A glass panel railing with a U-section comprises a first limb, a second limb, a first base part, a second base part, a first hook receptacle and a second hook receptacle. Between the two limbs, the foot region of the glass panel is held in a fixed manner. The U-section is composed of a two-part design; the first limb and second limb. The first limb can be fastened to the building while the second limb can be attached to the first limb so as to provide stability.
U-SECTION FOR MOUNTING A RAILING PANEL IN A FIXED MANNER

CROSS-REFERENCE TO RELATED PATENT APPLICATIONS


FIELD OF THE INVENTION

[0002] The invention relates to a U-section, between the two limbs of which the foot region of a panel to be arranged fixedly on a building can be held in a fixed manner. Such a panel may be, in particular, part of a railing such as, for example, a glass panel railing.

BACKGROUND OF THE INVENTION

[0003] Corresponding glass panel railings are known, for example, from DE 20 2007 009 239 U1 or WO 2009/003452 A1. In the case of railings of this type, provision is made to insert the glass panel, which can also consist of two individual panels which are connected to each other, in particular are adhesively bonded to each other, into a U-section holding the glass panel in a fixed manner. The foot region of the glass panel is enclosed by a U-shaped section body which is composed, for example, of plastic and is inserted into the U-section before the mounting of the glass panel. An exact and tilt-resistant moment of the glass panel is subsequently undertaken by means of wedge-like inserts. Before the glass panel is inserted into the U-section, said U-section has already been screwed or welded to a fastening profile arranged fixedly on a building. For this purpose, one of the two limbs of the U-section can have a bent-over portion, by means of which the U-section can be hooked onto the fastening profile. The U-section is in each case of single-part design, wherein the two limbs of the U-section are connected to each other via a base. As a result, it may be necessary, in the case of certain building structures, first of all to fasten separate holding sections to the building structure in order to be able to fasten the U-section to said holding sections in a second step.

SUMMARY OF THE INVENTION

[0004] Starting from this previously known prior art, the invention is based on the object of providing an improved U-section which can be produced in an economically favorable manner and can be mounted on the building structure without relatively large outlay.

[0005] The U-section according to the invention is provided by the features of the main claim. Expedient developments of the U-section are the subject matter of further claims which follow the main claim.

[0006] According to the invention, provision is made for the U-section to be of two-part design. By means of the two-part design of the U-section, first of all the one, first limb of the U-section can be fastened directly or indirectly to the building via a structural connecting element. The other, second limb of the U-section can then be attached to the first limb of the U-section so as to be secure in terms of stability. The U-section can therefore be fastened to the building also from the subsequent interior space of the U-section, since fastened to the building. This enables the U-section according to the invention to be used more universally and to be fastened to a very wide variety of building structures without major adaptations.

[0007] A panel, in particular a glass panel, can be mounted in the U-section, for example in the manner known in the prior art. This mounting can be undertaken, for example, by means of the fixed mounting described in DE 20 2007 009 239 U1 or WO 2009/003452 A1. However, the glass panel could also be adhesively bonded into the U-section.

[0008] In this case, the U-section does not have to be present over the entire length of the inserted panel. On the contrary, it may be sufficient to distribute a plurality of U-sections at a certain mutual spacing over the length of the panel such that U-sections are present merely in section. It would also be possible to provide the first limb of the U-section only in sections, whereas the second limb of the U-section can be designed as a continuous limb.

[0009] In a preferred embodiment, there can be form-fitting holding formations on the two limbs of the U-section, such that, in the state of the U-section in which the latter is fastened to the building, the parts of the U-section can be detached from one another only according to a plan. Apart from the installation state, the parts of the U-section can therefore no longer be detached from one another unintentionally. In this case, the holding formations can be designed in particular as undercutts. This form-fitting fastening of the two limbs of the U-section permits a particularly simple and rapid installation of the U-section, since the insertion of the limbs one in the other may already be sufficient for the mounting of the U-section.

