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(54) **ADJUSTMENT PART**

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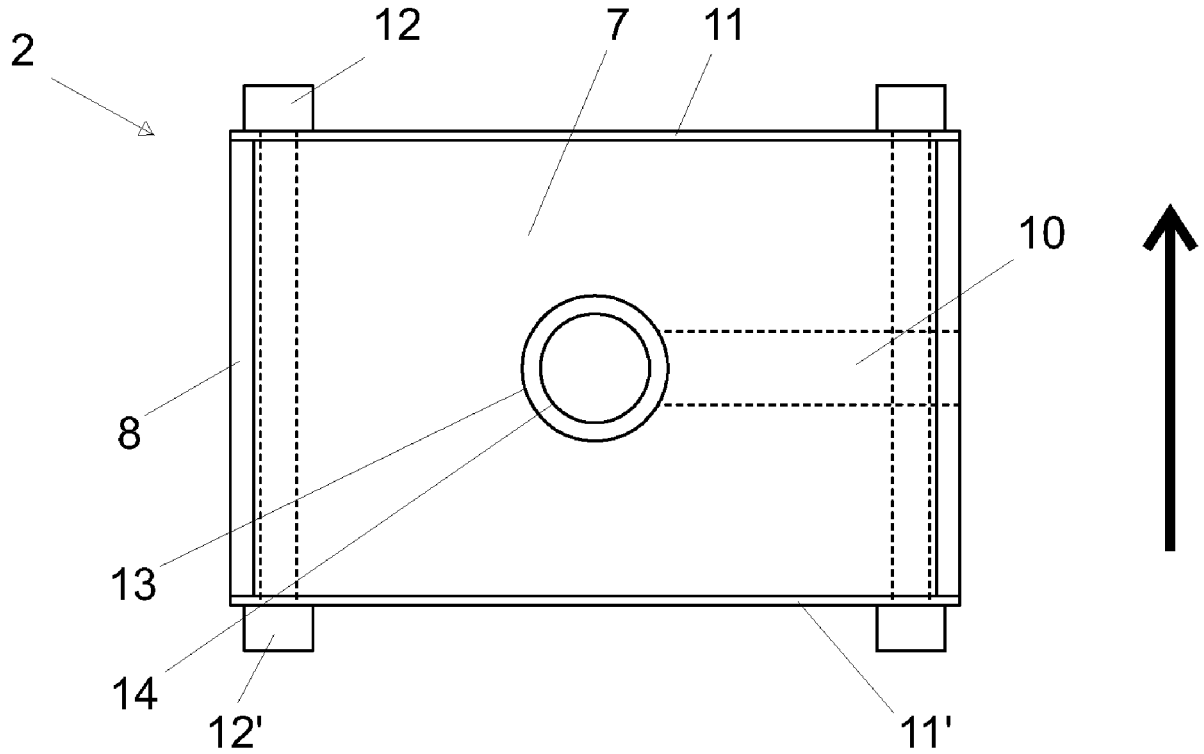
(57) **ABSTRACT**

"An adjustment part for adjusting, in conjunction with installation and fastening, the vertical straightness or position of railing type assemblies, such as glass railings, extending in vertical direction and being fastenable by a bottom edge region, said adjustment part being placed at a fastening point of the railing assembly between the railing assembly and a mounting surface therefor, said adjustment part comprising two mutually inclinable components, a space established between these components for locking a relative position of said mutually inclinable components with a hardening mass, as well as a conduit extending from an external surface of the adjustment part into said space for supplying said space with the hardening mass."



