A building glass facade of a building comprising a plurality of glass elements covering at least a portion of a building, wherein at least one of the glass elements comprises a safety glass panel. The glass elements have a brace to hold the safety glass panels that comprise at least two glass plates whereby there is an invisible protection against falling out, which is achieved by a separating or connecting film that is positively and non-positively connected with the braces by a film that is in the form of a separating or connecting film. The brace also has a type of fastening such that there is a permanently elastic medium for stress-free installation.
BUILDING GLASS FACADE OF A BUILDING, A CLAMPING ARRANGEMENT FOR HOLDING GLASS PANELS IN A GLASS FACADE OF A BUILDING, A BRACE TO HOLD SAFETY GLASS PANELS IN A GLASS FACADE OF A BUILDING, AND A BRACE TO HOLD SAFETY GLASS PANELS

CONTINUING APPLICATION DATA

[0001] This application is a Continuation-in-Part of International Application No. PCT/EP00/03000, filed on Apr. 5, 2000, which claims priority from Federal Republic of Germany Application No. 199 15 478.3, filed on Apr. 7, 1999. International Application No. PCT/EP00/03000 was pending as of the filing date of this application. The United States was an elected state in International Application No. PCT/EP00/03000.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] This invention relates to a building glass facade of a building, which facade comprises a plurality of glass elements or panels covering at least a portion of the building.

[0004] This invention further relates to a clamping arrangement in a facade for holding a glass panel on a facade. More particularly, the invention relates to a glass panel clamping arrangement for clamping a building glass panel in a facade to a building.

[0005] This invention also relates to a brace to hold safety glass panels. The safety glass panels thereby consist of at least two glass plates that are positively and non-positively connected to each other by a separating or connecting film. The brace is provided on one hand with a mounting device that can be attached to a building and on the other hand with a device that runs through the glass panel with flanges that simultaneously hold the glass plates.

[0006] 2. Background Information

[0007] German Patent No. 195 19 527 A1 describes a device in which a beam provided with the building-side mounting is supported on a building-side clamping element. The support is thereby provided by means of a bearing head of the beam that is mounted so that it yields elastically in the axial direction of the beam, whereby the bearing head is also mounted with lateral play or clearance in a bearing compartment. Consequently, when wind pressure is applied, it becomes possible for the beam and/or the bearing head to move parallel to the plane of the glass panel. The elastic flexibility of the bearing head is thereby created by spring washers or by a permanently elastic material. This permanently elastic material or the spring washers apply a continuous restoring force to the beam or to the glass panel in the sense of repositioning the beam. Ultimately, this system results in the introduction of stresses in the glass panel, whereby greater tolerances between the borings in the glass panel and the connection point to the building-side mounting cannot be compensated.

[0008] German Patent No. 44 00 979 A1 also describes a device in which the mounting bearing on the inside of the building has a spherical surface on the external surface that faces the mounting, and against which a compensating part with a complementary spherical cap surface is in contact. The clamping element thereby has a boring that runs all the way through to hold a clamp screw that connects the clamping elements and a retaining screw that penetrates a shim part and the compensator part, and is inserted into the clamping element. With this device, of course, manufacturing tolerances between the boring in the glass panel and a substructure can be compensated, but an elastic support of the glass panels on the mounting is no longer possible after the glass panels have been installed.

[0009] A similar device is described in German Patent No. 44 45 724 A1, in which a clamping element on the inside of the building has a spherical surface on its external surface facing the mounting, against which spherical surface a pivot bearing of a fastening part of a complementary surface is in contact. The pivot bearing is held with lateral play in a union nut or swivel nut. Here again, after installation, no relative movement of the glass panel with respect to the fastening part is possible.

[0010] In the fastening of glass panels, in particular safety glass panels, one mistake that is made repeatedly is that the glass panels are given no ability to successfully neutralize, after installation, the forces acting on them, such as thermal stresses, wind pressure, etc. Of course, glass has a certain elasticity, but the limits of this elasticity are soon reached on account of the nature of the material glass. To fasten glass panels as disclosed by the prior art, above a certain degree of loading the inevitable result is destruction of the glass panels. This destruction results from the fact that there is a certain rigidity that does not allow any freedom or room of adjustment. The elasticity of a glass panel simultaneously means that there is a neutralization of forces. Consequently, it must be stated that freedom is the ability to adapt or adjust. This statement is particularly true for safety glass panels that are installed in areas in which there is no safety element, for example, when the glass is used in overhead glazing applications. In these areas, of course, compound glass panels (VSG) are used, which have separating or connecting films between the individual plates of glass. Such compound glass panels are manufactured by first providing the individual plates of glass with the necessary borings and then, in a single manufacturing process, introducing the separating or connecting film. In this case, there are unavoidable manufacturing tolerances that are also of the type that cause the normally overlapping holes of two neighboring plates of glass to be misaligned.