[0010] The two limbs of the U-section can preferably both have a limb extension protruding downward from the region of the base of the U-section. As a result, the two limbs of the U-section can be fastened to each other in the region of the base of the U-section and also in the region of each limb extension of said limbs in an extension-proof and compression-proof manner in each case in a direction transversely with respect to the panel plane. In this case, the second limb can be held on the first limb so as to be supported in terms of load in a direction parallel to the panel plane.

[0011] The two limbs of the U-section can be fastened in the region of the base of the U-section by the fact that a first base part protrudes transversely from the first limb, and there is an upwardly open, first hook receptacle at the free end of said base part. A second base part can protrude transversely from the second limb, and there is a downwardly open, second hook receptacle at the free end of said base part. The second hook receptacle can be inserted from above into the first hook receptacle in a direction parallel to the panel plane and therefore the two limbs of the U-section are fastened to each other. It would also be possible to insert the second hook receptacle from above into the first hook receptacle in an oblique direction in order to fasten the two limbs of the U-section to each other. The first and the second base parts can thus be part of the base of the U-section. The two limbs of the U-section can be fastened in the region of each limb extension of said limbs by the fact that there is a third hook receptacle in the foot region of the first limb extension and there is a fourth hook receptacle in the foot region of the second limb extension. The third and fourth hook receptacles can be placed one in the other relative to each other in a
direction parallel to or obliquely with respect to the panel plane. In particular, the fourth hook receptacle is inserted from above into the third hook receptacle in a direction parallel to the panel plane.

[0012] In order to permit a visually attractive outer end of the U-section, one of the two limb extensions can have an end wall part. Said end wall part can be designed in such a manner that it automatically aligns with the hook formation present on the other limb extension or with the other limb extension, thus forming a common outer surface of the U-section.

[0013] In order to fasten the U-section to the building, there can be a cutout in the first limb of the U-section or in the limb extension of the first limb in order to be able to fasten the first limb to the building by means of a screw connection or by means of a dowel fastening. The first limb could also be fastened to a separate holding profile present on the building. It would also be possible to provide cutouts for the screw or dowel fastening both in the first limb and in the limb extension thereof.

[0014] There can be a bent-over suspension portion for the U-section at the upper end of the one limb of the U-section. By means of said bent-over suspension portion, said one limb and therefore the U-section can be hooked onto the vertical limb of a structural connecting element. In this case, the bent-over suspension portion can be present in particular on the first limb of the U-section.

[0015] The limb of the U-section with the limb extension thereof present integrally thereon, can be composed in particular of aluminum or an aluminum alloy. In this case, the limb only has a low weight, which is advantageous for the installation, and is at the same time sufficiently dimensionally stable in order to be able to hold the glass panel present in the limb in a fixed manner.

[0016] In an economically advantageous manner, at least one of the two limbs can be produced as an extruded section. In particular, the two limbs of the U-section can be produced as extruded sections, thus resulting in low manufacturing costs for the two limbs of the U-section.

[0017] Further advantages and features of the invention can be gathered from the features furthermore specified in the claims and from the exemplary embodiments below.

BRIEF DESCRIPTION OF THE DRAWING

[0018] The invention is described and explained in more detail below with reference to the exemplary embodiments which are illustrated in the drawing, in which:

[0019] FIG. 1 shows a cross section through a first embodiment, which is fastened to a building, of the U-section according to the invention with a glass panel held in the U-section in a fixed manner.

[0020] FIG. 2 shows a cross section through the individual parts of the U-section according to FIG. 1, said individual parts not yet having been assembled and fastened to one another,

[0021] FIG. 3 shows a cross section through a second embodiment, fastened to a building, of the U-section according to the invention, with a glass panel held in the U-section in a fixed manner,

[0022] FIG. 4 shows a cross section through the two limbs of the U-section according to FIG. 3, which limbs are not yet fastened to each other,

[0023] FIG. 5 shows a cross section through a third embodiment, which is fastened to a building, of the U-section according to the invention, and

[0024] FIG. 6 shows a perspective illustration of the first limb of the U-section according to FIG. 5, with a washer for the screw fastening.

DETAILED DESCRIPTION OF THE INVENTION

[0025] Details of a glass panel railing 10 together with the foot region thereof in cross section are illustrated in FIG. 1. The glass panel 18 which, in the present exemplary case, consists of two panels 14, 16 which are adhesively bonded fixedly to each other via an adhesive layer 12, is seated in a foot region 20 thereof in a two-part U-section 22 so as to be held in a fixed manner.

