EP-402.346, which are designed to be accommodated in a foot or more generally in the base of the piece of furniture and are provided with a ball which replaces the foot or base of the piece of furniture in resting on the floor during movement, so as to reduce the friction force that contrasts the movement and provide an elastically flexible contact which allows to negotiate small differences in level more easily.

[0004] Such devices generally comprise a substantially cylindrical enclosure, which is designed to be arranged inside a seat provided appropriately in the base or foot of the piece of furniture. A cylindrical receptacle is provided in such enclosure for a ball which can protrude from an opening provided on the side of the enclosure which, when the device is assembled to the piece of furniture, is directed toward the floor. Such ball can move axially along the cylindrical receptacle in order to pass from a movement position, in which it protrudes partially from the enclosure through such opening so as to replace the base of the piece of furniture in resting on the floor, to a static position, in which it is retracted into the enclosure, and vice versa. Retraction of the ball into the enclosure is contrasted by a spring which is accommodated within the enclosure. The spring is sized so that when the piece of furniture is not loaded, i.e., when only the weight of the piece of furniture bears on the spring, the ball, under the action of the spring, protrudes below the piece of furniture, and when instead the piece of furniture is loaded with objects or people, the spring yields until the ball can retract substantially completely into the enclosure, thus allowing the piece of furniture to rest firmly on the floor.

[0005] In this manner, by unloading the piece of furniture it is possible to move it more easily, since it rests on the floor by means of the ball, whereas in normal conditions, when the piece of furniture is loaded, it rests firmly on the ground so as to avoid any accidental movement.

[0006] These devices, in order to be able to apply them to the pieces of furniture, require the preliminary provision, in the foot or base of the piece of furniture, of a substantially cylindrical seat whose diameter is such as to accommodate coaxially the enclosure of the device substantially completely.

[0007] This preliminary operation is not always accepted by potential users, particularly when the piece of furniture has a certain value, since it alters significantly the integrity of the piece of furniture, further weakening the foot or base of the piece of furniture and thus increasing the possibility of accidental breakages during use.

[0008] The aim of the present invention is to solve the problem described above by providing a device which facilitates the movement of pieces of furniture or the like and does not require, for its application, significant alterations to the integrity of the piece of furniture or the like.

[0009] Within this aim, an object of the invention is to provide a device which can be applied to pieces of furniture or the like very simply and rapidly even by unspecialized personnel.

[0010] Another object of the invention is to provide a device which has high structural simplicity, so that it can be manufactured with greatly reduced costs with respect to known types of devices.

[0011] Another object of the invention is to provide a device which is composed of a small number of parts which are simple to manufacture and assemble.

[0012] Still another object of the invention is to provide a device which, notwithstanding its structural simplicity, is highly reliable in operation and has excellent durability.

[0013] This aim and these and other objects, which will become better apparent hereinafter, are achieved by a device for facilitating the movement of pieces of furniture or the like, characterized in that it comprises an enclosure which can be associated, by means of one of its sides, with the side of the piece of furniture or the like to be directed toward the floor, said enclosure defining internally a receptacle for a resting element which protrudes, in at least one active condition, from an opening which is defined on the side of said enclosure which lies opposite with respect to the side which can be associated with the piece of furniture, said resting element being movable with respect to said enclosure from a movement position, in which it protrudes partially from said enclosure through said opening and constitutes an elastically yielding rest for the piece of furniture on the floor, to a static position, in which it is at least partially retracted into said enclosure with respect to said movement position for substantially rigid resting of the piece of furniture on the floor, and vice versa, said resting element being movable from said movement position to said static position in contrast with the action of elastic means accommodated within said enclosure, said resting element being crossed by at least one passage for a tool for operating at least one connecting element, which is associated with the side of the enclosure which lies opposite said opening and can engage the piece of furniture.

[0014] Further characteristics and advantages of the invention will become better apparent from the description of two preferred but not exclusive embodiments of the device according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figures 1 to 6 are views of a first embodiment of the device according to the invention, and more particularly:

Figure 1 is an exploded perspective view of the device;
Figure 2 is a perspective view of the device in the assembled condition during its application to the foot of a piece of furniture;
Figure 3 is a perspective view of the device, applied to the foot of a piece of furniture;
Figure 4 is a view of the device, taken from its side designed to be directed toward the floor;
Figure 5 is an axial sectional view of the device, associated with a piece of furniture, in the movement position;
Figure 6 is an axial sectional view of the device, associated with a piece of furniture in the static position;
Figures 7 to 12, are views of a second embodiment of the device according to the invention, and more particularly:
Figure 7 is an exploded perspective view of the device;
Figure 8 is a perspective view of the device in the assembled condition during its application to the foot of a piece of furniture;
Figure 9 is a perspective view of the device, applied to the foot of a piece of furniture;
Figure 10 is a view of the device, taken from its side designed to be directed toward the floor;
Figure 11 is an axial sectional view of the device, associated with a piece of furniture, in the movement position;
Figure 12 is an axial sectional view of the device, associated with a piece of furniture, in the static position;
Figures 13 to 15 are views of the device according to the invention, again in its first embodiment, with a variation related to the elastic means, and more particularly:
Figure 13 is an exploded perspective view of the device;
Figure 14 is an axial sectional view of the device associated with a piece of furniture in the movement position;
Figure 15 is an axial sectional view of the device, associated with a piece of furniture, in the static position.

[0015] With reference to the figures, the device according to the invention, generally designated in its two embodiments by the reference numerals 1, 1a, comprises an enclosure 2, 2a, which can be associated, by means of one of its sides, with the side of the piece of furniture, of which only a base or foot 3 0 to be directed toward the floor has been shown.

[0016] The enclosure 2, 2a defines internally a receptacle 3, 3a for a resting element 4, 4a which protrudes, in at least one active condition, from an opening 5, 5a which is defined on the side of the enclosure 2, 2a which lies opposite with respect to its side which can be associated with the piece of furniture.

[0017] The resting element 4, 4a can move, with respect to the enclosure 2, 2a, from a movement position, in which it protrudes partially from the enclosure 2, 2a through the opening 5, 5a and constitutes an elastically yielding rest for the piece of furniture on the floor, to a static position, in which it is partially retracted into the enclosure 2, 2a with respect to the movement position in order to produce substantially rigid resting of the piece of furniture on the floor, and vice versa.

