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(54) **Panel for an elevated floor and panel lifter associated therewith**

(57) There is proposed a panel (10) for an elevated floor and a panel lifter (16) associated therewith. The panel (10) comprises a socket (24) with stop flange (26) and a first locking means inside. This socket is inserted in a through hole (28) of the panel (10), so that the stop

flange bears (26) on the lower side (14) of the panel (10). The panel lifter (16) comprises a second locking means which is capable of being engaged into the socket (24) so as to cooperate with the first locking means to form a mechanical connection which allows lifting of the panel (10).

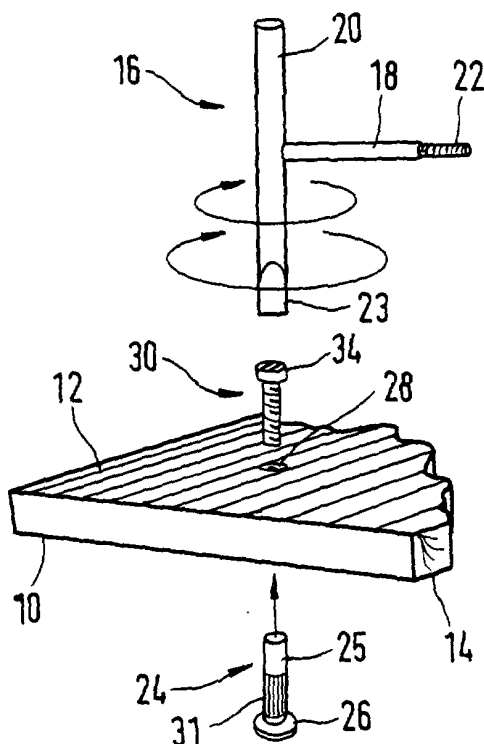


Fig.2

Description

Field of the invention

[0001] The present invention generally relates to a panel for an elevated floor and a panel lifter associated therewith.

Background of the invention

[0002] An elevated floor assembly basically consists of floor panels supported above the base floor by pedestals. The pedestals are normally located so as to provide support at panel corners. The pedestals may be supplemented by horizontal stringer members, which form a grid to provide support along the panel sides.

[0003] Elevated floors are used in rooms where substantial numbers of cables, pipes or ducts are required and where it is desirable to maintain accessibility of the latter for ease of installation, change or removal. Cables, pipes or even air conditioning services are thus installed between the base floor and the elevated floor and are accessible by removing panels where needed.

[0004] As the panels are generally contiguously assembled, only their upper side is accessible. Hence, removal of the panels is normally carried out by means of panel lifters employing suction cups, which are relatively voluminous and expensive. Moreover, in order to obtain an efficient depression between the suction cup and panel upper side, the latter must have a very smooth and even upper side. Panels may thus become more difficult to lift due to the wearing of the upper side with time. It also implies that ribbed panels cannot be lifted with such panel lifters. Furthermore, fireproof panels or steel-encapsulated panels can weigh up to 20 kg/panel, which increases the difficulties of lifting panels by means of suction cups.

Object of the invention

[0005] Hence, there is a need for a simple system for lifting panels.

Summary of the invention

[0006] The present invention proposes a panel for an elevated floor and a panel lifter associated therewith. The panel has an upper side and a lower side, as well as a through hole extending from one side to the other. It shall be appreciated that a socket with stop flange is inserted into the through hole so that the stop flange bears on the lower side. This socket has therein a first locking means. It shall further be appreciated that the panel lifter comprises a second locking means which is capable of being engaged into the socket so as to cooperate with the first locking means to form a mechanical connection which allows to lift the panel. Hence, to lift such a panel from an elevated floor assembly it suf-

fices to engage the second locking means into the socket to form the mechanical connection and then to exert an essentially upward force. The removal of the panel is thus very rapid and easy. The principal advantages of the invention are simplicity and flexibility. Indeed, the socket can be fitted in a through hole in various types of panels, even with rough or uneven surfaces, in order to obtain a panel which can be lifted with the associated panel lifter. It will be appreciated that the stop flange supports the weight of the panel when it is lifted by means of the panel lifter. Finally, it shall be noted that the cross-sections of through hole and socket may be relatively small, e.g. from 20 to 200 mm². Hence, their presence in the panel does not significantly disturb the continuity of the panel surface.

[0007] In a first embodiment, the first locking means is an inner thread in the socket. The panel lifter comprises a rod capable of being engaged into the socket and the second locking means is an outer thread on this rod, which can be screwed into the inner thread. It is thus possible to easily form a strong mechanical connection between the panel and the panel lifter.