[0026] The U-section 22 is of two-part design and has a first limb 24 and a second limb 26. In the state fastened to each other, the two limbs 24, 26 run approximately parallel to each other. In the present exemplary case, the two limbs 24, 26 have plane inner sides.

[0027] In contrast thereto, the U-section, at least in the lower region thereof, could also be of funnel-shaped design. In this case, the wall thickness of the two limbs 24, 26 would slightly increase downward—in the direction of the base of the U-section 22. Furthermore, or alternatively thereto, there could also be projections, grooves or undercutts on the inner sides of the two limbs 24, 26, for example in order to connect the two limbs to each other via a separate bridge.

[0028] The base of the U-section 22 is formed by a first base part 28 and a second base part 30. The first base part 28 protrudes approximately horizontally from the first limb 24, with a rounded portion 32 being formed. There is an upwardly open, first hook receptacle 34 at the free end of the first base part 28. The second base part 30 protrudes approximately horizontally from the second limb 26, with a rounded portion 36 being formed. There is a downwardly open, second hook receptacle 38 at the free end of the second base part 30. The second hook receptacle 38 can be inserted from above into the first hook receptacle 34. In said inserted state, the two base parts 28, 30 are aligned with each other and thus form the base of the U-section.

[0029] In the present exemplary case, the first base part 28 is designed to be significantly shorter than the second base part 30. In contrast thereto, the two base parts could also be designed to be approximately identical in length; it would also be possible to design the first base part to be longer than the second base part.

[0030] In the present exemplary case, the first limb 24 and the second limb 26 both have a downwardly protruding limb extension 40, 42. The two limb extensions 40, 42 have a downwardly tapering wall thickness. In contrast to the exemplary embodiment illustrated here, the respective wall thickness of the two limb extensions 40, 42 could also remain constant.

[0031] The first limb extension 40 of the first limb 24 has a cutout 44. A screw 46 can be guided through said cutout 44 in order to fasten the limb 24 to a building 48. As can be gathered in particular from FIG. 2, the screw 46 can be screwed directly into the building 48—optionally by means of a dowel—or can be screwed into a structural connecting element 50 present on the building 48.

[0032] There is a third hook receptacle 52 at the lower end of the first limb extension 40. In the present exemplary case, the third hook receptacle 52 is designed to be upwardly open. There is a fourth hook receptacle 54 at the lower end of the second limb extension 42. Said hook receptacle, in the present exemplary case, being designed to be downwardly
open. The fourth hook receptacle 54 can be inserted into the third hook receptacle 52 from above. The two limbs 24, 26 of the U-section 22 can therefore be fastened to each other firstly via the first and second hook receptacles 34, 38 and secondly via the third and fourth hook receptacles 52, 54.

[0033] In the present exemplary case, the second limb extension 42 has, at the lower end thereof, an end wall part 56 which is oriented approximately perpendicularly to the second limb extension 42. If the two limbs 24, 26 of the U-section 22 are fastened to each other, the end wall part 56 butts against the third hook receptacle 52 of the first limb extension 40, thus resulting in a mutually aligned outer surface of the U-section. A covering, for example, a screen, is therefore not required for the U-section. This saves on material, which reduces manufacturing and installation costs and results in a lower weight of the mounted U-section 22.

[0034] The glass panel 18 is held with the foot region 20 thereof in the U-section 22 in a fixed manner. The glass panel 18 is surrounded in a tightly fitting manner by a U-shaped section body 60. Said U-shaped section body 60 has a base 62 with two upwardly protruding walls 64, 66. As long as a glass panel 18 has not yet been inserted into the U-section 22 and into the U-shaped section body 60, the base 62 has the shape of a gable roof. When the base 62 with the shape of a gable roof is pressed down by an inserted glass panel 18, the lower wall regions, which each have an external rounded portion, are pressed outward against the two ends 24, 26 of the U-section 22. In this manner, play-free contact of the foot region 20 of the glass panel 18 in the base region of the U-section 22 is possible.