[0018] The resting element 4, 4a can move from the movement position to the static position in contrast with the action of elastic means 6, 6a, 6b which are accommodated in the enclosure 2, 2a.

[0019] According to the invention, the resting element 4, 4a is crossed by at least one passage 7, 7a for a tool 8 for operating at least one connecting element 9, 9a which is associated with the side of the enclosure 2, 2a which lies opposite with respect to the opening 5, 5a and can engage the piece of furniture in order to fix the device to the piece of furniture.

[0020] More particularly, the enclosure 2, 2a preferably is substantially cylindrical or frustum-shaped and tapers toward its end face designed to be fixed to the base or foot 30 of the piece of furniture, and can be associated, by means of an end face or upper end face 10, 10a thereof, with the base or foot 30 of the piece of furniture. The receptacle 3, 3a preferably has a substantially cylindrical shape and is defined coaxially in the enclosure 2, 2a. The opening 5, 5 a is defined at the other end face or lower end face of the enclosure 2, 2a, which lies opposite with respect to the upper end face 10,10a.

[0021] The resting element 4, 4a can slide axially in the receptacle 3, 3a and the elastic means 6, 6a, 6b comprise a spring which is interposed between the resting element 4, 4a and the upper end face 10, 10a of the enclosure 2, 2a.

[0022] The lower end face of the enclosure 2, 2a has an inner rim 12, 12a which surrounds the opening 5, 5a and defines a stop element, directed toward the inside of the receptacle 3, 3a, for a shoulder 13, 13a which is provided on the resting element 4, 4a in order to retain the resting element 4, 4a within the enclosure 2, 2a in contrast with the action applied by the elastic means 6, 6a, 6b.

[0023] The connecting element 9, 9a is constituted preferably by a self-tapping screw 14, 14a, which is accommodated with its head in the receptacle 3, 3a of the enclosure 2, 2a and passes, with its threaded stem, through a hole 15, 15a which is defined in the upper end face 10, 10a of the enclosure 2, 2a, preferably at the center of said upper end face 10, 10a.

[0024] The hole 15, 15a and the passage 7, 7a defined in the resting element 4, 4a are conveniently aligned one another so that the head of the screw 14, 14a faces the passage 7, 7a, as will become better apparent hereinafter.

[0025] Preferably, the hole 15, 15a and the passage 7, 7a are aligned one another and are coaxial to the re-

ceptacle 3, 3a.

[0026] The resting element 4, 4a, in the static position, is completely retracted into the enclosure 2, 2a so that the piece of furniture rests on the floor by means of the enclosure 2, 2a.

[0027] The elastic means 6, 6a, as shown in Figures 1 to 12, are constituted preferably by a conical spiral spring 11, 11 a, which is connected, with its end located at the apex of the cone, to the head of the screw 14, 14a and rests, with its other end located at the base of the cone, against the side of the resting element 4, 4a that is directed toward the inside of the receptacle 3, 3a.

[0028] More particularly, the spring 11, 11a is interposed between the head of the screw 14, 14a and a washer 16, 16a which rests against the side of the upper end face 10, 10a of the enclosure 2, 2a that is directed toward the inside of the receptacle 3, 3a.

[0029] The inner rim 12, 12a of the lower end face of the enclosure 2, 2a conveniently has discontinuities 17, 17a in order to facilitate the insertion of the resting element 4, 4a in the receptacle 3, 3a during the assembly of the device according to the invention.

[0030] In the first embodiment, shown in Figures 1 to 6, the resting element 4 is substantially shaped like a dome 18, in which the top of the dome 18 is directed toward the opening 5 and is designed to rest on the floor. The passage 7 is defined at the top of the dome 18.

[0031] The resting element 4 has a peripheral edge which protrudes laterally from the base of the dome and defines the shoulder 13, which faces the side of the inner rim 12 which is directed toward the inside of the receptacle 3.

[0032] In the second embodiment, shown in Figures 7 to 12, the resting element 4a comprises a disk-like element 18a, which is arranged coaxially within the receptacle 3a and is covered, on its face directed toward the opening 5a, with a felt 19a or the like designed to rest on the floor. The disk-like element 18a has a peripheral rim which defines the shoulder 13a which faces the side of the inner rim 12a which is directed toward the inside of the receptacle 3a. The passage 7a passes through both the disk-like element 18a and the felt 19a or the like.

[0033] The device in the first embodiment is designed to be used on hard stone or ceramic floors, while the device in the second embodiment is designed to be used preferably on wooden floors, such as for example parquet flooring or the like.

[0034] As shown in the variation illustrated in Figures 13 to 15, the elastic means, designated in said variation by the reference numeral 6b, can be constituted by a Belleville washer 11b, made of polycarbonate or spring steel. It should be noted that although the Belleville washer 11b has been shown for the sake of simplicity only for the first embodiment of the device as a replacement of the spiral spring 11, it can also be adopted in the second embodiment of the device as a replacement of the spiral spring 11a.

[0035] The Belleville washer 11 b is crossed centrally by a hole, by means of which the washer 11b engages the head of the screw 14 or 14a and rests with its peripheral rim against the side of the resting element 4 or 4a that is directed toward the inside of the receptacle 3 or 3a.

[0036] The other numerals of Figures 13 to 15 which relate to elements of the device that have already been described with reference to the first embodiment have been designated by the same reference numerals.

[0037] Use of the device according to the invention is as follows.

[0038] The device according to the invention can be fixed very simply and quickly to the base or foot 30 of a piece of furniture by using the self-tapping screw 14, 14a. In practice, after optionally providing, on the side of the base or of the foot 30 of the piece of furniture to be rested on the floor, a guiding hole of suitable diameter, one proceeds by screwing the screw 14, 14a into such hole by means of a screwdriver or other similar tool 8 which is inserted in the enclosure 2, 2a through the passage 7, 7a provided in the resting element 4, 4a.