[0008] In an alternative embodiment, the first locking means is a first bayonet means in the socket. The panel lifter comprises a rod capable of being engaged into the socket and the second locking means is a second bayonet means on this rod, which cooperates with the first bayonet means in the socket.

[0009] Preferably, the socket has a length that is inferior to the thickness of the panel and a closing element obturates the through hole above the socket. This closing element prevents foreign bodies from entering the socket, which would hinder the engagement of the second locking means. The through hole preferably has an enlarged cross-section above the socket, so that a closing element can have a greater cross-section than the socket to fully cover the latter. Furthermore, the closing element should completely fit inside this enlarged cross-section and not stick out on the upper side of the panel.

When the first locking means of the socket is an inner thread, the closing element is advantageously a screw which is screwed into this inner thread. This screw advantageously has a cylindrical head fitting into the enlarged cross section of the through hole. When the first locking means of the socket is a first bayonet means, the closing element advantageously engages the first bayonet means.

[0010] To fix the socket in the through hole, the socket is preferably provided with blocking ribs on its outer surface.

[0011] In a very handy and simple embodiment, the panel lifter comprises a rod and a handle, which is perpendicularly mounted to one end of this rod. The second locking means is arranged at the other end of the rod.

[0012] When the socket is located in a peripheral region of the panel, the force required to lift the panel is smaller, as the latter can be pivoted about a distal edge which rests on the structure of the floor assembly.

[0013] It remains to be noted that in an elevated floor assembly, all panels do not need to be removable by means of the panel lifter. Indeed, when one panel has been removed, the adjacent panels can be removed as they can be pushed up from below, i.e. from their lower side. Accordingly it suffices that e.g. every fifth panel be removable by means of the panel lifter. The present invention thus provides a simple, cheap and flexible system of panel and panel lifter.

Brief description of the drawings

[0014] The present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig.1: is a three-dimensional view showing the drilling of a stepped through hole in an panel for an elevated floor, before insertion of the socket;

Fig.2: is a three-dimensional view showing the insertion of the socket in the panel of Fig.1, thereby obtaining an panel which can be lifted by means of the panel lifter;

Fig.3: is a three-dimensional view showing the engagement of the panel lifter in the panel of Fig. 2;

Fig.4: is a three-dimensional view showing the lifting of the panel of Fig.3 by means of the panel lifter.

Detailed description of a preferred embodiment

[0015] An elevated floor assembly basically consists of floor panels supported above the base floor by pedestals, which are normally located so as to provide support at panel corners. The pedestals may be supplemented by horizontal stringer members, which form a grid to provide support along the panel sides. Hence, there is an intermediate chamber between the base floor and the elevated floor, which allows for accommodation of a variety of cables, pipes or ducts or even air conditioning services.

[0016] The big interest of such an elevated floor assembly is that it permits the installation of a variety of cables and services in the intermediate chamber formed between the base floor and the elevated floor—which is also advantageous with respect to safety and aesthetics—while however allowing accessibility to these cables and services by removing the panels where needed.

[0017] In Fig. 1 a panel 10 for an elevated floor is partially represented. This panel 10 has an upper side 12 and an opposite lower side 14. It is generally made of agglomerated wood or—if it has to be fireproof—of a mineral material and may be steel-encapsulated. It will be appreciated that the weight of such a fireproof panel of 60 cm x 60 cm may exceed 20 kg.

[0018] In Fig.2, reference sign 16 indicates a panel lifter which comprises a rod 18 provided at one end with a perpendicularly mounted handle 20. At the other end of the rod 18 an outer thread 22, which represents a lifter locking means, is arranged. In this handy embodiment of the panel lifter 16, one end of the handle is formed as a screwdriver, as indicated by reference sign 23.

[0019] In order to be able to lift the panel 10 with the panel lifter 16, the panel 10 has to be equipped with a socket, indicated generally by reference sign 24 in Fig. 2. This socket 24 has a cylindrical shaft 25 and is provided with a stop flange 26 at its lower end. As seen on Fig.2, this stop flange 26 preferably forms a collar surrounding the cylindrical shaft 25. To be able to insert the socket 24 in the panel 10, a through hole 28 having preferably a cross-section substantially equal to that of the shaft 25 is drilled in the panel 10 by means of a drilling machine 30, as shown in Fig.1. The socket 24 is then inserted from the lower side 14 into the through hole 28 so that the stop flange 26 bears on the lower side 14 of the panel 10. To fix the socket 24 in the through hole 28, the shaft 25 is provided on its outer surface with blocking ribs 31. The socket 24 has an inner thread (not shown) therein, which represents a panel locking means which is capable of cooperating with the lifter locking means. It shall be appreciated that the outer thread 22 on the rod 18 of the panel lifter 16 is capable of being engaged into the socket 24 and screwed in the inner thread to form a mechanical connection, as will be explained later.