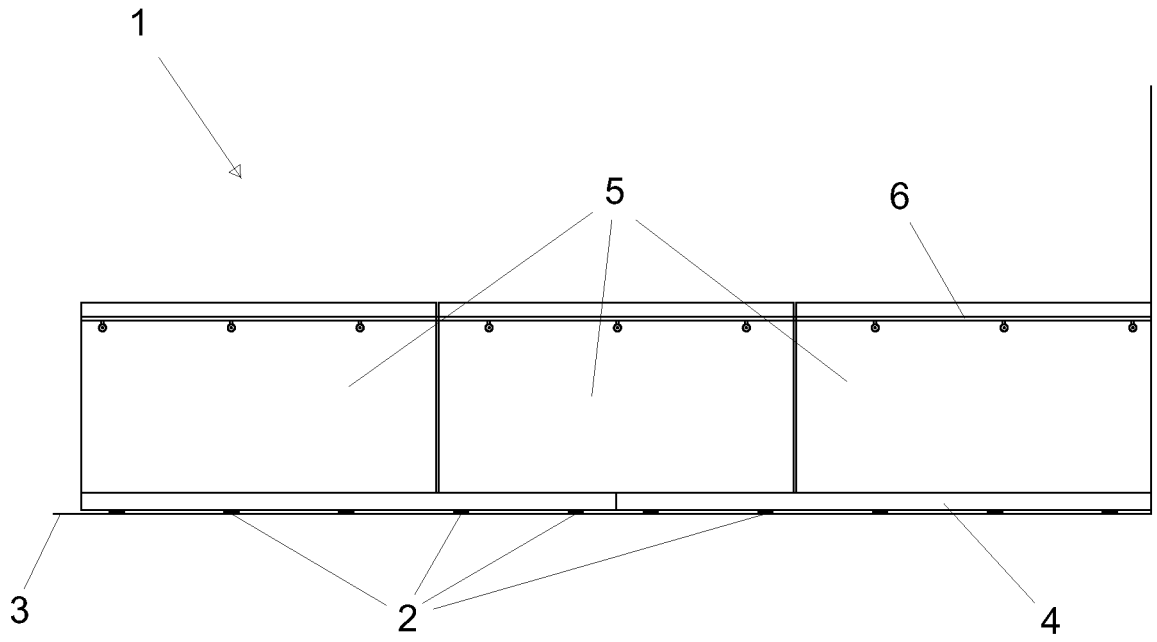


FIG. 1

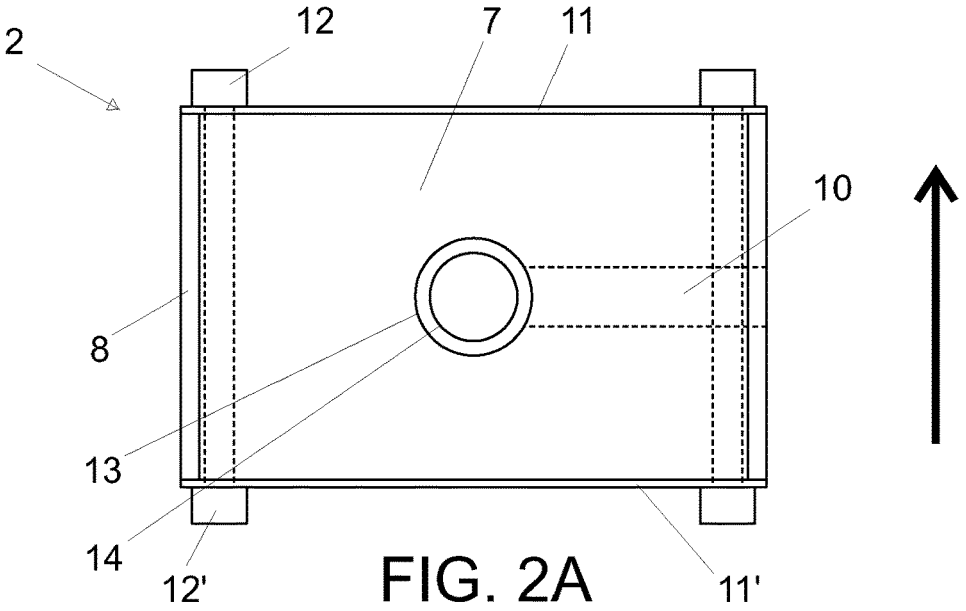


FIG. 2A

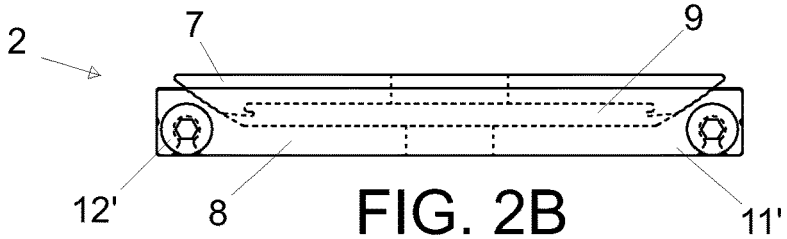


FIG. 2B

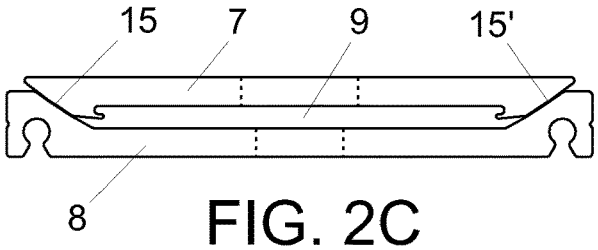


FIG. 2C

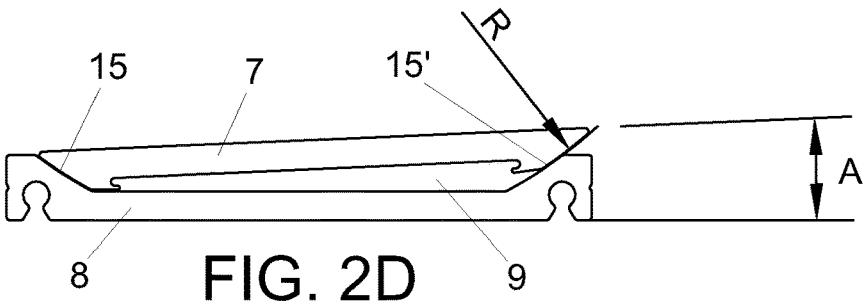


FIG. 2D

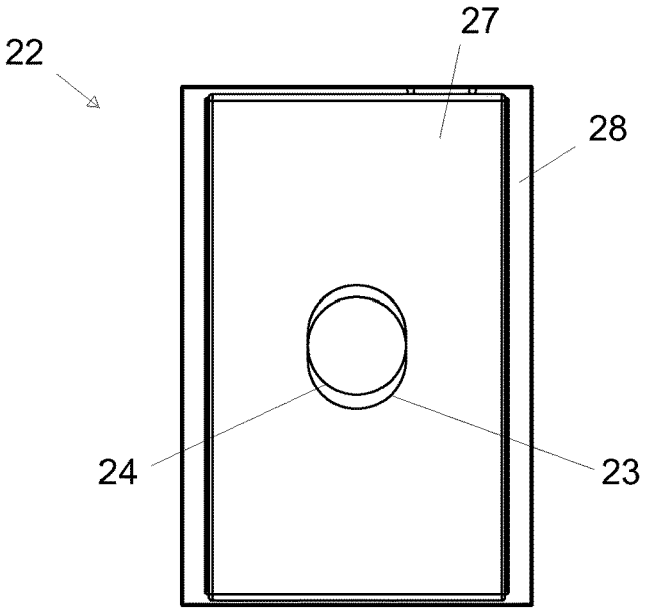


FIG. 3A

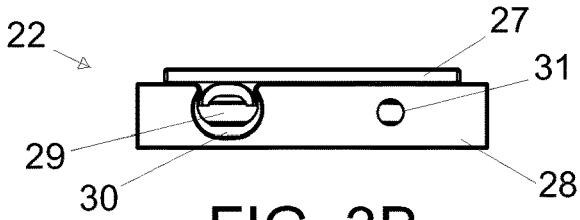


FIG. 3B

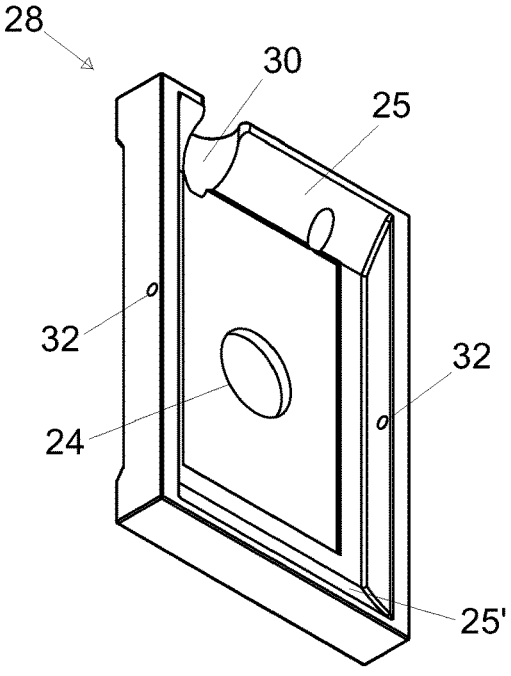


