

HINGE FOR A GLASS DOOR

1. Field of the Invention

The present invention relates to a hinge for a glass door, especially to hinge that is adjustable to allow two longitudinal side surfaces of a glass panel
5 respectively corresponding to and being parallel to two longitudinal inner sidewalls of a doorframe.

2. Description of the Prior Art(s)

A glass door has a glass panel mounted on a doorframe via a hinge. A conventional hinge has a stationary base, a pivot base and a holding assembly.
10 The stationary base is securely mounted on the doorframe. The pivot base is securely mounted on the stationary base. The holding assembly has two holding panels holding the glass panel, attached to the glass panel via multiple fasteners and connected to the pivot base via a pivot shaft. Thus, the glass panel is able to pivot relative to the doorframe and to open or close the doorframe.

15 The glass panel has two longitudinal side surfaces. The doorframe has two longitudinal inner sidewalls. In general, the longitudinal inner sidewalls of the doorframe are parallel to each other. Therefore, when the glass panel is closed relative to the doorframe, the longitudinal side surfaces of the glass panel respectively correspond to and are parallel to the longitudinal inner
20 sidewalls of the doorframe. However, as the longitudinal inner sidewalls of the doorframe are not parallel to each other due to manufacturing errors or assembling errors, the glass panel is deflected relative to the doorframe. Consequently, the longitudinal side surfaces of the glass panel are unable to parallel to the longitudinal inner sidewalls of the doorframe, and a clearance

exists between the longitudinal side surfaces of the glass panel and the longitudinal inner sidewalls of the doorframe.

Moreover, in general, people find the clearance exists between the glass panel and the doorframe after the glass panel is mounted on the doorframe via the conventional hinge. Even if the conventional hinge is adjustable, the glass panel has to be disassembled from the conventional hinge to allow the people to measure angles that the conventional hinge has to be adjusted and to adjust the conventional hinge. After the conventional hinge has been adjusted, the people remount the glass panel on the conventional hinge.

The above-mentioned processes of resetting the glass panel are complicated and troublesome.

A conventional ANGULAR ADJUSTMENT ARRANGEMENT OF SIDE PIVOT HINGE, as disclosed in U.S. Patent Application No. 2005/0071952 A1, includes a joint body, a joint seat, a joint housing, and a supporting shaft. The joint body is securely mounted on a glass structure. The joint seat is mounted on a border frame. The joint housing is formed on the joint body and has two locking slots and two adjustment slits respectively communicating with the locking slots. Two ends of the supporting shaft respectively protrude in the locking slots. Two locking members are respectively mounted through the joint housing and rotatably engage with the joint housing to adjust widths of the adjustment slits. Accordingly, the joint body and the glass structure are able to be adjusted to align with the border frame.

However, considering weight of the glass structure, the joint housing should be hard enough to support the glass structure without deformation. That is, the widths of the adjustment slits are hard to be adjusted by merely adjusting engagement of the locking members and the joint housing. Moreover, since two inner surfaces defined around the locking slots are smooth, the joint housing is unable to tightly hold the supporting shaft. Thus, the joint body and the glass

structure easily misalign with the border frame.

Another conventional ADJUSTABLE GLASS HINGE, as disclosed in DE Patent Application No. 20 2008 001 656 U1, includes a fastening assembly fastened to a door frame, and a clipping plate assembly clipping a glass panel.

- 5 The fastening assembly includes a fastening seat, two bucking elements disposed in the fastening seat and coupled respectively with an elastic element, a pintle running through the fastening seat, and a seat board fastened to the fastening seat. The clipping plate assembly has a first clip plate and a second clip plate that are coupled together, and a clipping blade to hold and confine
- 10 two directing members. Two adjusting screws are mounted through the first clip plate to securely press against the directing members. When the glass panel is opened, the adjusting screws can be turned to release from or to hold the directing members. Thus, the pintle as well as the glass panel can be adjusted. However, since the pintle is only laterally held by the directing members, the
- 15 pintle easily slides axially, such that the glass panel is unstable.

- The main objective of the present invention is to provide a hinge for a glass door. The hinge has a securing fitting, a door holding assembly holding a glass panel, a pivot base securely attached to the securing fitting, a pivot shaft rotatably mounted through the pivot base and two stop screws. The pivot shaft
- 20 has multiple positioning recesses longitudinal arranged along the pivot shaft, and two positioning rods respectively protrude axially ends of the pivot shaft and pivotally connected to the door holding assembly. Multiple positioning balls are mounted in the pivot base and are pushed by multiple springs to engage the positioning recesses of the pivot shaft. The stop screws are mounted
- 25 through the door holding assembly and selectively abut the positioning rods of the pivot shaft to allow the pivot shaft being adjusted or being held in a closing position. Thus, the glass panel is able to be adjusted to close a doorframe.