OBJECT OF THE INVENTION

[0011] German Patent No. 39 18 158 C1 discloses a fire-protection glass unit which has a metal frame with an encircling mounting groove, in which, with the interposition of a compensating adapter, a glass panel is fastened. The compensating adapter has two glued-on expanded metal strips, the edges of which are in the mounting groove, whereby a strip-shaped non-metallic spacer is located between the edges. The compensating adapter ensures that in the event of a fire, a destructive temperature gradient will not occur between the large surface of the glass panel and the edge of the glass panel, and also prevents any mechanical stresses caused by differential thermal expansion in the metal frame and in the glass panel from having negative effects.

[0012] An object of the invention resides in a building glass facade of a building having a fastening assembly to
attach and hold glass panels. The invention permits an installation free of tension on the fastening assembly during assembly, and permits a sufficient elasticity between the fastening assembly and the glass panel after installation.

[0013] An additional object of the invention is to fasten safety glass panels so that on one hand, no stresses occur in the glass panels during installation, and on the other hand so that, after installation, the safety glass panels retain a certain freedom of movement to adapt to their fastening point, and can also be used, for example, in overhead glazing applications without the need for additional safety-relevant devices.

SUMMARY OF THE INVENTION

[0014] This object can be achieved in a building glass facade of a building comprising a plurality of glass elements covering at least a portion of a building, which at least one of the elements comprises a glass panel and a brace or fastening device.

[0015] The invention also teaches that this object can be accomplished in a brace to hold safety glass panels. In order to secure the glass plates, there is an invisible protection against falling out, which is achieved by a separating or connecting film in connection with the braces, and a permanently elastic medium is provided between the brace parts and the glass plates for stress-free installation. Additional characteristics of the invention are disclosed herein below. The invention teaches that to secure the glass panels, an invisible protection against falling out is provided and is accomplished by the separating or connecting film in connection with the puntiform braces used. Simultaneously, there is a permanently elastic medium between the brace and the glass plates to guarantee stress-free installation and subsequent mobility, and thus the elasticity of the glass panels being held.

[0016] Because the separating or connecting film is used as a load-bearing element, there is simultaneously an invisible protection of the safety glass panels against destruction and thus falling out. For this purpose, the puntiform braces are designed so that in their center clamping area they firmly clamp the separating or connecting film, and simultaneously, as a result of the use of the permanently elastic medium, do not reduce the freedom of movement of the safety glass panel.

[0017] For this purpose, on the highly-sensitive glass sheets in the vicinity of the borings, a reinforced separating or connecting film is used. For example, the film can also contain a network of appropriate materials, such as Kevlar or carbon fibers, for example, which also spread out in a sunburst pattern around a punctiform brace. To be able to clamp the separating or connecting film, rather large borings must be introduced inside the safety glass panels. As noted above, these borings are introduced before the process of connecting the individual glass sheets by means of the separating or connecting film. Thus, the separating or connecting film must project into the area of the boring. This can be accomplished on one hand by using a continuous film, in which case a small-diameter boring can be punched out later after the glass sheets have been connected to each other. It is also possible to punch borings in the films before the process of connecting the glass sheets to each other. The above mentioned materials can also be used to provide reinforcement in the vicinity of the clamping. It is also possible, in the vicinity of the punched-out portions of the separating and connecting film, to introduced flat lugs, for example, that are connected positively and non-positively with the connecting film. This measure improves the transmission of forces between the film and the brace.

[0018] Therefore on one hand, the film can be clamped directly by the brace, and on the other hand, the lug that has been introduced is clamped by the brace.

[0019] The braces are preferably realized in the form of puntiform braces, so that they consist at least of two simple rotating parts that can be screwed into each other. The two rotating parts, after they have been screwed into each other, have a clamping area that is formed by clamp surfaces that are flat. Between these clamping surfaces, the projecting separating or connecting film or lug is then connected positively and non-positively with the brace.