[0039] It should be noted that the device according to the invention is extremely simple to apply to the piece of furniture or the like and does not substantially alter the integrity of the piece of furniture, since it requires providing, in the piece of furniture, at most a guiding hole having a small diameter, which as such does not compromise the strength of the base or foot 30 of the piece of furniture.

[0040] When the piece of furniture is not loaded, i.e., free from the weight that bears on it during its use, such as for example the weight of a person in the case of a chair or armchair or sofa, or the weight of the objects stored in the piece of furniture in the case of a piece of furniture such as a bookshelf, wardrobe, glass cupboard or the like, the spring 11, 11 a, 11b keeps the resting element 4, 4a in the movement position, i.e., so that it protrudes partially from the lower end face of the enclosure 2, 2a, as shown in Figures 5, 11 and 14. In this manner, the piece of furniture rests on the floor by means of the resting element 4, 4a, which ensures limited friction on the floor and provides elastically yielding resting, facilitating the negotiation of slight differences in level and making it considerably easier to move the piece of furniture along the floor.

[0041] When the weight usually provided during the use of the piece of furniture instead bears on the piece of furniture, the spring 11, 11 a, 11b is compressed by this weight, and the resting element 4, 4a passes to the static position, i.e., it retracts into the enclosure 2, 2a, as shown in Figures 6, 12 and 15. In this manner, the piece of furniture rests on the floor by means of the enclosure 2, 2a and therefore stable resting of the piece of furniture is achieved, avoiding its accidental movement.

[0042] In practice it has been found that the device according to the invention fully achieves the intended aim, since it is extremely simple to apply to pieces of furniture without substantially altering the integrity of the piece of furniture or the like.

[0043] The device thus conceived is susceptible of nu-

merous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

[0044] In practice, the materials used, as well as the dimensions, may be any according to requirements and to the state of the art.

[0045] The disclosures in Italian Patent Application No. MI2006A002380 from which this application claims priority are incorporated herein by reference.

[0046] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A device for facilitating the movement of pieces of furniture or the like, **characterized in that** it comprises an enclosure which can be associated, by means of one of its sides, with the side of the piece of furniture or the like to be directed toward the floor, said enclosure defining internally a receptacle for a resting element which protrudes, in at least one active condition, from an opening which is defined on the side of said enclosure which lies opposite with respect to the side which can be associated with the piece of furniture, said resting element being movable with respect to said enclosure from a movement position, in which it protrudes partially from said enclosure through said opening and constitutes an elastically yielding rest for the piece of furniture on the floor, to a static position, in which it is at least partially retracted into said enclosure with respect to said movement position for substantially rigid resting of the piece of furniture on the floor, and vice versa, said resting element being movable from said movement position to said static position in contrast with the action of elastic means accommodated within said enclosure, said resting element being crossed by at least one passage for a tool for operating at least one connecting element, which is associated with the side of the enclosure which lies opposite said opening and can engage the piece of furniture.

2. The device according to claim 1, **characterized in that** said enclosure is substantially cylindrical or frustum-shaped and can be associated, by means of an end face or upper end face thereof, with the piece of furniture, said receptacle having a substantially cylindrical shape and being defined coaxially in said enclosure, said opening being defined at the other end face or lower end face of said enclosure which lies opposite with respect to the upper end face, said resting element being able to slide axially within said receptacle and said elastic means comprising a spring which is interposed between said resting element and the upper end face of said enclosure.

3. The device according to claims 1 and 2, **characterized in that** said lower end face of the enclosure has an inner rim which surrounds said opening and defines a stop element, which is directed toward the inside of said receptacle, for a shoulder which is provided on said resting element in order to retain said resting element in said enclosure in contrast with the action of said elastic means.

4. The device according to one or more of the preceding claims, **characterized in that** said connecting element comprises a screw which is accommodated with its head in said enclosure and passes, with its threaded stem, through a hole which is defined in the upper end face of said enclosure, said screw being engageable with the piece of furniture in order to fix said enclosure to the piece of furniture.

5. The device according to one or more of the preceding claims, **characterized in that** said hole and said passage are aligned one another.

6. The device according to one or more of the preceding claims, **characterized in that** said hole and said passage are aligned one another and are coaxial with respect to said receptacle.

7. The device according to one or more of the preceding claims, **characterized in that** said resting element, in said static position, is completely retracted into said enclosure in order to rest the piece of furniture on the floor by means of said enclosure.

8. The device according to one or more of the preceding claims, **characterized in that** said spring is constituted by a conical spiral spring which is connected, by means of its end located at the apex of the cone, to the head of said screw and rests, with its end arranged at the base of the cone, against the side of said resting element which is directed toward the inside of said receptacle.

9. The device according to one or more of the preceding claims, **characterized in that** said inner rim of the lower end face of the enclosure has discontinuities which are adapted to facilitate the insertion of said resting element in said receptacle.

10. The device according to one or more of the preceding claims, **characterized in that** said resting element is shaped substantially like a dome in which the top of the dome is directed toward said opening and is designed to rest on the floor, said resting element

having a peripheral rim which protrudes laterally from the base of the dome and defines said shoulder which faces the side of said inner rim of the lower end face of the enclosure which is directed toward the inside of said receptacle.

11. The device according to one or more of the preceding claims, **characterized in that** said resting element comprises a disk-like element which is arranged coaxially within said receptacle and is covered, on its face directed toward said opening, with a felt or the like which is designed to rest on the floor, said disk-like element having a peripheral rim which defines said shoulder which faces the side of said inner rim of the lower end face of the enclosure which is directed toward the inside of said receptacle, said passage passing through said disk-like element and said felt or the like.

12. The device according to one or more of the preceding claims, **characterized in that** said spring is constituted by a Belleville washer which is connected centrally to the head of said screw and rests, with its peripheral rim, against the side of said resting element that is directed toward the inside of said receptacle.