FIG. 3C

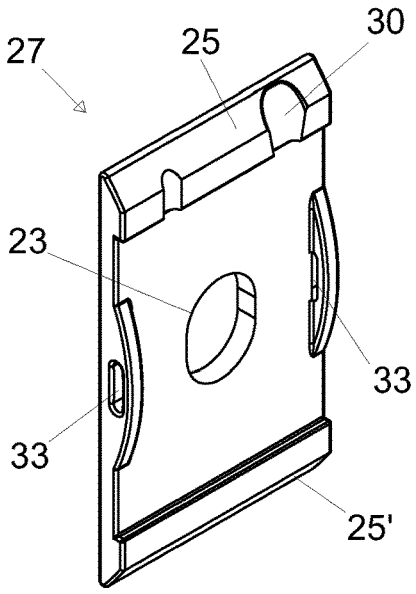


FIG. 3D

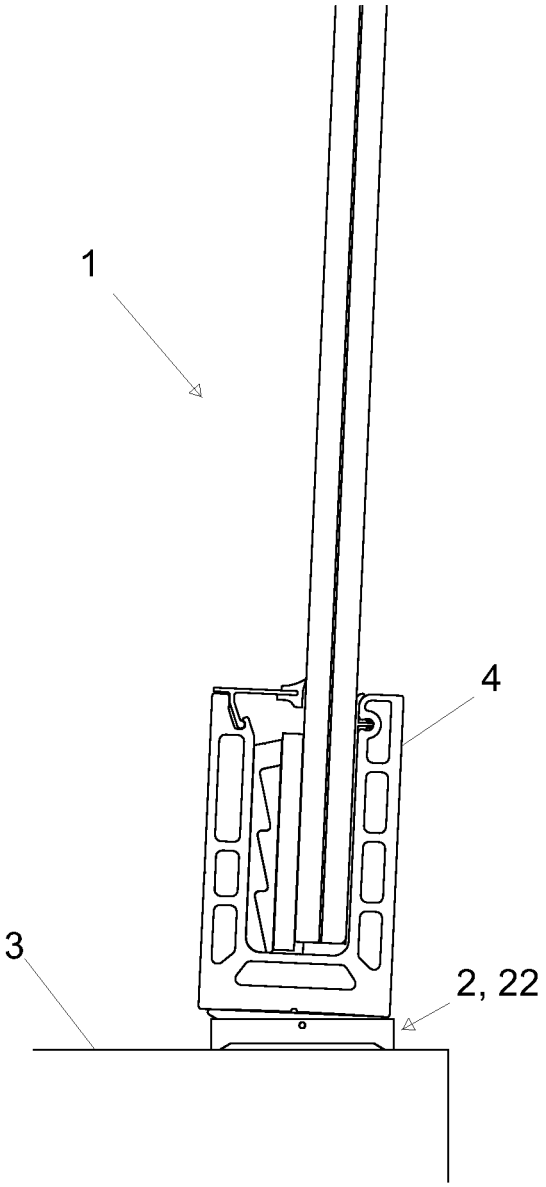


FIG. 4A

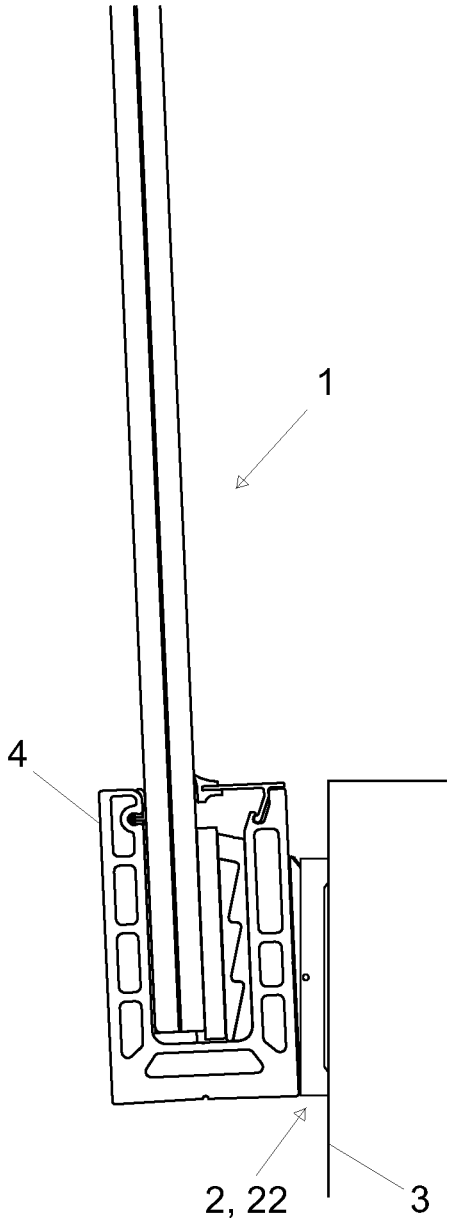


FIG. 4B

ADJUSTMENT PART

[0001] The invention relates to an adjustment part for use in the installation and fastening of railing type assemblies, such as glass railings, extending in vertical direction and being fastenable by a bottom edge region, said adjustment part providing a means to enable adjustment of the discussed railing assembly's vertical straightness.

[0002] Glass railings comprise typically a base member used in fastening a railing, a glass panel section fastenable to the base member, as well as a handrail fastenable to a top edge or top edge region of the glass railing.