[0020] In the present embodiment, the socket 24 has a length that is inferior to the thickness of the panel 10. Hence there is a gap above the socket 24, which is advantageously filled by a closing member to protect the socket 24. As shown on Fig. 2, such a closing member is advantageously formed by a screw 30, which is screwed in the inner thread of the socket 24. Turning now to Fig. 1 again, it shall be noted that the drill bit 32, used for drilling the through hole 28, allows to drill stepped holes. With this drill bit 32, the through hole 28 is drilled in such a way that the portion of the through hole 28 situated above the socket 24 has an enlarged cross-section. Depth and diameter of this enlarged portion of the through hole 28 are determined so that the cylindrical head 34 of the screw 30 fits therein.

[0021] When the panel 10 is to be removed from the floor assembly, the first step is to remove the screw 30, e.g. by means of the screwdriver 23. Then the rod 18 of the panel lifter 16 is engaged into the socket 24 and the outer thread 22 screwed in the inner thread, as suggested by Fig.3, to form a solid mechanical connection. Finally, the panel 10 is lifted from the elevated floor assembly by exerting an essentially upward force on the panel lifter 16, as shown in Fig.4.

[0022] Such a panel 10 equipped with a socket 24 can thus easily be removed, by means of the panel lifter 16, from the elevated floor in which it assembled, in order to access the intermediate chamber—between the base floor and the elevated floor—for installing, replac-

ing or servicing cables, ducts or services therein.

[0023] It will be understood that the great advantages of the present invention, which are simplicity and flexibility, are mainly provided by the socket 24. The latter can be easily inserted in any kind of panel. The stop flange 26 of the socket 24 is capable of transmitting an important lifting force to the panel 10 without damaging the latter, so that even very heavy panels may be removed without any difficulties.

[0024] As can be seen on Fig.4, the socket 24 is advantageously located in a peripheral region of the panel 10. Hence, to remove the panel 10 it is not necessary to raise it horizontally, but it can be pivoted about a distal edge, which rests on the structure of the floor assembly. The force required for removing the panel 10 is thus smaller.

Claims

1. Panel for an elevated floor and panel lifter associated therewith, said panel (10) having an upper side (12) and an opposite lower side (14), **characterized in that**

said panel (10) comprises a socket (24) with stop flange (26) that is inserted in a through hole (28) of said panel (10) so that said stop flange (26) bears on said lower side (14), said socket (24) having therein a first locking means, and

said panel lifter (16) comprises a second locking means which is capable of being engaged into said socket (24) so as to cooperate with said first locking means to form a mechanical connection which allows lifting of the panel (10).

2. Panel for an elevated floor and panel lifter according to claim 1, **characterized in that** said first locking means is an inner thread in said socket, **in that** said panel lifter (16) comprises a rod (18) capable of being engaged into said socket (24), and **in that** said second locking means is an outer thread (22) on said rod (18), which can be screwed into said inner thread.

3. Panel for an elevated floor and panel lifter according to claim 1 or 2, **characterized in that** said socket (24) has a length that is inferior to the thickness of said panel (10), wherein a closing element obturates said through hole (28) above said socket (24).

4. Panel for an elevated floor and panel lifter according to claim 3, **characterized in that** said through hole (28) has an enlarged cross section above said socket (24).

5. Panel for an elevated floor and panel lifter according to claims 2 and 4, **characterized in that** said closing element is a screw (30) being screwed into said

inner thread in said socket (24), wherein said screw (30) has a cylindrical head (34) fitting into said enlarged cross section of said through hole (28).

6. Panel for an elevated floor and panel lifter according to claim 1, **characterized in that** said first locking means is a first bayonet means in said socket, **in that** said panel lifter comprises a rod capable of being engaged into said socket, and **in that** said second locking means is a second bayonet means on said rod.

7. Panel for an elevated floor and panel lifter according to claims 4 and 6, **characterized in that** said closing element engages said first bayonet means in said socket, wherein said closing element has a cylindrical head fitting into said enlarged cross section of said through hole.

8. Panel for an elevated floor and panel lifter according to any one of the preceding claims, **characterized in that** said panel lifter (16) comprises a rod (18) and a handle (20) perpendicularly mounted to one end of said rod (18), wherein said second locking means is arranged at the other end of said rod (18).

9. Panel for an elevated floor and panel lifter according to any one of the preceding claims, **characterized in that** said socket (24) is located in a peripheral region of said panel (10).

10. Panel for an elevated floor and panel lifter according to any one of the preceding claims, **characterized in that** said socket (24) has blocking ribs (31) on its outer surface.