[0020] This system can also be used, for example, on multiple-plate or laminated safety glass panels. In such a case, for example on a safety glass panel that consists of three plates, spacer rings are used for the center sheet, whereby the height of these spacer rings is equal to the thickness of the middle glass plate. In this case, two films project into the area of the boring, which on one hand are kept apart by the spacer ring and on the other hand, as a result of the screwing together of the two brace parts, positively and non-positively clamp the spacer ring on one hand and the separating and connecting film on the other hand.

[0021] The above mentioned lugs can also be used on multiple-plate safety glass panels. These lugs would then simultaneously surround the spacer ring.

[0022] The two brace parts which are screwed into each other each have flanges which extend beyond the edge of the boring inside the safety glass panels. In this case, a dimensional coordination between the brace and the borings inside the safety glass panels is necessary to guarantee the clamping of the glass panel. This clamping is achieved because a permanently elastic medium is introduced between the flanges of the brace parts and the edges of the glass panels and the boring. This permanently elastic medium can consist of rubber, silicone, etc., for example. As a result of this solid yet elastic mounting, a neutralization of forces on the safety glass panels is achieved, which in particular enormously reduces the danger of breakage of such safety glass panels, and simultaneously, when there is a break in these safety glass panels, provides protection against them falling out, which protection is invisible from the outside. Such braces can be mounted on any type of substructure and can also be made without additional effort from stainless steel or light alloy.

[0023] The above-discussed embodiments of the present invention will be described further herein below. When the word “invention” is used in this specification, the word “invention” includes “inventions”, that is, the plural of “invention”. By stating “invention”, the Applicants do not in any way admit that the present application does not include more than one patentably and non-obviously distinct invention. The Applicants hereby assert that the disclosure of this application may include more than one invention, and, in the event that there is more than one invention, that these inventions may be patentable and non-obvious one with respect to the other.
BRIEF DESCRIPTION OF THE DRAWINGS

[0024] The invention is explained in greater detail below with reference to a number of different exemplary embodiments that are illustrated schematically in the accompanying drawings, in which:

[0025] FIG. 1A shows a perspective view of a building with a facade including glass panel clamping arrangements according to at least one embodiment of the present invention.

[0026] FIG. 1B shows an elevation of part of a building face with glass panels according to at least one embodiment of the present invention.

[0027] FIG. 1 is a sectional view of a portion of a fastening of a safety glass panel that consists of two plates of glass in an overhead mounting.

[0028] FIG. 2 shows a safety glass panel that consists of three individual plates with a punctiform brace.

[0029] FIG. 3 shows a detail of the vicinity of the boring of a safety glass panel into which a lug has been introduced.

[0030] FIG. 4 is the same as FIG. 3, but with a safety glass panel that consists of three individual plates.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0031] FIG. 1A shows a perspective view of a building with a facade including glass panel clamping arrangements according to at least one embodiment of the present invention. In one possible embodiment of the present invention, as illustrated in FIG. 1A, the invention is shown with a building having a facade F with glass panels 200. The glass panels are secured with glass panel clamping arrangements or fastening assemblies 100 which are placed in any desired pattern to suit the size of a glass panel 200.

[0032] FIG. 1B shows an elevation of a portion of a building face with glass panels according to at least one embodiment of the present invention. In one possible embodiment of the present invention, illustrated in FIG. 1B, a facade F of a building is shown in which glass panels 200 are secured with fastening assemblies 100. The fastening assemblies 100 are made up of glass panels and braces.

[0033] The safety glass panel, a portion of which is illustrated in FIG. 1, consists of glass plates 2 and 3 which have been connected to each other by a separating or connecting film 1. The separating or connecting film 1 thereby projects into a glass boring 30.

[0034] The punctiform brace and thus the glass panel are mounted on a ceiling fastener 11 by means of a fastening screw 5 and a thread 12. The punctiform brace thereby consists of a front brace part 13 and an inside brace part 14. The brace parts 13 and 14 are screwed to each other by means of a thread 7. The fastening screw 5 runs all the way through both parts.

[0035] When the brace parts 13 and 14 are screwed together, clamping surfaces 22, 24, as shown in FIG. 2, come together, whereby they simultaneously clamp between them the separating or connecting film 1 that extends in this area. The glass plates 2 and 3 are prevented from falling out by the clamping of the separating or connecting film 1 between the brace parts 13 and 14.

