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(54) **CLAMPING ARRANGEMENT FOR A PLATE-SHAPED BODY**

(57) A clamping arrangement for clamping a plate-shaped body, such as a glass plate, is described. The clamping arrangement comprises a profile which is composed of profile parts which are in separable from each other and between them there is an opening for the plate-shaped body, and two pressure elements each on opposite sides of the introduced plate-shaped body, against

the profile parts in the opening for support. At least one of the two profile parts is equipped with one or more clamping organs, which exercise clamping force on the corresponding pressure element and the plate-shaped body. In this way, there is an improved, adjustable, but still solid clamping arrangement for plate-shaped bodies.

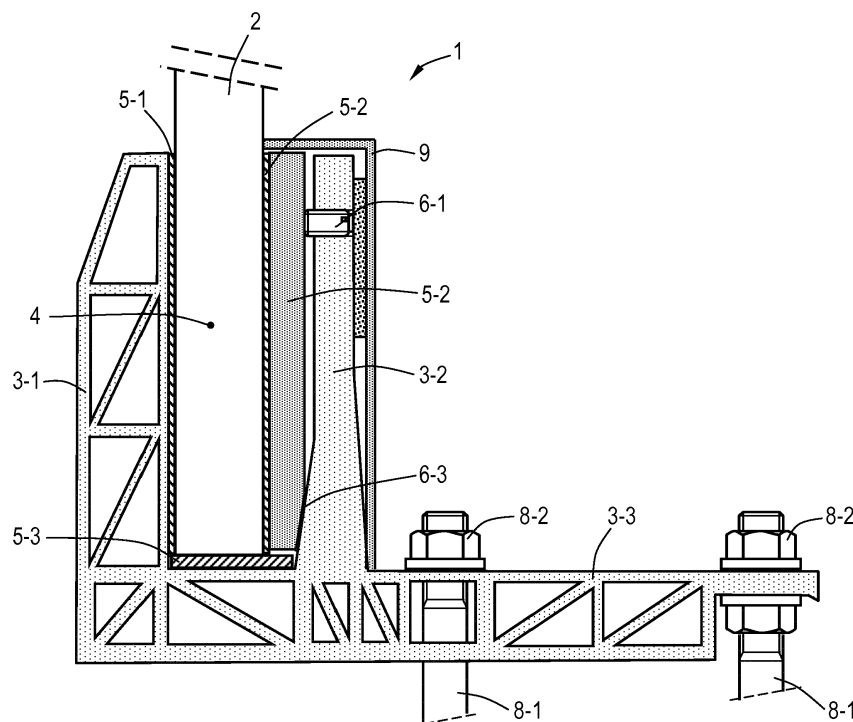


Fig.2

Description

[0001] This present invention concerns a clamping arrangement for clamping a plate-shaped body, for example, a glass plate.

[0002] Such a clamping arrangement has meanwhile become generally known. The problem with the known clamping arrangements is that the set-up, in practice, is often a vertical set up and the possible readjustment after setting and assembly, if this is possible, as well as the clamped holding of the plate-shaped body, leaves to be desired.

[0003] The object of this invention is to provide an improved adjustable, but still solid clamping arrangement for plate-shaped bodies.

[0004] For this purpose, the clamping arrangement, in accordance with the invention, is characterised in that it comprises:

- a profile that is constructed from profile parts which are inseparable from each other, having between them an opening for the plate-shaped body, and
- two pressure elements each on opposite sides of the applied plate-shaped body, which elements support against the profile parts in the opening,

wherein at least one of the two profile parts is equipped with one or more clamping organs, which exercise a clamping force on the corresponding pressure element and the plate-shaped body.

[0005] The advantage of clamping arrangement according to the invention is that for the benefit of good stability of the clamping arrangement, it is assumed that the profile parts are inseparable from each other and connected to the profile of the clamping arrangement, and, in this way intrinsically solid, which border the opening in which the plate-shaped body is located. The body is fixed in the opening while it is located therein between the pressure elements on opposite sides which support the fixed profile parts. Setting the clamping force, and also of the often vertical position or angle of the solid clamped plate-shaped body takes place by means of at least one clamping organ applied in or onto both profile parts.