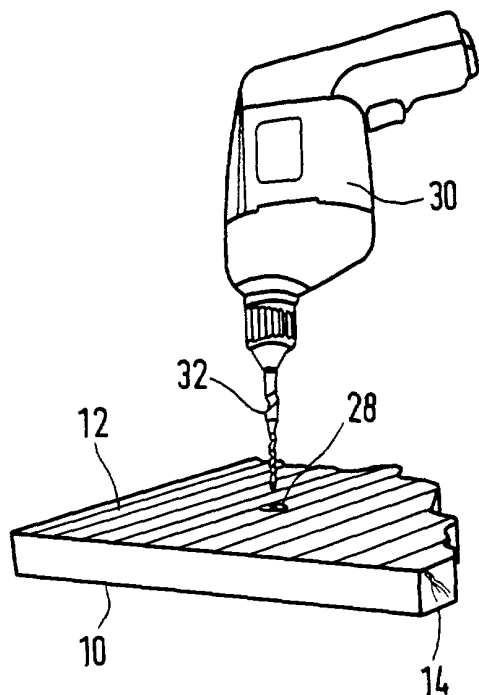


Fig.1

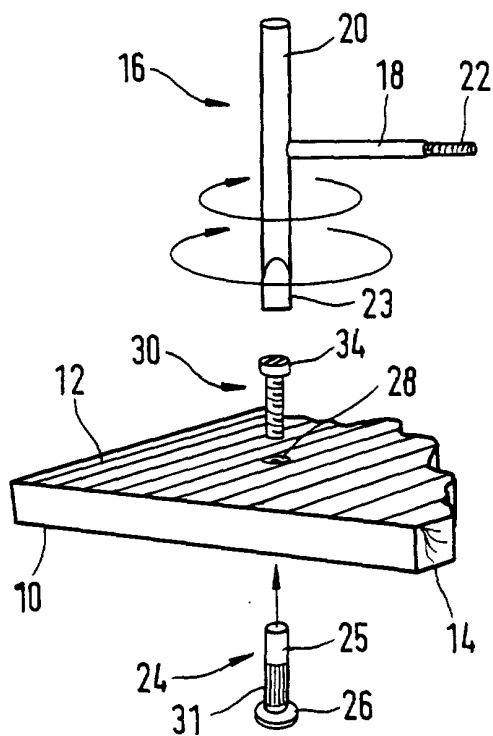


Fig.2

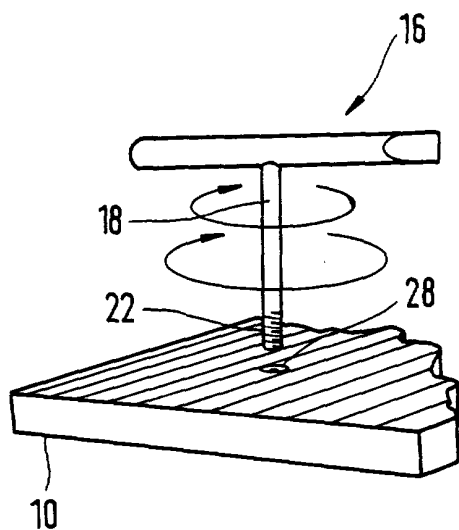


Fig.3

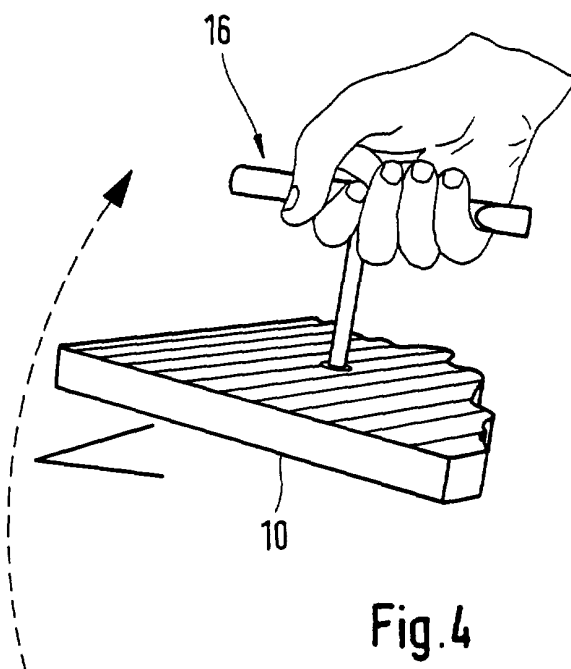


Fig.4



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 11 8329

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		6 November 2001	Ayiter, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04001)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 01 11 8329

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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