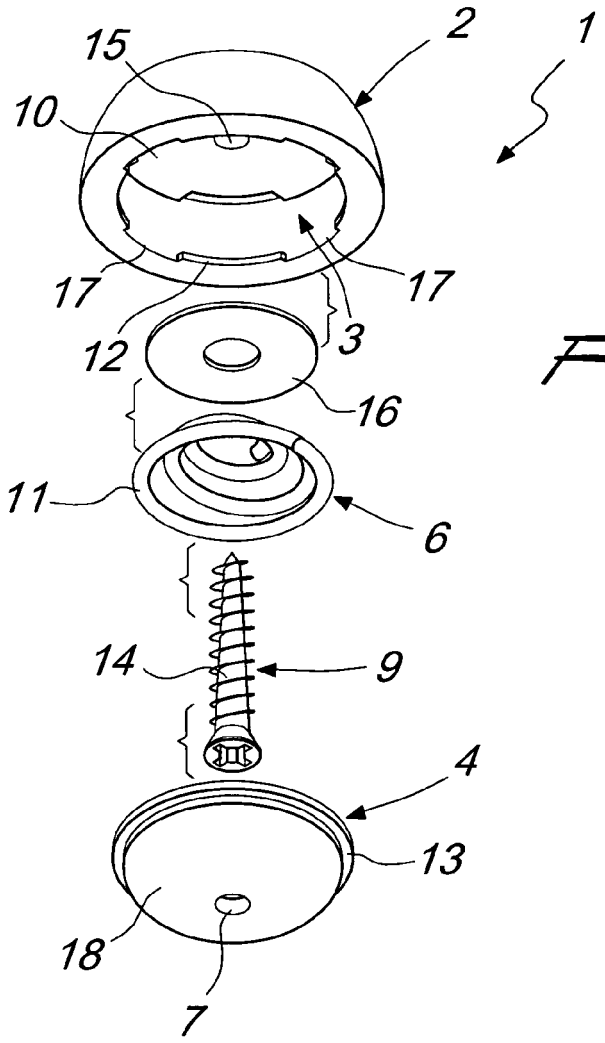

Fig. 1

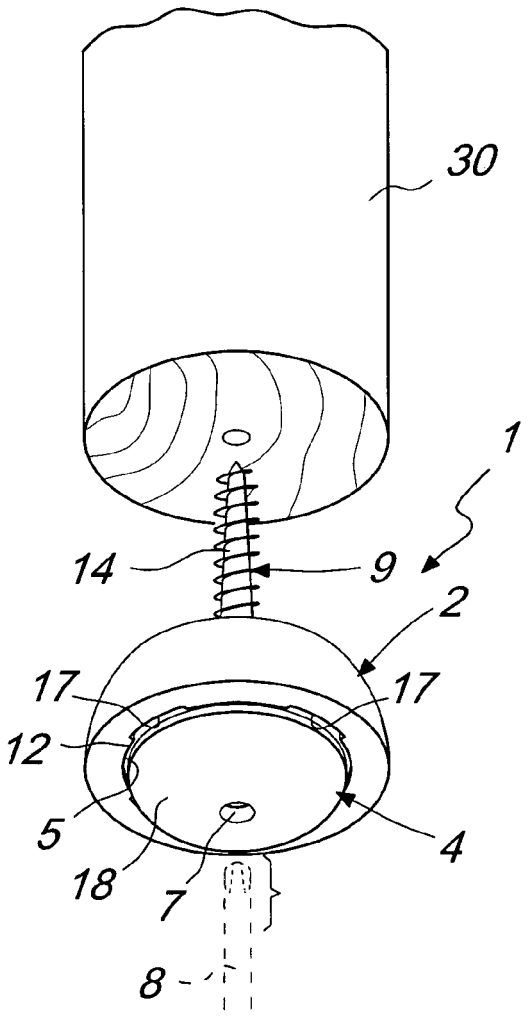

Fig. 2

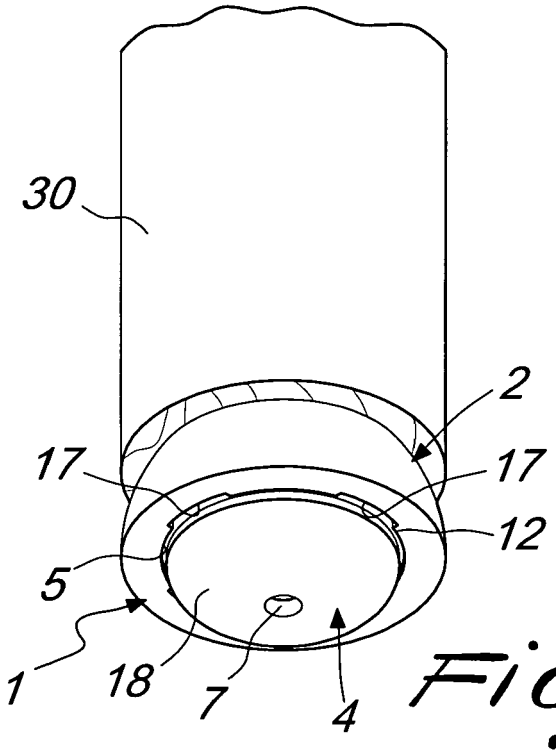

Fig. 3

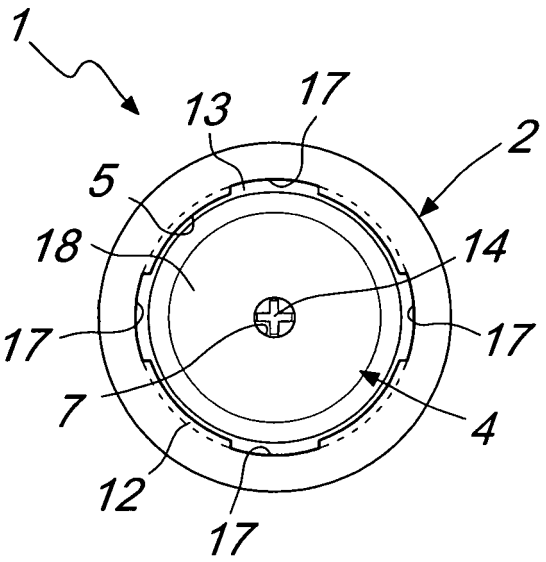

Fig. 4

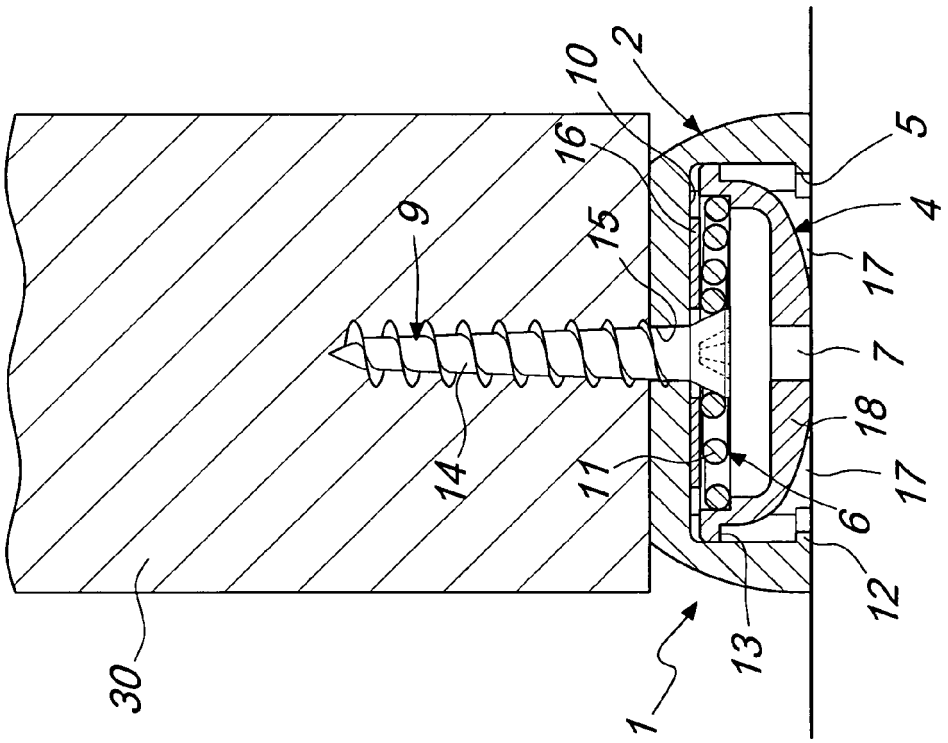