IN THE DRAWINGS:

Fig. 1 is an operational perspective view of a hinge for a glass door in accordance with the present invention;

Fig. 2 is an exploded perspective view of the hinge in Fig. 1;

5 Fig. 3 is a side view in partial section of the hinge in Fig. 1;

Fig. 4 is another side view in partial section of the hinge in Fig. 1;

Fig. 5 is an operational top view in partial section of the hinge along line 5-5 in Fig. 3; and

Fig. 6 is another operational top view in partial section of the hinge in
10 Fig. 1.

With reference to Figs. 1 and 2, a hinge for a glass door in accordance with the present invention comprises a securing fitting 10, a door holding assembly 40, a pivot base 20, a pivot shaft 30 and two stop screws 44.

The securing fitting 10 is a panel and has multiple securing holes 11
15 and two mounting holes 12. The securing holes 11 are separately formed through the securing fitting 10. Multiple fasteners are mounted through the securing holes 11 of the securing fitting 10 and are fastened to a doorframe so the securing fitting 10 is securely mounted on the doorframe. The mounting
holes 12 of the securing fitting 10 are separately formed through the securing
20 fitting 10.

With further reference to Fig. 4, the door holding assembly 40 is disposed beside the securing fitting 10 and has a first holding panel 41, a second holding panel 42, two fastening screws 420, a mounting seat 43, two limiting bars 434, three foamed pads 45, two cushion pads 46, a resilient pad

47.

The first holding panel 41 has a rear edge 411, an inner surface, a mounting recess and two connecting portions 410. The rear edge 411 of the first holding panel 41 corresponds to the securing fitting 10. The mounting
 5 recess of the first holding panel 41 is formed in the rear edge 411 of the first holding panel 41. The connecting portions 410 are separately formed on and protrude from the inner surface of the first holding panel 41. Each connecting portion 410 of the first holding panel 41 has an inner thread formed in the connecting portion 410.

10 The second holding panel 42 is disposed beside and is separate from the first holding panel 41, and has a rear edge, an inner surface, a mounting recess and two connecting holes 421. The rear edge of the second holding panel 42 corresponds to the securing fitting 10. The inner surface of the second holding panel 42 corresponds to the inner surface of the first holding panel 41.
 15 The mounting recess of the second holding panel 42 is formed in the rear edge of the second holding panel 42 and aligns with the mounting recess of the first holding panel 41. The connecting holes 421 of the second holding panel 42 are separately formed through the second holding panel 42 and respectively align with the connecting portions 410 of the first holding panel 41.

20 The fastening screws 420 are respectively mounted through the connecting holes 421 of the second holding panel 42 and are respectively fastened to the inner threads of the connecting portions 410 of the first holding panel 41. A glass panel 50 is held between the first and second holding panels 41, 42.

The mounting seat 43 is formed on the inner surface of the first holding panel 41, is disposed around the mounting recess of the first holding panel 41 and has a longitudinal portion, two lateral portions, a rear side surface 435, a longitudinal outer surface, a longitudinal inner surface, two outer lateral surfaces, two positioning recesses 430, two inner sidewalls, two abutting sidewalls 432, two adjusting threaded holes 431 and two limiting bar holes 433. Each lateral portion has a proximal end and a distal end surface. The proximal end of the lateral portion is attached to the longitudinal portion. The longitudinal outer surface and the longitudinal inner surface of the mounting seat 43 are defined on the longitudinal portion. The outer lateral surfaces of the mounting seat 43 are respectively defined on the lateral portions. The distal end surfaces of the lateral portions form the rear side surface 435 of the mounting seat 43 and the rear side surface 435 is separated from the rear edge 411 of the first holding panel 41. The positioning recesses 430 of the mounting seat 43 are separately formed in the mounting seat 43, are arranged longitudinally and are respectively formed longitudinally through the lateral portions of the mounting seat 43. The inner sidewalls of the mounting seat 43 are respectively defined in the positioning recesses 430 of the mounting seat 43. The abutting sidewalls 432 of the mounting seat 43 are respectively defined in the positioning recesses 430 of the mounting seat 43 and respectively correspond to the inner sidewalls of the mounting seat 43. The adjusting threaded holes 431 are respectively formed transversely in the inner sidewalls of the mounting seat 43, are formed through the rear side surface 435 of the mounting seat 43, are formed through the mounting seat 43 and are respectively formed transversely through the

lateral portions of the mounting seat 43. Each adjusting threaded hole 431 is disposed between the inner sidewall and the distal end surface of the lateral portion of the mounting seat 43. The limiting bar holes 433 are separately formed transversely in the mounting seat 43, respectively communicate with
 5 the positioning recesses 430 of the mounting seat 43, are respectively formed transversely through the lateral portions of the mounting seat 43. Each limiting bar hole 433 is disposed between the inner sidewall and the distal end surface of the lateral portion of the mounting seat 43. The limiting bars 434 are respectively mounted in the limiting bar holes 433 and protrude in the
 10 positioning recesses 430 of the mounting seat 43.