[0003] The adjustment of vertical straightness for the glass panel section of prior known glass railings is problematic. It is the position of a glass railing's base member that largely defines the vertical position and straightness of the glass railing placed therein, and the mounting surfaces of a building to be used in fastening a base member may exhibit even major fluctuations in terms of the vertical or horizontal straightness thereof. Correction of the base member's position is generally performed by using various filler plates between the building's mounting surface and the glass railing's base member for ensuring straightness. The use of such filler plates is nevertheless often inconvenient and slows down the installation of a glass railing.

[0004] One prior known solution for adjusting the vertical straightness of a glass railing's glass panel section is to rest a bottom edge of the glass panel section on the bottom of an internal space in the base member and to provide vertically movable support pieces in a top edge region of the base member's internal space, on either side of the glass panel section. These support pieces are displaced in vertical direction on either side of the glass panel section by means of screws included in a top surface of the base member. It is by moving the base member's support pieces to positions offset from each other in vertical direction that the glass panel section can be inclined with respect to the base member, whereby the straightness of the glass panel section can be corrected after the installation of a glass railing.

[0005] US patent application publication 2001025953 A1 discloses a glass railing assembly, comprising a fixedly lockable base member, a glass railing panel fastenable to the base member, an attachment part which provides a wedge effect and is fitted between a sidewall of the base member's internal space and the glass railing panel, as well as a support piece which is fitted between a sidewall of the base member's internal space and one side surface of the glass railing panel, wherein the attachment part and the support piece are inclinable for adjusting the glass railing panel's vertical orientation with respect to the base member.

[0006] However, such an adjustment of the vertical straightness for a glass railing's glass panel section, conducted via a base member or base portion, is a time-consuming process at installation stage, and, depending on the employed solution, may also be troublesome as a result of the adjustment being needed from either side of the railing, especially since there is often a fall on one side of the railing.

[0007] One optional method of adjustment for glass railing assemblies is to employ an intermediate spacer piece, which is placed and/or fixed under or alongside the base member of a glass panel section and by way of which the base member's straightness can be adjusted so as to eliminate the need of separately adjusting the glass panel section's orientation with respect to the base member. One such solution is known from the published patent application EP 2 942 450 A1. However, the attachment and adjustment of such prior known intermediate members require a designated extra work phase prior to the installation and attachment of an actual glass railing.

[0008] It is by the present invention that a simple adjustment is provided for the vertical straightness or position of a glass railing assembly or the like railing assembly which requires vertical straightness and which is to be fastened by a bottom edge region, said adjustment being possible to carry out without a substantial extension to the time needed for installation and fastening operations. The solution according to the invention also preferably enables an adjustment for the vertical straightness or position of such railing assemblies which themselves do not possess any adjustment means for the vertical straightness or position of a vertically extending section.

[0009] The adjustment part according to the invention for adjusting, in conjunction with installation and fastening, the vertical straightness or position of railing type assemblies, such as glass railings, extending in vertical direction and in longitudinal direction as well as being fastenable by a bottom edge region, said adjustment part being placed at a fastening point of the railing assembly between the railing assembly and the surface of a building functioning as a mounting surface therefor, comprises two mutually inclinable components, a space established between these components for locking a relative position of said mutually inclinable components with a hardening mass, as well as a conduit extending from an external surface of the adjustment part into said space for supplying said space with the hardening mass.

[0010] By means of such an adjustment part is enabled an easy adjustment of the vertical straightness of a railing assembly in connection with installation, nor is a separate adjustment required for the vertically extending panel section of a railing assembly to be fastened.

[0011] In this context, the term vertical straightness or position is used in reference to the substantial perpendicularity or vertical position of a railing assembly in a plane transverse and perpendicular relative to the longitudinal direction of a railing type assembly with respect to a substantially horizontal plane, such as typically for example the plane of a building's floor. Hence, in this context, the adjustment of vertical straightness or position refers to inclining a railing type assembly and the vertically extending section or sections thereof in a plane that is substantially perpendicular to a longitudinal direction of the railing type assembly.

[0012] In one preferred embodiment of the invention, regarding said two mutually inclinable components of the adjustment part, one comprises a surface to be set against the surface of an installable railing assembly and the other a surface to be set against the surface of a building, whereby that external surface of the adjustment part, from which said conduit is extending, is different from said adjustment part's surface to be set against the surface of an installable railing assembly, as well as from said surface thereof to be set against the surface of a building. Hence, the locking mass providing a locking effect can be advantageously supplied into a space between the components of the adjustment part after the installable railing assembly has been fitted in place and its vertical straightness has been adjusted.