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Fig. 6

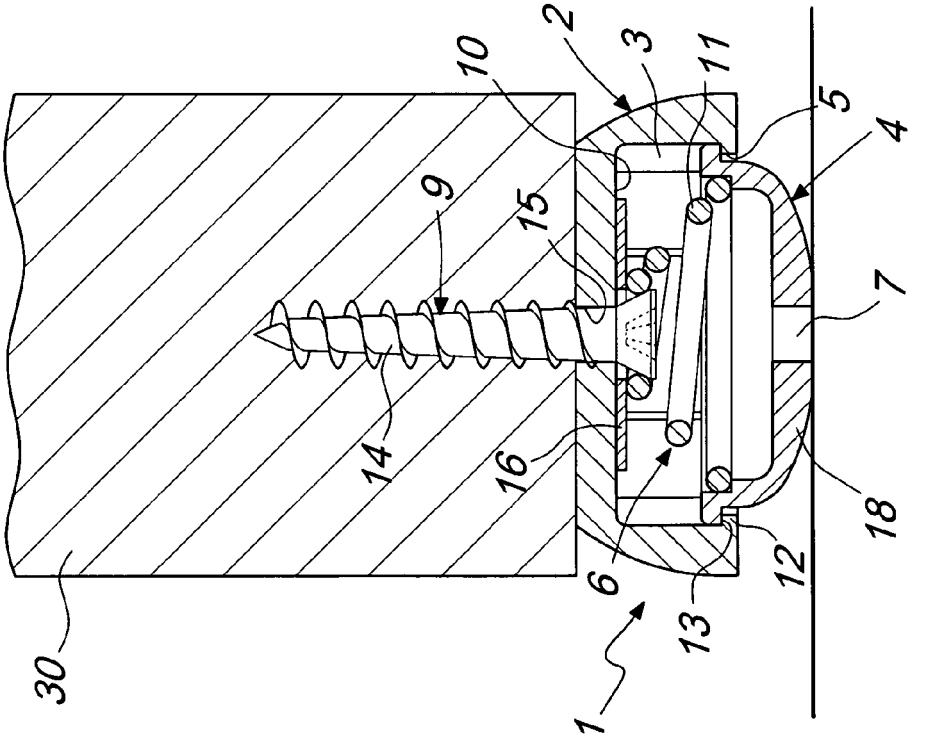
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Fig. 5

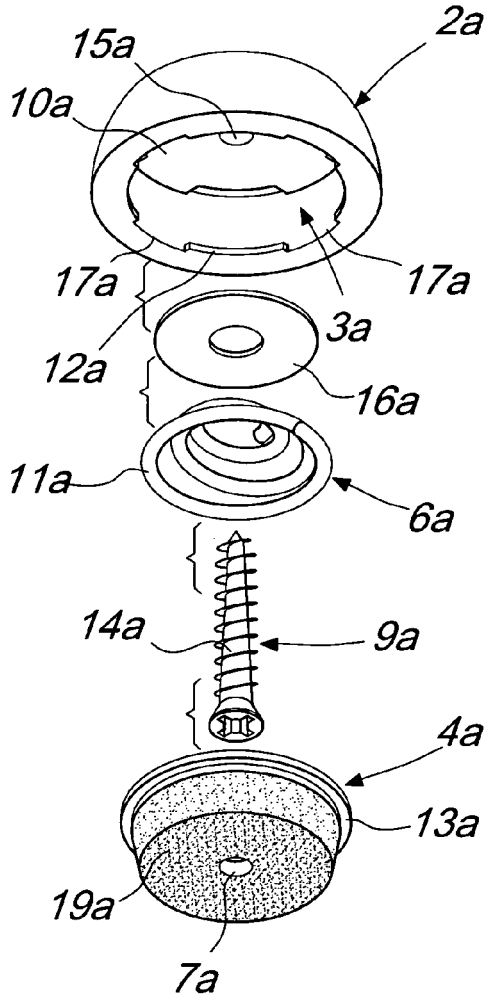
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Fig. 7