[0006] In possible embodiments of the clamping arrangement, one or more of the clamping organs are constructed as clamping organs which produce an adjustable clamping force. Advantageously the clamping organs are constructed as adjustable clamping organs, but the clamping organs may also be constructed as fixed organs. As an example of such a fixed organ, an inclined clamping surface is mentioned here, which supports or forms an integral part of one or both profile parts. There, one wedge-shaped constructed part of the pressure element which operates at the bottom of the opening makes frictional contact with the inclined clamp surface, as a result of which the plate-shaped body is clamped in fixed position.

[0007] A further embodiment of the clamping arrangement is characterised in that at least the pressure element not equipped with clamping organs has a side facing its pressure element which side exhibits a convexity.

[0008] The advantage of the application of such a convexity is that by means of the pressing clamping organs on the other side of the plate-shaped body, it is possible to affect the degree of clamping and the current position or angle of the plate-shaped body which is clamped in the opening.

[0009] Further detailed possible embodiments which are applied separately are mentioned together with the examples related thereto in the following description.

[0010] At least, the clamping arrangement, according to this invention, will be further explained based of the following figures, in which corresponding parts are labeled with the same reference numbers. Thereby:

Figure 1 shows a first embodiment of the clamping arrangement according to the invention; and
Figure 2 shows a second embodiment of the clamping arrangement according to the invention.

[0011] Figures 1 and 2 each show a clamping arrangement 1 which is suitable for clamping a plate-shaped body 2. The plate-shaped body 2 may be a glass, metal, or plastic plate. In the case of a glass plate, it can be considered, as being or not being composed of multiple layers, possibly toughened glass, including, among other things, such as used in a fence or railing along hand rails, balconies, stairs, etc. Therein, for safety reasons, reduced back-lash clamping of the plate-shaped body 2 is of great importance. After all, a small clearance at the clamping side, usually the bottom, of the body 2 already leads to a swing which is observable and experienced by users to be unsafe, or greater clearance on its opposite, upper, unclamped side. The plate-shaped body 2 comprises a profile 3 which is constructed from profile parts which are inseparable from each other 3-1, 3-2 having there between an opening 4 for introducing the plate-shaped body 2 therein. Also, the clamping arrangement 1 comprises two supporting pressure elements 5-1, 5-2, each on opposite sides of the introduced plate-shaped body 2, against the profile parts 3-1, 3-2 in the opening 4. At least one of the two profile parts 3-1, 3-2 is equipped with one or more clamping organs, a clamping force on the pressure elements concerned 5-1, 5-2, and thus exercised on the plate-shaped body 2, to be further explained hereinafter as clamping organs 6-1, 6-2, 6-3; also referred to as 6.

[0012] The pressure elements 5-1, 5-2, as shown in both figures are flat, somewhat flexible elements which are at least applied on opposite sides of the plate-shaped body 2 in the opening 4. By means of the pressure elements 5-1 and 5-2, clamp force exerted by the various clamping organs 6 on the body 2 is spread over a larger area of the part of the body 2, which is located in the opening 4. Preferably, the lower, or short side of the

clamped part of the body 2 is supported by a supporting part 5-3, whereby the pressure part concerned, in this case 5-1, is L-shaped. The supporting part 5-3 can form a whole with the pressure element 5-1.

[0013] Figure 1 shows a construction of the clamping arrangement 1 in which only the profile parts 3-2 are equipped with two clamping members 6-1, 6-2, and in this case, placed above each other, each of which is constructed as a pressure clamping screw against the pressure element 5-2. The clamping screws concerned can, for this purpose, be turned from the inside, i.e. as seen from the right in the figure, in the threaded openings in the element 5-2 in order to exert an adjustable clamping force on the plate-shaped body 2. This is particularly important when the clamping arrangement is applied at the edge of a patio or balcony, the outer side of which, in particular, after the application of the plate-shaped body 2 is not easily accessible or is not accessible without tools.

[0014] In this construction it is also shown that, at least, that the side facing the pressure element 5-1 of the profile part 3-1 not equipped with clamping organs has introduced a convexity in its outer surface. Pressure elements 5-1, and the part of the body 2 located in the opening 4 can tilt subsequently to this convexity 7. The tilting takes place by turning at least one of the two clamping screws of the clamping organs 6-1 and 6-2. A symmetrical position adjustment of the body 2 occurs when the top T of the convexity 7 is located approximately at the halfway point of the height of the opening 4. In practice, the radius of curvature of the convexity is such that the clearance existing at the bottom and / or at the top of the opening 4 is approximately 1 mm to each side in relation to the vertical.