The foamed pads 45 are respectively mounted on the outer lateral surfaces and the longitudinal outer surface of the mounting seat 43, and are held between the mounting seat 43 and the glass panel 50. The cushion pads 46 are respectively mounted on the inner surfaces of the first and second holding
 15 panels 41, 42, and are respectively held between the first holding panel 41 and the glass panel 50 and between the second holding panel 42 and the glass panel 50. The resilient pad 47 is mounted on the longitudinal inner surface of the mounting seat 43.

With further reference to Fig. 3, the pivot base 20 is mounted in the
 20 mounting recesses of the first and second holding panels 41, 42, is securely attached to the securing fitting 10, resilient abuts the resilient pad 47 and has a rear surface, two end surfaces, a pivot hole 21, multiple spring holes 23, multiple springs 24, multiple positioning balls 25, two fastening holes 22, two fasteners 220 and two end panels 26.

The rear surface of the pivot base 20 corresponds to the securing fitting 10. The pivot hole 21 is longitudinally formed through the pivot base 20. The spring holes 23 are separately formed transversely in the rear surface of the pivot base 20 and communicate with the pivot hole 21. The springs 24 are
 5 respectively mounted in the spring holes 23. Each spring 24 has an inner end. The positioning balls 25 are respectively mounted in the spring holes 23. Each positioning ball 25 abuts the inner end of a corresponding spring 24 and is pushed toward the pivot hole 21.

The fastening holes 22 of the pivot base 20 are separately formed
 10 transversely in the rear surface of the pivot base 20 and respectively align with the mounting holes 12 of the securing fitting 10. The fasteners 220 are respectively mounted through the mounting holes 12, 22 of the securing fitting 10 and the pivot base 20 and are fastened to the pivot base 20. Thus, the pivot base 20 is securely mounted on the securing fitting 10 as well as the doorframe.

15 The end panels 26 are respectively mounted on the end surfaces of the pivot base 20. Each end panel 26 has a through hole 260 formed through the end panel 26, aligning with the pivot hole 21 of the pivot base 20 and being smaller than the pivot hole 21 in diameter.

The pivot shaft 30 is cylindrical, is rotatably mounted through the pivot
 20 hole 21 of the pivot base 20, is larger than the through holes 260 of the end panels 26 in diameter, is smaller than the pivot hole 21 of the base 20 in diameter and has an outer surface, two ends, multiple positioning recesses 31, two positioning rods 32 and two limiting grooves 320.

The positioning recesses 31 of the pivot shaft 30 are separately formed

in the outer surface of the pivot shaft 30, are longitudinal arranged along the pivot shaft 30, respectively correspond to the spring holes 23 of the pivot base 20 and respectively engage the positioning balls 25.

The positioning rods 32 are respectively formed on and axially
 5 protrude from the ends of the pivot shaft 30, is smaller than the through holes 260 of the end panels 26 in diameter, are respectively mounted through the through hole 260 of the end panels 26 and protrude out of the pivot base 20. Each positioning rod 32 has a side surface being grained. The limiting grooves 320 are respectively formed in and around the side surface of the positioning
 10 rods 32 and respectively engage the limiting bars 434 of the door holding assembly 40 so the pivot shaft 30 is stably mounted in the positioning recesses 430 of the mounting seat 43.

With further reference to Fig. 5, the stop screws 44 are respectively mounted adjustably in the threaded holes 431 of the mounting seat 43 and
 15 selectively abut and push the positioning rods 32 of the pivot shaft 30. Thus, the positioning rods 32 of the pivot shaft 30 are held between the stop screws 44 and the abutting sidewalls 432 of the mounting seat 43 and the pivot shaft 30 is secured to the door holding assembly 40. When the door holding assembly 40 and the glass panel 50 rotate, the pivot shaft 30 rotates accordingly.
 20 As the glass panel 50 is closed relative to the doorframe, the positioning balls 25 respectively engage the positioning recesses 31 of the pivot shaft 30. Consequently, the glass panel 50 is held in a closing position.