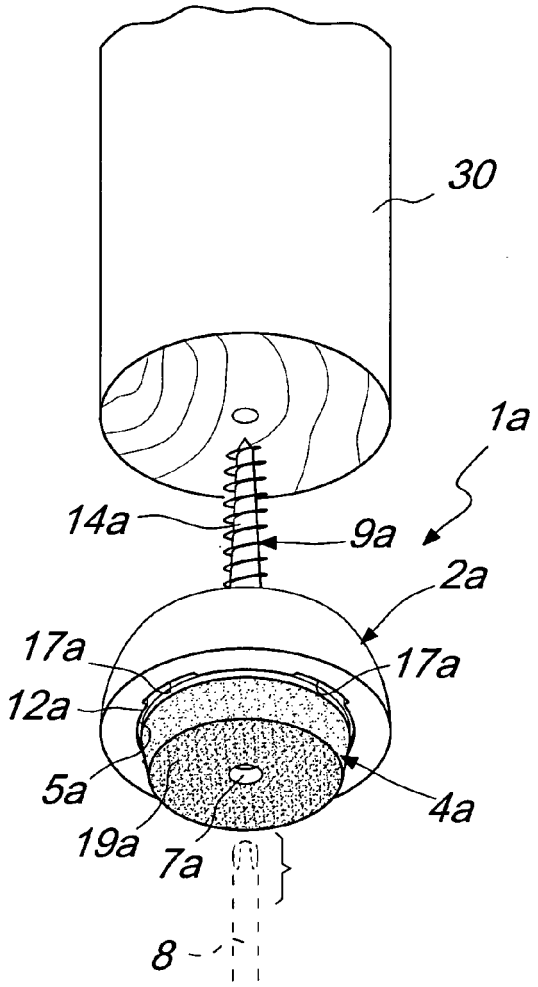
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Fig. 8

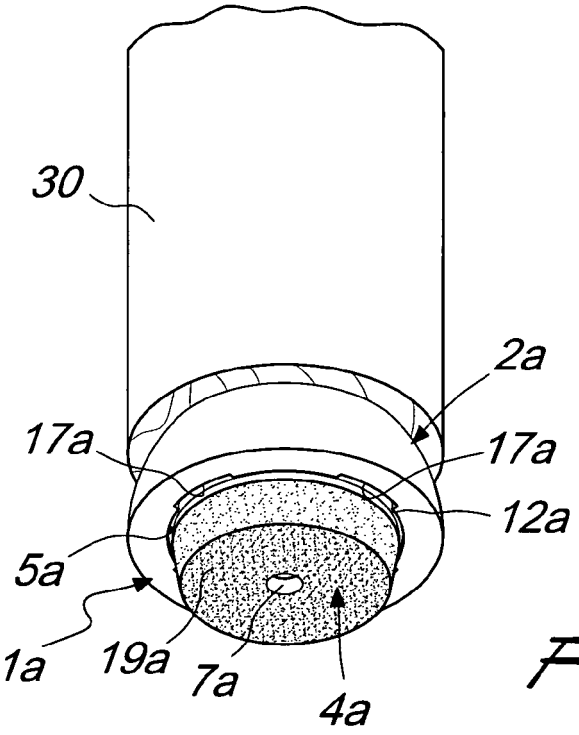
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Fig. 9

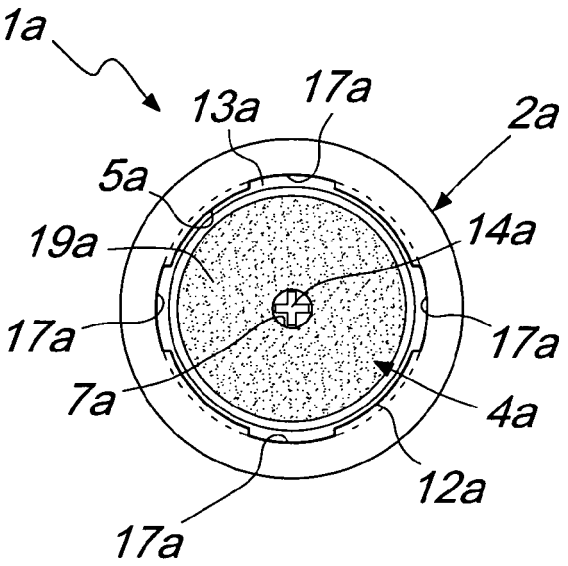
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Fig. 10

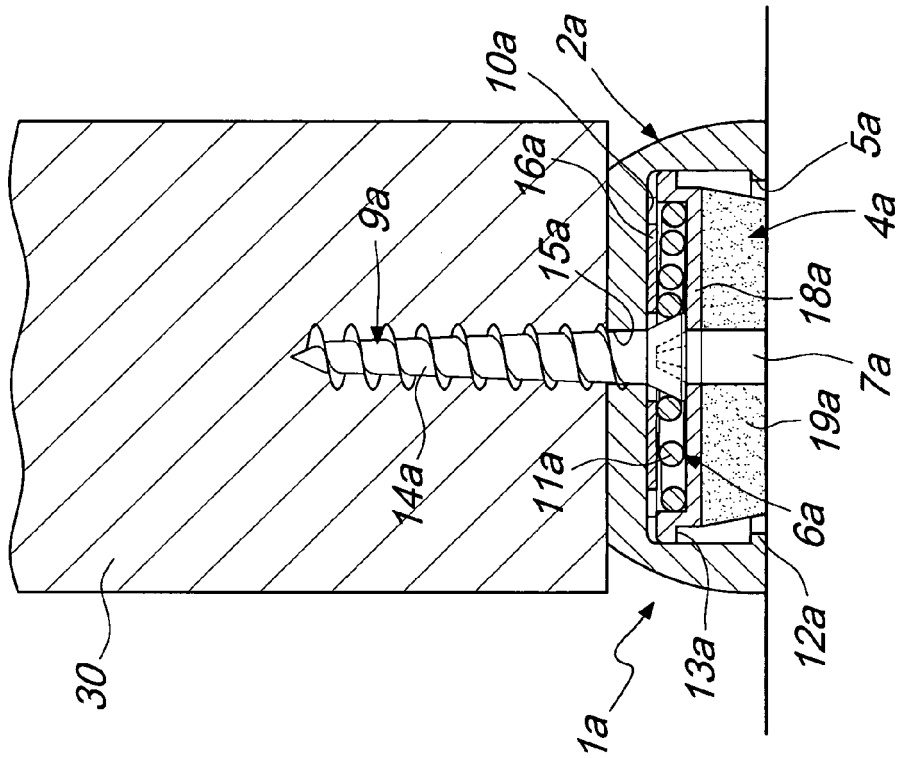
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Fig. 12