[0015] Figure 2 shows a construction of the clamping arrangement 1 in which the side facing the pressure elements 5-2 of the clamping organs 6-1, 6-3 3-2, profile part 3-2 is equipped with clamping organ 6-3 constructed as inclined clamping surface. In such a case, a projecting wedge-shaped part of the pressure element 5-2 at the bottom of opening 4 makes frictional contact with the inclined clamp surface by striking that pressure element 5-2 the foot at the bottom in opening 4 of the body 4 is moved to the left in Figure 2 and it is also clamped more firmly. When the clamping organ 6-1 which is equipped with a clamping screw is located above the inclined clamping surface of the profile part 3-2, therewith the position of the plate-shaped body 2 can be further adjusted. Also in this execution, the convexity 7 can be introduced in the side facing pressure element 5-1 of the profile part 3-1 which is not equipped with clamping organs.

[0016] This figure further shows that the profile 3 has a continuous ground profile 3-3 beyond the profile part 3-2 in which openings have been introduced in order to fix therein or thereto, respectively, adjustment bolts 8-1, or locknuts 8-2, respectively, in order to be able to anchor the clamping arrangement in one go to the surface.

Thereto, at some distance, from the profile part 3-2, a concrete floor can be molded. If desired, the upright profile part 3-2, together with the pressure element 5-2, can be covered by a corner plate 9.

[0017] As outlined above the clamping organ 6-1 may be equipped with a clamping screw located above the inclined clamping surface of the profile part 3-2. For adjustment purposes it may be desired to have a clamping screw, but then the screw will have to be accessible from the right side in the figures and need not be buried under cement or concrete. The left side may be the exposed outer side of for example a balcony, gallery or stand, which are generally not easily accessible without scaffolding. In an alternative the clamping organ may be comprise a serration or a series of serrations also for preventing the pressure element 5-2 from moving upward. Thereto the serration's ridges and valleys extend longitudinally along the preferably continuous pressure strip element 5-2, so that they can be fastened by exerting a force from above by means of for example a soft hammer. In that case the pressure element 5-2 is firmly secured and clamps the plate shape body 2, while the cement or concrete may be poured on said right side to a higher level than in cases where a clamping screw is used, without the use of the corner plate 9 being necessary. Advantage of the use of the longitudinal continuous pressure strip elements 5-1, 5-2 and 5-3 is further that complete lower part of the plate shaped body 2 is being clamped, that is on and along all its three clamped sides, thus preventing peak loads therein. For that reason separate wedges or keys are less advisable, because they tend to increase the chances of breaking the clamped plates 2.

Claims

1. Clamping arrangement for clamping a plate-shaped body comprising:

- a profile that is constructed from profile parts which are inseparable from each other, having between them an opening for the plate-shaped body, and
- two pressure elements each on opposite sides of the applied plate-shaped body, against the profile parts in the opening for support, wherein at least one of the two profile parts is equipped with one or more clamping organs, which exercise a clamping force on the corresponding pressure element and the plate-shaped body; whereby the side facing the pressure element of the profile part equipped with clamping organs has an inclined clamping surface (6-3); and whereby a projecting wedge-shaped part of the pressure element at the bottom of the opening, in the case the plate-shaped body is inserted in

the opening, makes frictional contact with the inclined clamping surface (6-3).

2. Clamping arrangement according to claim 1, **characterised in that** only one of the two profile parts is equipped with clamping organs. 5
3. Clamping arrangement according to claim 1 or 2, **characterised in that** one or more of the clamping organs are constructed as adjustable clamping force producing clamping organs. 10
4. Clamping arrangement according to one of the claims 1-3, **characterised in that** at least the pressure element not equipped with clamping organs has a side facing its pressure element which side exhibits a convexity. 15
5. Clamping arrangement according to claim 4, **characterised in that** the top of the convexity is located approximately at the halfway point of the height of the opening into which the plate-shaped body is to be introduced. 20
6. Clamping arrangement according to claim 4 or 5, **characterised in that** the radius of curvature of the convexity is such that the clearance existing at the bottom and / or at the top of the opening is approximately 1 mm. 25
7. A clamping arrangement according to one of the claims 1-6, **characterised in that** at least one of the two pressure elements has a falling supporting part up to the bottom of the short side of the plate-shaped body. 30
8. A clamping arrangement according to claim 7, **characterised in that** the at least one pressure element with the support part is L-shaped. 35
9. Clamping arrangement according to claim 7 or 8, **characterised in that** at least one pressure element forms a whole with its supporting part. 40
10. Clamping arrangement according to any one of the claims 1-9, **characterised in that** the clamping organ is located above the inclined clamping surface of the profile part. 45
11. Clamping arrangement according to one of the claims 1-10, **characterised in that** at least one clamping organ is a clamping screw. 50
12. Clamping arrangement according to one of the claims 1-11, **characterised in that** the profile has one continuous ground profile beyond at least one of the two profile parts into which openings are introduced in order to fix the clamping arrangement to 55