[0036] The brace parts 13 and 14 thereby have flanges 9 and 4 that partly overlap the outside surfaces 15 and 16 of the outer glass plates. The flanges 4 and 9 on one hand overlap the area of the boring 30 inside the glass plates 2, 3, and on the other hand the flanges 4, 9 project beyond the glass plates 2, 3. Between the outer sides 15, 16 of the glass plates and the flanges 4, 9 with contact surfaces 17, 18, a permanently elastic medium in the form of an insert 6, 8 is inserted, which thus fills up the open space inside the boring 30 of the glass plates 2, 3 and the brace parts 13, 14. The size of this space can be designed as a function of the loads that such safety glass panels are required to withstand. It is clear, however, that as a result of the clamping of the separating and connecting film 1, the brace parts 13, 14 have achieved an invisible protection against the safety glass panel falling out, and a clamping of the safety glass panel is simultaneously achieved to a certain degree as a result of the fact that the safety glass panel can be loaded as a function of outside factors, and there is a neutralization of force in the event of the application of external loads.

[0037] This situation is also explained with reference to the exemplary embodiment illustrated in FIG. 2, in which, analogous to FIG. 1, two brace parts 20, 26 are connected to each other by means of a thread 25. The brace part 20 thereby has a boring 28 which runs through the center of the brace part 20. A fastening screw 29 is inserted into the boring 28, whereby the head of the screw disappears into a blind hole. By means of a connecting surface 19, in connection with the fastening screw 29, this brace can be fastened to a substructure after the brace part 26 has been screwed onto the thread 25. The brace parts 20, 26, analogous to the brace parts 13, 14, as shown in FIG. 1, have corresponding clamping surfaces 22 and 24. Because this exemplary embodiment illustrates a safety glass panel which consists of the glass plates 2, 3 and 21, in this case there are two separating and connecting films. This separating and connecting film 1 also projects into the vicinity of the boring 30 inside the safety glass panel and can thus be clamped between the clamping surfaces 22, 24. In this case, to bridge the thickness that equals the distance of the glass plate 3, a spacer ring 23 is required, which is inserted between the two films. Then the two brace parts 20, 26 can be connected to each other via the thread 25, and then the two separating and connecting films 1 with the spacer ring 26 located between them can be positively and non-positively connected to each other.

[0038] In this exemplary embodiment, too, the contact surfaces 17, 18 are on the brace parts 20, 26, as a result of which it is ensured that there is an overhanging part that projects beyond the outside surfaces of the glass plates 2 and 21. In this region of the contact surfaces 17, 18 and of the boring 30, an insert 6, 8 made of permanently elastic material is also inserted. Therefore this type of fastening in a safety glass panel can provide protection against falling out and can also serve as a device to guarantee the neutralization of forces when loads are applied.

[0039] In the exemplary embodiment illustrated in FIG. 3, only the portion of the glass plates 2, 3 with the separating or connecting film in between is shown. The separating or connecting film 1 thereby has a reinforcement 34 in its
The exemplary embodiment illustrated in FIG. 4 is analogous to the exemplary embodiment illustrated in FIG. 3, except that in this case, there are once again three glass plates 2, 3, 21, which are connected positively and non-positively by separating and connecting films 1. Especially with multiple-pane safety glass panels, it is difficult to guarantee that the borings 30, 31, 32 introduced into the individual glass plates will be properly aligned after the separating films have been connected to one another in the fabrication process. Therefore it is technically necessary, for reasons related to the fabrication process, to make the separating films 30, 31, 32 large enough to ensure a secure bracing and thus clamping of the separating and connecting films 1 with the brace parts 13, 14 (as shown in FIG. 1), 20, 26 (as shown in FIG. 2). In this exemplary embodiment, too, the distance of the thickness of the glass plate 3 is bridged by a spacer ring 23, whereby simultaneously a lug 33 bridges the separating and connecting films 1 with the spacer ring 23 between them.

One feature of the invention resides broadly in the brace to hold safety glass panels that consist of at least two glass plates (2, 3, 21) that are positively and non-positively connected to each other by a separating and connecting film (1), whereby the brace is equipped on one hand with a mounting or retaining device that can be fastened to a building and on the other hand the glass plates (2, 3, 21) are held between clamping flanges (4) and (9), as shown in FIG. 1, characterized by the fact that to secure the glass plates (2, 3, 21), there is an invisible protection against falling out, which is achieved by a separating or connecting film (1) in connection with the braces, and a permanently elastic medium (6, 8), as shown in FIG. 1, is provided between the brace parts and the glass plates for stress-free installation.