[0035] The wall thickness of the two walls 64, 66 of the U-shaped section body 60 decreases continuously upward—away from the base 62. For the tilt-resistant holding of the glass panel 18 in the U-section 22, wedges 68, 70 are inserted between the right limb 24 and the right wall 64 and between the left limb 26 and the left wall 66. A play-free contact of the foot region 20 of the glass panel 18 is thereby also realized in the upper region of the U-section 22. In this case, the wedges 68, 70 are inserted downward into the clearance present between the U-shaped section body 60 and the U-section 22 to a depth such that the desired, play-free contact of the glass panel 18 is achieved in the upper region of the U-section 22. In this case, an orientation of the glass panel 18 can be undertaken by such wedges 68, 70 being inserted to differing depths.

[0036] The wedges 68, 70 can be present in the form of a continuous wedge strip which is formed over the entire length of the U-section 22. However, the wedges 68, 70 may also be present only in parts. It has proven particularly easy in terms of installation to design the outer wedge 68, which is inserted between the left limb 26 and the left wall 66, as a continuous wedge strip. After said outer wedge strip 68 is positioned, a plurality of inner wedges 70 which are spaced apart from one another can then be inserted between the right limb 24 and the right wall 64.

[0037] In the present exemplary case, that surface of the walls 64, 66 which is directed toward the wedges 68, 70, like that surface of the wedges 68, 70, which surface is directed toward the walls 64, 66 of the U-shaped section body 60, is of serrated design. By means of the serrated surfaces, the wedges 68, 70 intermesh with the corresponding walls 64, 66, thus making it possible to prevent the wedges 68, 70 from unintentionally slipping out.

[0038] The U-shaped section body 60 is composed of a lightweight plastics material which has sufficient compression resistance. The weight of the glass panel 18 becomes only insubstantially greater by means of the U-shaped section body 60 pushed thereon. In the present exemplary case, the wedges 68, 70 are composed of rigid plastic with a Shore hardness of approximately 70 to 90. They can also be composed of a metallic material. In particular, the outer wedge strip 68 can be composed of a rigid plastic while the inner wedges 70 can be composed of a metal. As an alternative thereto, use could also be made of metallic wedges with a plastics coating in order to increase the sliding friction between the wedge and the U-section 22, which is preferably composed of metallic material.

[0039] A second embodiment of a glass panel raling 10.3 with a changed U-section 22.3 is illustrated in FIGS. 3 and 4. The first limb 24 of the U-section 22.3 is identical to that of the U-section 22 according to FIGS. 1 and 2. The second limb 26.3 of the U-section 22.3 differs from the second limb 26 of the U-section 22 by means of the second limb extension 42.3 thereof. The second limb extension 42.3 is not aligned with the limb 26.3 and is therefore also not formed parallel to the first limb extension 40. On the contrary, the second limb extension 42.3 is slightly bent directly below the second base part 30 and directed toward the first limb extension 40. Furthermore, in the present exemplary case, the second limb extension 42.3 has a constant wall thickness which corresponds to the wall thickness of the second limb 26.3.

[0040] The second limb extension 42.3 butts with the end wall part 56.3 thereof against the third hook receptacle 52 of the first limb 24 and therefore likewise forms an outer surface in alignment with the third hook formation 52. The second limb 26.3 can therefore also serve as a facing. Owing to the bent limb extension 42.3, the fourth hook receptacle 54.3 is designed to be significantly shorter in the end region of said second limb extension 42.3 than the fourth hook receptacle 54 of the U-section 22. As before, however, fastening of the second limb 26.3 to the first limb 24 is possible, said fastening being undertaken in the region of the base of the U-section 22.3 and in the end region of the limb extensions 40, 42.3.

[0041] A third embodiment of a glass panel railing 10.5 according to the invention is illustrated in FIGS. 5 and 6. In the present exemplary case, the two limbs 24.5 and 26.5 each have a bend 72, 74. Between said bends 72, 74 and the respective base parts 28.5, 30.5, the wall thickness of the two limbs 24.5, 26.5 tapers upward—away from the two base parts 28.5, 30.5 and toward the two bends 72, 74. By contrast, the two limbs 24.5, 26.5 have a constant wall thickness above the bends 72, 74.