a surface.

13. Clamping arrangement according to claim 12, **characterised in that** the clamping arrangement is equipped in or on the opening for fixing with adjustment bolts or lock nuts.
14. Clamping arrangement according to one of the claims 1-13, **characterised in that** at least one clamping organ is embodied by a serration or a series of serrations for preventing the pressure element (5-2) from moving upward.
15. Clamping arrangement according to one of the claims 1-14, **characterised in that** at least one of the pressure elements (5-1, 5-2, 5-3) are longitudinally continuous pressure elements.

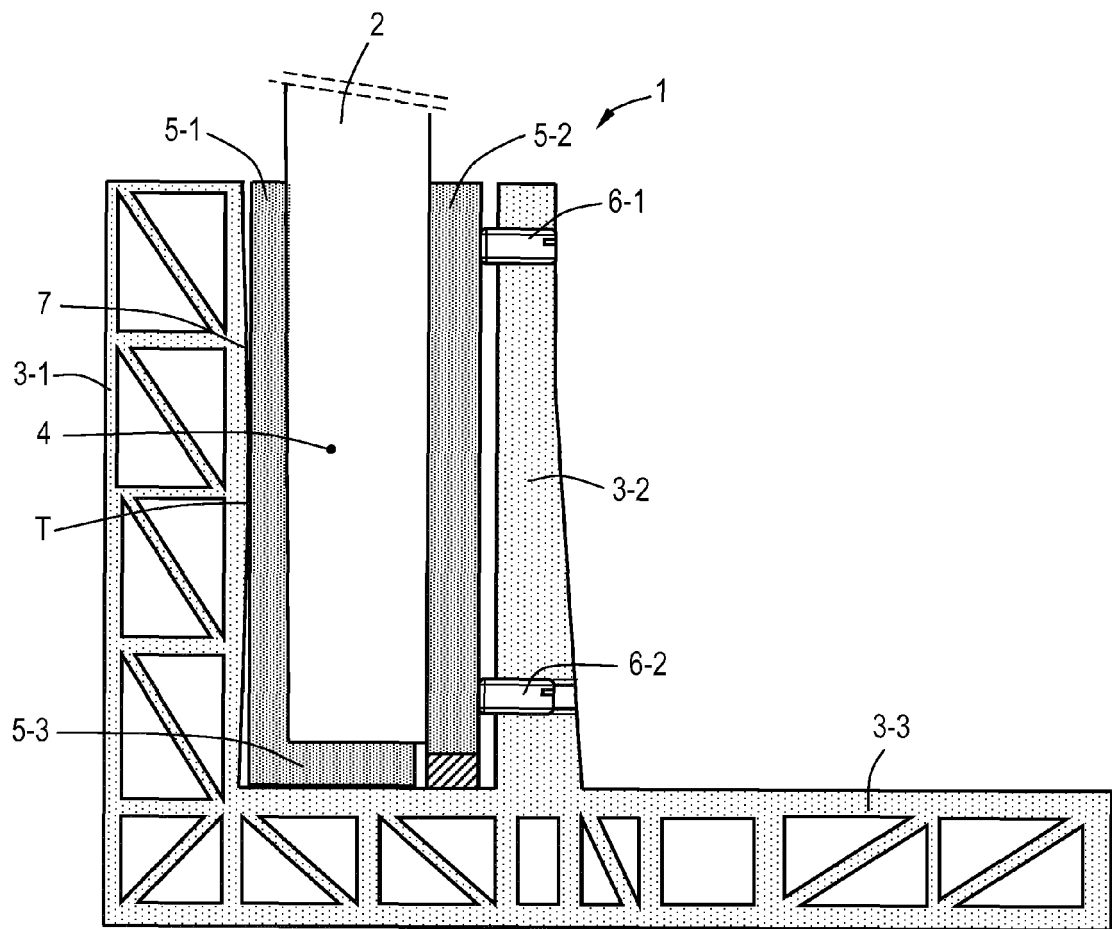


Fig.1

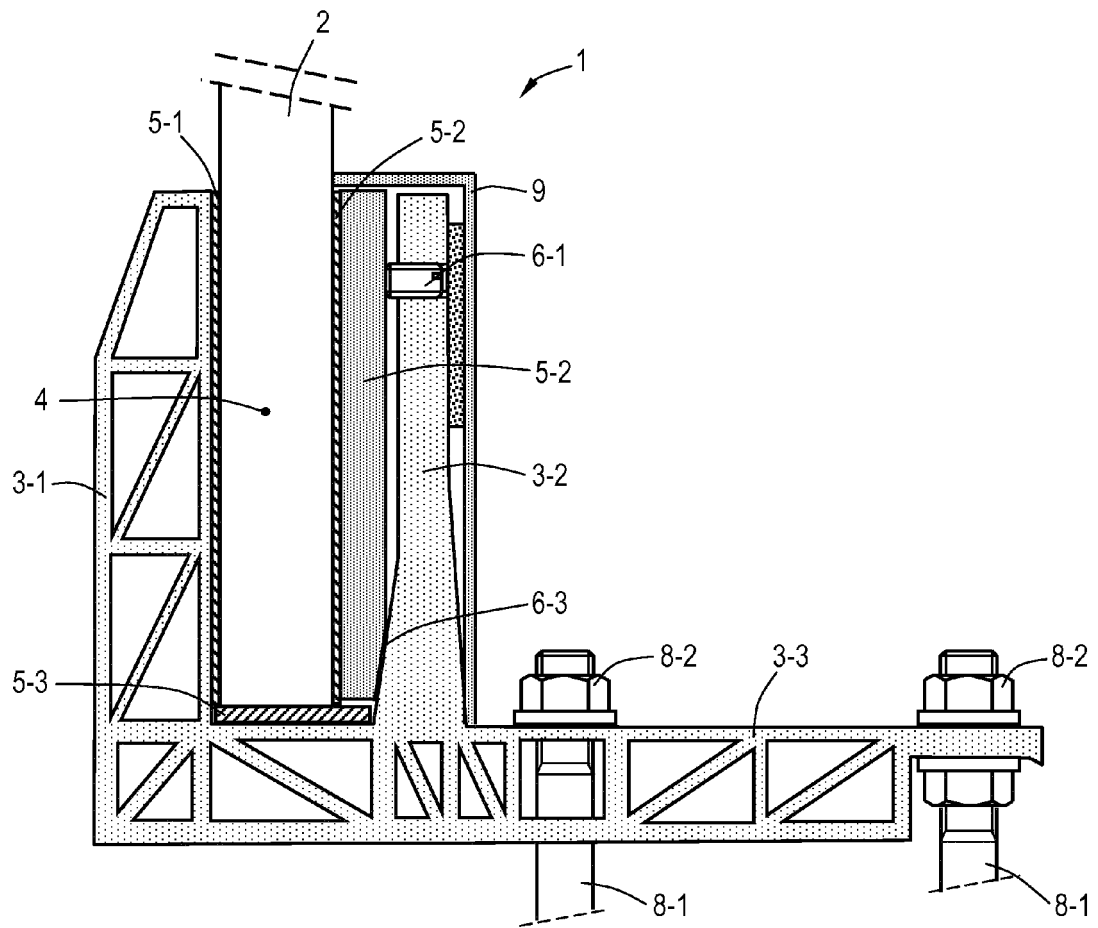


Fig.2



EUROPEAN SEARCH REPORT

Application Number
EP 15 16 9639

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 647 663 A1 (OBERHOFER ALFONS [AT]) 19 April 2006 (2006-04-19) * paragraph [0041]; figures 1,3 * -----	1-7, 9-11,14, 15	INV. E04F11/18
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 1 October 2015	Examiner Topcuoglu, Sadik Cem
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 15 16 9639

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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