[0013] In one embodiment of the invention, the surfaces of the adjustment part's two mutually inclinable components to be set against each other are accurate for achieving the inclinability of these components. In this embodiment, the surfaces of said components to be set against each other have a radius of curvature which is preferably 60-80 mm. In addition, the number of curved surfaces in the components to be set against each other is preferably two in the adjustment part, said two curved surfaces setting against each other being placed in edge regions of the adjustment part, and said curved surfaces defining said space therebetween for hardening mass.

[0014] In one embodiment of the invention, the adjustment part comprises a hole extending through each of the mutually inclinable components for a fastening element for the railing assembly to be fastened. Thereby, a fastening bolt or some other fastening element for the railing assembly can be passed through the adjustment part.

[0015] In one embodiment of the invention, the two mutually inclinable components of the adjustment part are provided as extruded aluminum profiles and the ends of these aluminum profiles, transverse relative to the extruding direction, are closed with plate-like pieces for establishing a space for hardening mass between said components.

[0016] Alternatively, the two mutually inclinable components of the adjustment part can be produced by casting of aluminum or stainless steel.

[0017] In one embodiment of the invention, said two mutually inclinable components of the adjustment part are attached to each other in an inclinable manner.

[0018] More specifically, the features of an adjustment part according to the invention are presented in claim **1**. Preferred features and embodiments for an attachment part of the invention are presented in the dependent claims.

[0019] The invention will now be described more precisely by way of example with reference to the accompanying figures, in which

[0020] FIG. **1** shows schematically one railing assembly fastened by means of adjustment parts of the invention,

[0021] FIGS. **2**A-**2**D show schematically one embodiment for an adjustment part of the invention,

[0022] FIGS. **3**A-**3**D show schematically one optional embodiment for an adjustment part of the invention, and

[0023] FIGS. **4**A and **4**B show schematically two different ways of fastening a railing assembly with an adjustment part of the invention.

[0024] FIG. **1** shows schematically a railing assembly, which in the illustrated embodiment is a glass railing assembly **1** fastened by its bottom edge to an appropriate building surface **3** with fastening elements passing through adjustment parts **2** of the invention.

[0025] The glass railing assembly **1** consists typically of a glass railing's base member **4** shown in FIG. **1**, a glass panel section **5** placed in and fastened to the base member, as well as a handrail **6** fastened to an upper portion of the glass panel section.

[0026] In the process of installing the glass railing assembly **1** shown in FIG. **1** in its place, it will be necessary to adjust the railing assembly to a straight position in vertical direction, because the horizontal straightness of its mounting surface **3** is often less than sufficient in terms of ensuring the straightness of an entire railing assembly extending in its longitudinal direction.

[0027] With regard to the embodiment shown in FIG. **1**, it should be noted that a gap, established between the building surface **3** and the base member's bottom surface by the thickness of the adjustment parts **2** present under a bottom of the railing assembly's **1** base member **4**, is typically covered with a separate strip or the like concealment solution in order to make the adjustment parts invisible in the finished glass railing assembly.

[0028] In addition, with regard to the embodiment shown in FIG. **1**, it should be noted that the adjustment parts **2** can also be used in connection with a side surface of the glass railing assembly's **1** base member **4** as the glass railing assembly is being fastened by its bottom region to a vertical building surface.

[0029] FIGS. **2**A-**2**D show schematically and in more detail one adjustment part **2** of the invention and its design. FIG. **2**A shows the adjustment part **2** in a top view, FIG. **2**B shows the adjustment part in a side view, FIG. **2**C shows adjustability-providing components **7** and **8** of the adjustment part in a side view, and FIG. **2**D shows the adjustment part's components **7** and **8** in a maximal adjustment position in a side view.

[0030] The embodiment for an adjustment part **2** of the invention, shown in FIGS. **2**A and **2**B, consists of a top component **7**, a bottom component **8**, a space **9**, a conduit **10**, end plates **11** and **11'**, fastening screws **12** and **12'** for the end plates, a through-hole **13** in the top component, and a through-hole **14** in the bottom component. An arrow alongside FIG. **2** represents the lengthwise direction of a railing type assembly adjustable with the adjustment part **2**, the railing type assembly being tilted by a bottom edge region of the railing type assembly in a plane perpendicular to that lengthwise direction.

[0031] The adjustment part **2** has a top surface of its top component **7** placed against an appropriate surface of the railing type assembly's bottom edge region, either its bottom surface or side surface. The adjustment part has a bottom surface of its bottom component **8** placed against a building's appropriate mounting surface.