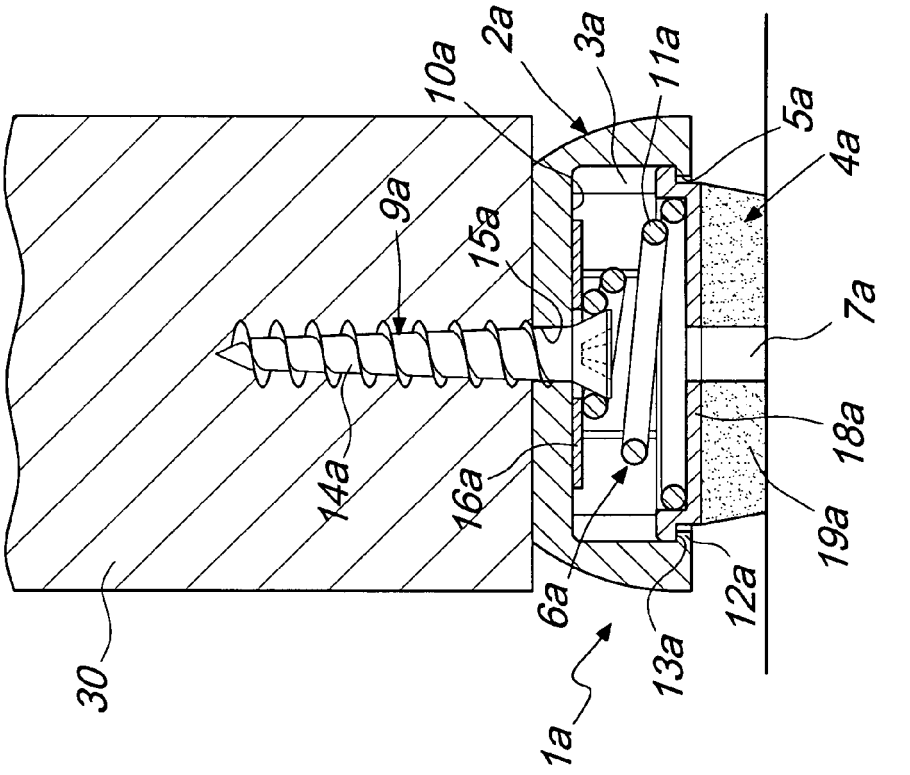
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Fig. 11