Yet another feature of the invention resides broadly in the brace, characterized by the fact that the protection against falling out is located inside the braces which are preferably realized in the form of punctiform braces.

Yet another feature of the invention resides broadly in the brace, characterized by the fact that to fasten the braces, there are borings (30, 31, 32) in the glass plates (2, 3, 21), whereby the edges of contact surfaces (17, 18), as shown in FIG. 1, are overlapped and held by contact surfaces (17, 18) of the brace parts (4, 19, 20, 26) and the separating or connecting film (1) extends into the vicinity of the borings (30, 31, 32), whereby the separating and connecting film (1) has a punched-out portion, the diameter of which is smaller than the diameter of the borings (30, 31, 32) and the separating and connecting film is clamped directly or indirectly positively and non-positively in the vicinity of the punched-out portion by the brace used.

Still another feature of the invention resides broadly in the brace, characterized by the fact that the separating and connecting film (1) has a reinforcement (34) at least in the peripheral area of the borings (30, 31, 32).

A further feature of the invention resides broadly in the brace, characterized by the fact that the peripheral area of the punched-out portion is covered by a lug (33, 35).

Another feature of the invention resides broadly in the brace, characterized by the fact that the reinforcement (34) and the lug (33, 35) are made of Kevlar, carbon or glass fiber.

Yet another feature of the invention resides broadly in the brace, characterized by the fact that the brace consists of at least the brace parts (13, 14) or (20, 26), each of which has a flat clamping surface (22, 24), in the vicinity of which the separating or connecting film (1), during assembly, is clamped directly or indirectly with the insertion of a spacer ring (23) between the clamping surfaces (22, 24).

Another feature of the invention resides broadly in the brace, characterized by the fact that the brace parts (13, 14, 20, 26) are made of stainless steel or light alloy.

A further feature of the invention resides broadly in the brace, characterized by the fact that in the vicinity of the clamping of the glass plates (2, 3, 21) between the contact surfaces (17, 18) and the external glass surfaces (15, 16), the permanently elastic medium is introduced in the form of inserts (6, 8).

Another feature of the invention resides broadly in the brace, characterized by the fact that the inserts (6, 8) project into the borings (30, 31).

Yet another feature of the invention resides broadly in the brace, characterized by the fact that the inserts (6, 8) are made of rubber or silicone.

The components disclosed in the various publications, disclosed or incorporated by reference herein, may be used in the embodiments of the present invention, as well as, equivalents thereof.

The appended drawings in their entirety, including all dimensions, proportions and/or shapes in at least one embodiment of the invention, are accurate and to scale and are hereby included by reference into this specification.

All, or substantially all, of the components and methods of the various embodiments may be used with at least one embodiment of all the embodiments, if more than one embodiment is described herein.

All of the patents, patent applications or patent publications, which were cited in the German Office Action dated Apr. 7, 1999, for Fed. Rep. Of Germany Application, and/or in the International Search Report for PCT/EP00/03000, and/or cited elsewhere are hereby incorporated by reference as if set forth in their entirety herein.


[0057] The corresponding foreign patent publication applications, namely Federal Republic of Germany Patent Application No. 199 15 478.3, filed on Apr. 7, 1999, and International Application No. PCT/EP00/030000, filed Apr. 5, 2000, having inventors Ernst Udo Bloebaum and Reinhard Janutta, as well as their published equivalents, and other equivalents or corresponding applications, if any, in corresponding cases in the Federal Republic of Germany and elsewhere, and the references cited in any of the documents cited herein, are hereby incorporated by reference as if set forth in their entirety herein.

[0058] The details in the patents, patent applications and publications may be considered to be incorporeal, at applicant’s option, into the claims during prosecution as further limitations in the claims to patentably distinguish any amended claims from any applied prior art.

[0059] Although only a few exemplary embodiments of this invention have been described in detail above, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention. Accordingly, all such modifications are intended to be included within the scope of this invention as defined in the following claims. In the claims, means-plus-function clauses are intended to cover the structures described herein as performing the recited function and not only structural equivalents but also equivalent structures.


[0064] The invention as described hereinabove in the context of the preferred embodiments is not to be taken as limited to all of the provided details thereof, since modifications and variations thereof may be made without departing from the spirit and scope of the invention.