[0032] Between the top component **7** and the bottom component **8** is established a space **9**, the end regions of said space being closed by end plates **11** and **11'** which are fastened to the bottom component **8** with fastening screws **12** and **12'** for the end plates. Extending into the space **8** from an outer edge of the adjustment part **2** is a conduit **10**, said conduit being established in this embodiment by coinciding grooves formed both in the top component **7** and in the bottom component **8**. By way of this conduit **10** there is provided a means of supplying the space **9** with hardening mass at the final stage of fastening and vertically adjusting a railing type assembly, whereby, after the hardening of said mass, the top component **7** and the bottom component **8** will be in a locked position relative to each other.

[0033] The adjustment part **2** is formed with a through-hole **13** in the middle of its top component **7**, and the bottom component **8** is formed with a through-hole **14** in the corresponding location. Through these through-holes is inserted an appropriate fastening element for a railing type assembly, such as a fastening bolt, which extends from a bottom part of the railing type assembly through the adjustment part **2** into a structure which defines the building's mounting surface.

[0034] FIGS. **2**C and **2**D show a top component **7** and a bottom component **8** of the adjustment part **2**, as well as changing a relative position of these components.

[0035] The top component **7** and the bottom component **8** are in contact with each other by way of curved surfaces **15**, **15'**, along which the top component **7** can be inclined relative to the bottom component **8**.

[0036] In the embodiment of FIGS. **2**A-**2**D, the adjustment part **2** has a length of about 52 mm in the arrow-pointed direction disregarding the heads of fastening screws **12** and **12'**, the adjustment part has a width of about 80 mm, a thickness of about 11 mm in the condition of FIG. **2**B. The embodiment's curved surfaces **15** and **15'** have a radius of curvature of about 60 mm, resulting in a maximal angle of inclination A between a bottom surface of the bottom component **8** and a top surface of the top component **7** being about 2.5° either way. With a typical railing assembly height, which is about 1 m, is achieved a shift of about 4 cm either way in the railing assembly's top edge.

[0037] FIGS. **3**A-**3**D illustrate schematically one alternative embodiment for an adjustment part of the invention. FIG. **3**A shows an adjustment part **22** in a top view, FIG. **3**B shows the adjustment part from one of its lateral ends, FIG. **3**C shows a bottom component **28** of the adjustment part, and FIG. **3**D shows a top component **27** of the adjustment part. In this embodiment, the adjustment part **22** only consists essentially of the top component **27** and the bottom component **28** which are attached to each other in a swinging manner.

[0038] As opposed to the embodiment of FIGS. **2**A-**2**D, it is in the embodiment of FIGS. **3**A-**3**D that the adjustment part's bottom component **28** is constructed in a single piece by casting, whereby it replaces, as a single piece, the bottom component **8**, the end plates **11**, **11'**, as well as the fastening screws **12**, **12'** for the end plates featured in the embodiment of FIGS. **2***a*-**2**D.

[0039] In the embodiment of FIGS. **3**A-**3**D, the adjustment part **22** has a top surface of its top component **27** placed against an appropriate surface in the bottom edge of a railing type assembly, either its bottom surface or side surface. The adjustment part has a bottom surface of its bottom component **28** placed against an appropriate mounting surface of the building.

[0040] The adjustment part **22** has its top component **27** and its bottom component **28** designed so as to establish a space **29** therebetween. Into this space **29** extends from a lateral end surface of the adjustment part **22** a conduit **30**, said conduit consisting of grooves formed in the top component **27** and in the bottom component **28**. By way of this conduit **30** there is provided a capability of filling the space **29** substantially completely with hardening mass at the final stage of fastening and vertically adjusting a railing type assembly, whereby, after said mass has hardened, the top component **27** and the bottom component **28** will be locked in a relative position with respect to each other. Into the space **29** extends from a lateral end surface of the adjustment part **22** also a smaller conduit **31** by means of which it is possible to confirm that the space **29** is substantially filled with hardening mass.

[0041] The adjustment part **22** is formed with a through-hole **23** in the middle of its top component **27**, and the bottom component **28** is formed with a through-hole **24** in the corresponding location. Through these through-holes **23** and **24** is inserted an appropriate fastening element for a railing type assembly, such as a fastening bolt, which extends from a bottom part of the railing type assembly through the adjustment part **22** into a structure which defines the building's mounting surface.

[0042] The adjustment part **22** has its top component **27** and its bottom component **28** in contact with each other via curved surfaces **25**, **25'**, along which the top component can be inclined relative to the bottom component **28**. In addition, the top component **27** is attached to the bottom component **28** with appropriate rod type fastening elements (not shown) via holes **32** included in the side surfaces of the bottom component **28** and via elongated and curved slots **33** included in the side surfaces of the top component **27**. The elongated and curved slots **33** of the top component **27** allow the top component to be inclinable with respect to the bottom component **28**.