[0042] The first base part 28.5 has a latching lug 76 next to the first hook receptacle 34. A latching hook 78 which is integrally formed at the bottom of the second base part 30.5 of the second limb 26.5, can engage under said latching lug 76. The two limbs 24.5, 26.5 can therefore be detached from each other only by overcoming a certain resistance; thus making it possible to prevent inadvertent detaching of the U-section 22.5 even during installation.

[0043] The limb extension 40.5 of the first limb 24.5 has a corrugated region 80 on its inner side. In said corrugated region 80, there is a plurality of elongated holes 82 which are spaced apart from one another and of which, in the present exemplary case, only one elongated hole 82 is illustrated. A washer 84 which, in the present exemplary case, is wedge-shaped, has a corrugated underside 86 which can be placed
against the corrugated region 80 of the limb extension 40.5. Furthermore, the washer 84 has a bore 88. Said bore 88 can be positioned over the elongated hole 82. The first limb 24.5 can subsequently be fastened to a building 48 or to a structural connecting element 50 by means of a screw 46. The limb 24.5 can be aligned in terms of height by the elongated hole 82. In contrast to the exemplary embodiment illustrated here, the washer 84 could also be of approximately flat design.

[0044] **In the exemplary embodiment illustrated in FIG. 5,** the first limb 24.5 has an end wall part 90 which is integrally formed on the third hook receptacle 52. Said end wall part 90 is aligned with the lower edge of the limb extension 42.5 of the second limb 26.5, thus providing a visually attractive end by means of a common outer surface of the U-section 22.5 in this exemplary case too.

[0045] In contrast to the exemplary embodiments illustrated here, the two limbs of the U-section could furthermore also be fastened to each other by further fastening means, for example by means of one or more screws. In particular, during the installation of the U-section, such screw connections could also serve as an additional means of securing the U-section.

1. A glass panel railing with a U-section comprising:
   - a first limb;
   - a second limb;
   - a first base part;
   - a second base part;
   - a first hook receptacle; and
   - a second hook receptacle, wherein between the two limbs of which a foot region of a glass panel is held in a fixed manner, the U-section is composed of a two-part design, the first limb is fastenable to the building, the second limb is attachable to the first limb so as to provide stability, the two limbs both have a limb extension protruding downward from the base of the U-section, the first base part protrudes transversely from the first limb, the second base part protrudes transversely from the second limb, the first hook receptacle is upwardly open and is provided at a free end of the first base part, the second hook receptacle is downwardly open and is provided at a free end of the second base part, and the second hook receptacle is insertable into the first hook receptacle in a direction parallel to or obliquely with respect to the panel plane.

2-4. (canceled)

5. The glass panel railing according to claim 1, wherein there is a third hook receptacle in the foot region of the first limb extension, there is a fourth hook receptacle in the foot region of the second limb extension, and the third and fourth hook receptacles are insertable one into the other relative to each other in a direction parallel to or obliquely with respect to the panel plane.

6. The glass panel railing according to claim 1, wherein, the first base part and the second base part are both part of the base of the U-section.

7. The glass panel railing according to claim 5, wherein, the second and the fourth hook receptacles are insertable into the first and third hook receptacles from the same direction.

8. The glass panel railing according to claim 1, wherein one of the two limb extensions has an end wall part in such a manner that said end wall part and the other limb extension or the hook formation present on the other limb extension have a common, mutually aligned outer surface of the U-section.

9. The glass panel railing according to claim 1, wherein there are cutouts in the first limb and/or in the first limb extension for the screw or dowel fastening of the U-section to the building and/or to a separate holding profile on the building.

10. The glass panel railing according to claim 1, wherein there is a bent-over suspension portion for the U-section at the upper end of the one limb of the U-section.

11. The glass panel railing according to claim 1, wherein at least one limb with the limb extension present integrally thereon is composed of aluminum or an aluminum alloy.

12. The glass panel railing according to claim 5, wherein, the first base part and the second base part are both part of the base of the U-section.