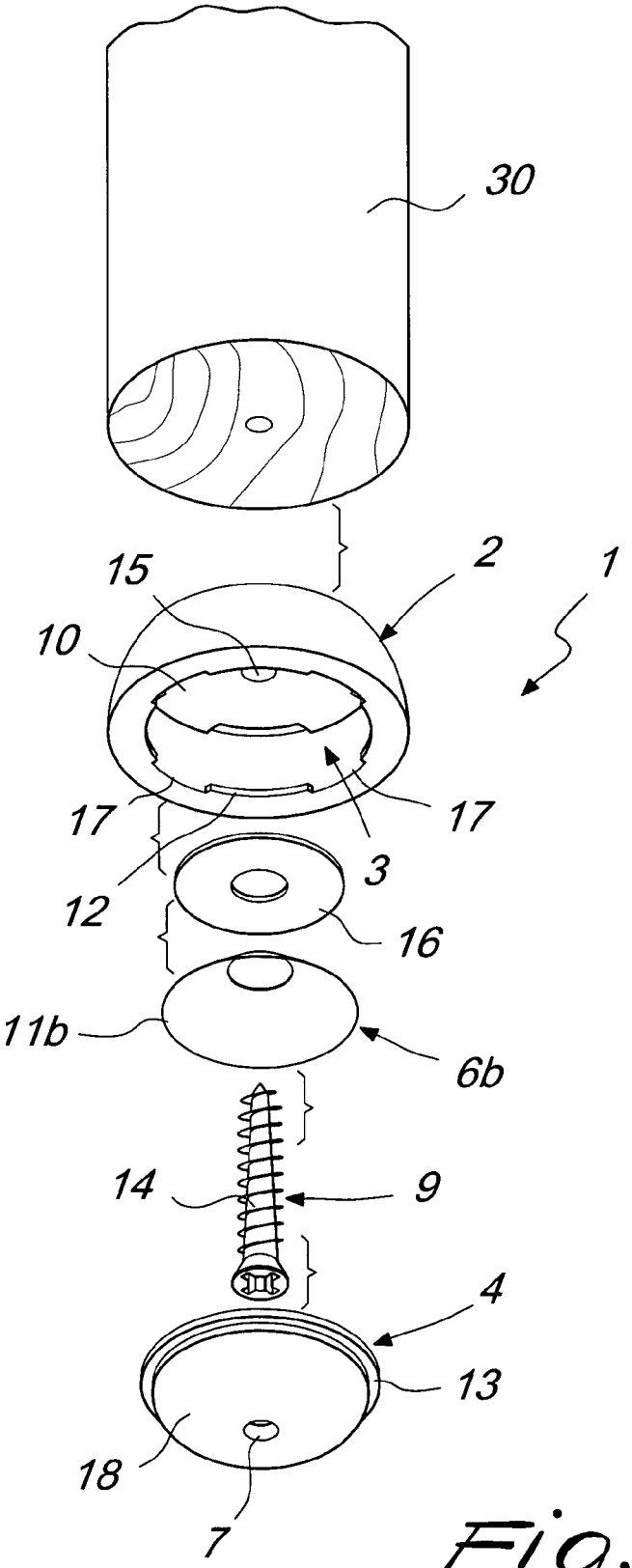

Fig. 13

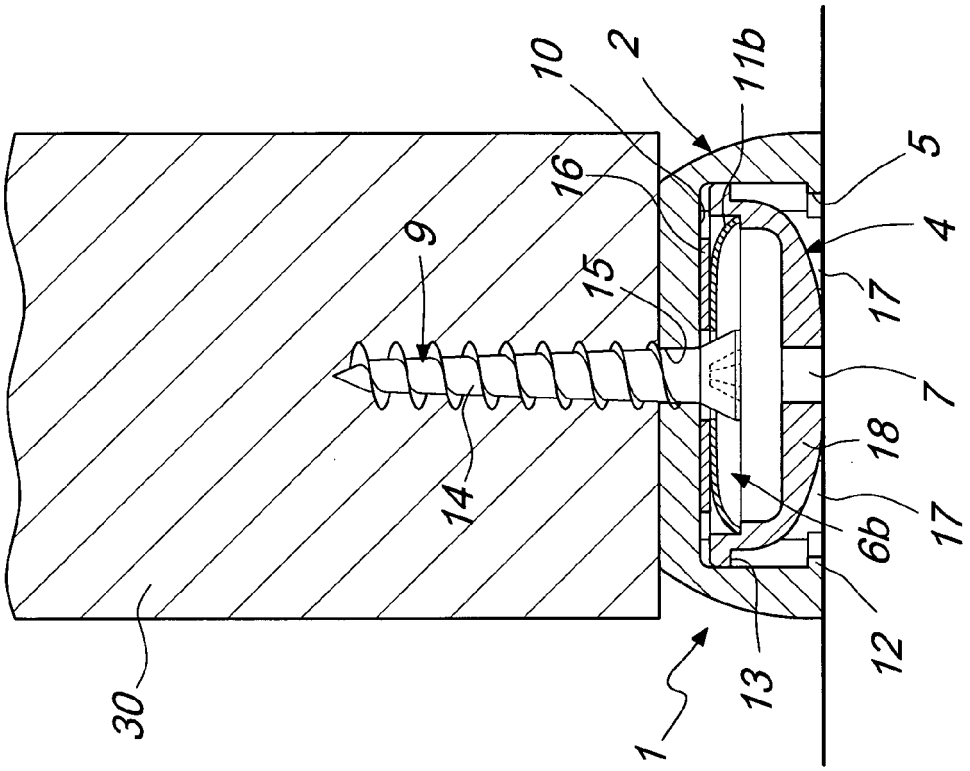
10
2
11b
16
5
4
9
15
17
7
18
14
6b
17
30
12
13
1

Fig. 15

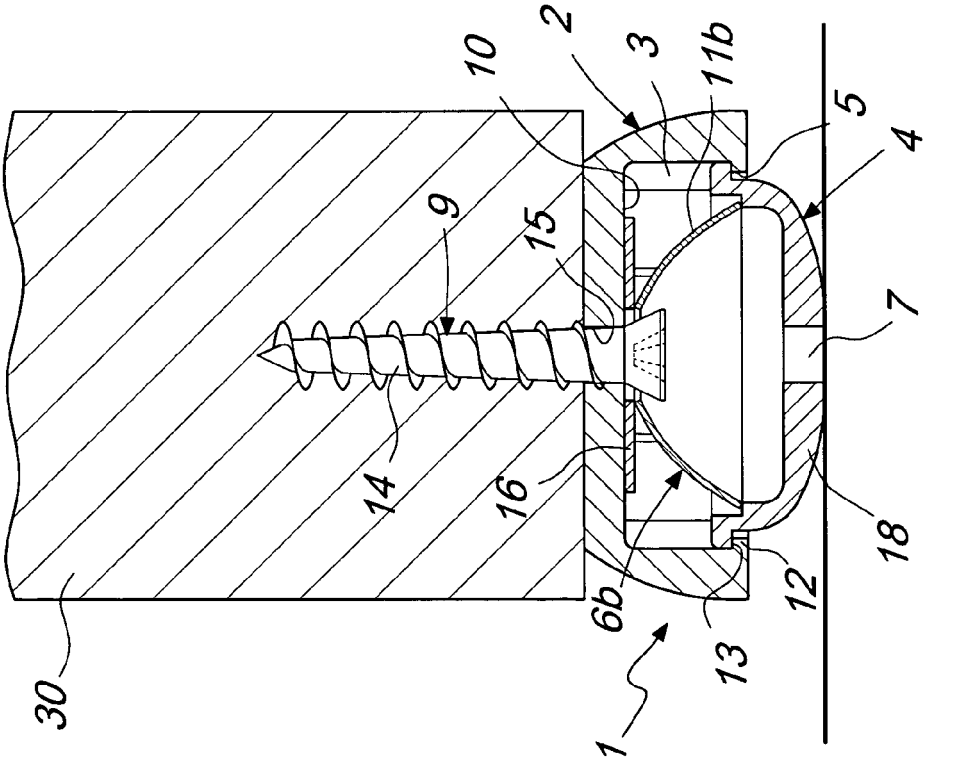
10
2
3
11b
5
4
9
15
7
14
16
18
6b
12
13
30
1

Fig. 14

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 02 3048

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	DE 432 992 C (JOSEF MICKL; FRANZ MANNSBARTH; JOSEF LABUT; ROBERT ALT & CO FA) 23 August 1926 (1926-08-23) * the whole document *	1-6,10	INV. A47B91/04
X	DE 31 35 296 A1 (ERNST HANS HELLMUT) 24 March 1983 (1983-03-24) * abstract; figure 6 * * page 6, paragraph 1 *	1,2	
A	US 2 055 715 A (EDWARD BARKER CHARLES) 29 September 1936 (1936-09-29) * the whole document *	1-12	

TECHNICAL FIELDS SEARCHED (IPC)

A47B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	3 April 2008	Jones, Clive

CATEGORY OF CITED DOCUMENTS

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03-04-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 432992 C	23-08-1926	NONE	
DE 3135296 A1	24-03-1983	NONE	
US 2055715 A	29-09-1936	NONE	

REFERENCES CITED IN THE DESCRIPTION

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