[0043] In the embodiment of FIGS. **3**A-**3**D, the width of the adjustment part **22**, i.e. its extent in the cross-sectional plane of a railing type assembly to be fastened, is about 80 mm. The embodiment's curved surfaces **25** and **25'** have a radius of curvature which is about 60 mm.

[0044] FIGS. **4**A and **4**B illustrate schematically two different ways of fastening a railing type assembly with an adjustment part of the invention.

[0045] FIGS. **4**A and **4**B depict a railing type assembly, in this case a glass railing assembly **1**, which is fastened to an appropriate mounting surface **3** of the building by way of the glass railing assembly's base member **4** through an adjustment part **2**, **22** of the invention.

[0046] In the fastening solution shown in FIG. **4**A, the glass railing assembly **1** is fastened by way of a bottom surface of the base member **4** defining its bottom edge, whereby the adjustment part **2**, **22** is positioned between the base member's bottom surface and the building's substantially horizontal mounting surface **3** in an attachment point area of the glass railing assembly. The width of an adjustment part **2**, **22** to be used in this bottom attachment, i.e. its extent in the glass railing assembly's cross-sectional plane shown in the figure, is preferably about 60 mm, being thereby retained in its entirety under the base member **4**.

[0047] In the fastening solution shown in FIG. **4**B, the glass railing assembly **1** is fastened by way of a side surface of the base member **4** defining its bottom edge, whereby the adjustment part **2**, **22** is positioned between the base member's side surface and the building's substantially vertical mounting surface **3** in an attachment point area of the glass railing assembly. The width of an adjustment part **2**, **22** to be used in this side attachment, i.e. its extent in the glass railing assembly's cross-sectional plane shown in the figure, is preferably about 80 mm.

[0048] Although the invention in the illustrated embodiments is described in the fastening of a glass railing assembly and in adjusting the vertical straightness thereof, it is respectively suitable for the fastening and vertical straightness adjustment of other types of railing-like assemblies as well.

[0049] With regard to the embodiment shown in the figures and described above, it should be appreciated that it is by no means intended to limit the invention. A person skilled in the art will be capable of modifying the disclosed embodiment for a variation suitable for him/her within the scope of protection defined by the appended claims.

1. An adjustment part for adjusting, in conjunction with installation and fastening, the vertical straightness or posi-

tion of railing type assemblies, such as glass railings, extending in vertical direction and being fastenable by a bottom edge region, said adjustment part being placed at a fastening point of the railing assembly between the railing assembly and a mounting surface therefor, and said adjustment part comprising two mutually inclinable components, wherein the adjustment part comprises a space established between said mutually inclinable components, for locking a relative position of said mutually inclinable components with a hardening mass, as well as a conduit extending from an external surface of the adjustment part into said space for supplying said space with the hardening mass.

2. The adjustment part according to claim **1**, wherein, with regard to said two mutually inclinable components of said adjustment part, one comprises a surface to be set against the surface of an installable railing assembly and the other a surface to be set against the surface of a building, whereby that external surface of the adjustment part, from which said conduit is extending, is different from said adjustment part's surface to be set against the surface of an installable railing assembly, as well as from said surface thereof to be set against the surface of a building.

3. The adjustment part according to claim **1**, wherein surfaces of said adjustment part's two mutually inclinable components to be set against each other are curved for achieving the inclinability of these components.

4. The adjustment part according to claim **3**, wherein the surfaces of the components to be set against each other have a radius of curvature which is 60-80 mm.

5. The adjustment part according to claim **3**, wherein the number of curved surfaces in the components to be set against each other is two in the adjustment part, said two curved surfaces setting against each other being placed in edge regions of the adjustment part, and said curved surfaces defining said space therebetween for hardening mass.

6. The adjustment part according to claim **1**, which comprises a hole extending through each of the mutually inclinable components for a fastening element for the railing assembly to be fastened.

7. The adjustment part according to claim **1**, whose two mutually inclinable components are provided as extruded aluminum profiles and the ends of these aluminum profiles, transverse relative to the extruding direction, are closed with plate-like pieces for establishing a space for hardening mass between said components.

8. The adjustment part according to claim **1**, whose two mutually inclinable components are produced by casting of aluminum or stainless steel.

9. The adjustment part according to claim **1**, wherein said two mutually inclinable components are attached to each other in an inclinable manner.

* * * * *