[0065] At Least Partial Nomenclature

[0066] 1 Separating and connecting film
[0067] 2 Glass plate
[0068] 3 Glass plate
[0069] 4 Flange
[0070] 5 Fastening screw
[0071] 6 Insert
[0072] 7 Thread
[0073] 8 Insert
[0074] 9 Flange
[0075] 11 Ceiling fastener
[0076] 12 Thread
[0077] 13 Brace part
[0078] 14 Brace part
[0079] 15 Glass outside, outdoor (outside?)
4. The building glass facade as claimed in claim 3, wherein the peripheral area of the punched-out portion is covered by a lug (33, 35).
5. The building glass facade as claimed in claim 4, wherein the reinforcement (34) and the lug (33, 35) are made of Kellar, carbon or glass fiber.
6. The building glass facade as claimed in claim 5, wherein the brace comprises at least the brace parts (13, 14) or (20, 26), each of which has a flat clamping surface (22, 24), in the vicinity of which the separating or connecting film (1), during assembly, is clamped directly or indirectly with the insertion of a spacer ring (23) between the clamping surfaces (22, 24).
7. The building glass facade as claimed in claim 6, wherein the brace parts (13, 14, 20, 26) are made of stainless steel or light alloy.
8. The building glass facade as claimed in claim 7, wherein the vicinity of the clamping of the glass plates (2, 3, 21) between the contact surfaces (17, 18) and the external glass surfaces (15, 16), the permanently elastic medium is introduced in the form of inserts (6, 8).
9. The building glass facade as claimed in claim 8, wherein the inserts (6, 8) project into the borings (30, 31).
10. The building glass facade as claimed in claim 9, wherein the inserts (6, 8) are made of rubber or silicone.
11. Brace to hold safety glass panels that comprise at least two glass plates (2, 3, 21) that are positively and non-positively connected to each other by a separating and connecting film (1), whereby the brace is equipped on one hand with a mounting device that can be fastened to a building and on the other hand the glass plates (2, 3, 21) are held between clamping flanges (4) and (9), wherein to secure the glass plates (2, 3, 21), there is an invisible protection against falling out, which is achieved by a separating or connecting film (1) in connection with the braces, and a permanently elastic medium (6, 8) is provided between the brace parts and the glass plates for stress-free installation.
12. Brace as claimed in claim 11, characterized by the fact that to fasten the braces, there are borings (30, 31, 32) in the glass plates (2, 3, 21), whereby the edges of contact surfaces (17, 18) are overlapped and held by contact surfaces (17, 18) of the brace parts (4, 19, 20, 26) and the separating or connecting film (1) extends into the vicinity of the borings (31, 32, 33), whereby the separating and connecting film (1) has a punched-out portion, the diameter of which is smaller than the diameter of the borings (30, 31, 32) and the separating and connecting film is clamped directly or indirectly positively and non-positively in the vicinity of the punched-out portion by the brace used.
13. Brace as claimed in claim 12, characterized by the fact that the separating and connecting film (1) has a reinforcement (34) at least in the peripheral area of the borings (31, 32, 33).
14. Brace as claimed in claim 13, characterized by the fact that the peripheral area of the punched-out portion is covered by a lug (33, 35).
15. Brace as claimed in claim 14, characterized by the fact that the reinforcement (34) and the lug (33, 35) are made of Kellar, carbon or glass fiber.
16. Brace as claimed in claim 12, characterized by the fact that the brace comprises at least the brace parts (13, 14) or (20, 26), each of which has a flat clamping surface (22, 24), in the vicinity of which the separating or connecting film (1),
during assembly, is clamped directly or indirectly with the insertion of a spacer ring (23) between the clamping surfaces (22, 24).

17. Brace as claimed in claim 16, characterized by the fact that the brace parts (13, 14, 20, 26) are made of stainless steel or light alloy.

18. Brace as claimed in claim 12, characterized by the fact that in the vicinity of the clamping of the glass plates (2, 3, 21) between the contact surfaces (17, 18) and the external glass surfaces (15, 16), the permanently elastic medium is introduced in the form of inserts (6, 8).

19. Brace as claimed in claim 18, characterized by the fact that the inserts (6, 8) project into the borings (30, 31).

20. Brace as claimed in claim 19, characterized by the fact that the inserts (6, 8) are made of rubber or silicone.

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