With reference to Fig. 5, showing a doorframe having two longitudinal inner sidewalls 60, 61 being parallel to each other. When the glass panel 50 is

closed relative to the doorframe, two longitudinal side surfaces of the glass panel 50 respectively correspond to and are parallel to the longitudinal inner sidewalls 60, 61 of the doorframe.

With reference to Fig. 6, showing a doorframe having two longitudinal
5 inner sidewalls 62, 63 being not parallel to each other. Thus, when the glass door 50 is closed relative to the doorframe, the longitudinal side surfaces of the glass panel 50 may not respectively correspond to the inner sidewalls 62, 63 of the doorframe and the glass panel 50 may be deflected relative to the doorframe. Under this circumstance, the stop screws 44 are loosened to release
10 the positioning rods 32 of the pivot shaft 30. Thus, the pivot shaft 30 is capable of being rotated relative to the door holding assembly 40. Then, positions of the positioning recesses 31 of the pivot shaft 30 are adjusted and the closing position of the glass panel 50 is also adjusted accordingly. Therefore, the longitudinal side surfaces of the glass panel 50 is able to respectively
15 correspond to the inner sidewalls 62, 63 of the doorframe when the glass panel 50 is closed relative to the doorframe.

CLAIMS

1. A hinge for a glass door comprising:
 - a securing fitting (10);
 - 5 a door holding assembly (40) disposed beside the securing fitting (10) and having:
 - a mounting seat (43) having:
 - two positioning recesses (430) separately formed in the mounting seat (43) and arranged longitudinally;
 - 10 two inner sidewalls respectively defined in the positioning recesses (430) of the mounting seat (43);
 - two abutting sidewalls (432) respectively defined in the positioning recesses (430) of the mounting seat (43) and respectively corresponding to the inner sidewalls of the mounting seat (43);
 - 15 two adjusting threaded holes (431) respectively formed transversely in the inner sidewalls of the mounting seat (43) and formed through the mounting seat (43); and
 - two limiting bar holes (433) separately formed transversely in the mounting seat (43) and respectively communicating with the positioning recesses (430) of the mounting seat (43); and
 - 20 two limiting bars (434) respectively mounted in the limiting bar holes (433) and protruding in the positioning recesses (430) of the mounting seat (43);
 - a pivot base (20) securely attached to the securing fitting (10) and

having:

a rear surface corresponding to the securing fitting (10);

a pivot hole (21) longitudinally formed through the pivot base (20);

5 multiple spring holes (23) separately formed transversely in the rear surface of the pivot base (20) and communicating with the pivot hole (21);

multiple springs (24) respectively mounted in the spring holes (23), and each spring having an inner end; and

multiple positioning balls (25) respectively mounted in the
10 spring holes (23), and each positioning ball (25) abutting the inner end of a corresponding spring (24) and pushed toward the pivot hole (21);

a pivot shaft (30) rotatably mounted through the pivot hole (21) of the pivot base (20) and having:

an outer surface;

15 two ends;

multiple positioning recesses (31) separately formed in the outer surface of the pivot shaft (30), longitudinal arranged along the pivot shaft (30), respectively corresponding to the spring holes (23) of the pivot base (20) and respectively engaging the positioning balls (25);

20 two positioning rods (32) respectively formed on and axially protruding from the ends of the pivot shaft (30) and protruding out of the pivot base (20) , and each positioning rod (32) having a side surface; and

two limiting grooves (320) respectively formed in and around the side surfaces of the positioning rods (32) and respectively engaging the

limiting bars (434) of the door holding assembly (40); and

two stop screws (44) respectively mounted adjustably in the threaded holes (431) of the mounting seat (43) and selectively abutting and pushing the positioning rods (32) of the pivot shaft (30).

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2. The hinge as claimed in claim 1, wherein the side surface of each positioning rod (32) of the pivot shaft (30) is grained.

3. The hinge as claimed in claim 2, wherein

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the pivot base (20) further has:

two end surfaces; and

two end panels (26) respectively mounted on the end surfaces of the pivot base (20), and each end panel (26) having a through hole (260) formed through the end panel (26), aligning with the pivot hole (21) of the pivot base (20) and being smaller than the pivot hole (21) in diameter;

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the pivot shaft (30) is larger than the through holes (260) of the end panels (26) in diameter and is smaller than the pivot hole (21) of the base (20) in diameter; and

the positioning rods (32) of the pivot shaft (30) are smaller than the through holes (260) of the end panels (26) in diameter and are respectively mounted through the through holes (260) of the end panels (26).

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4. The hinge as claimed in claim 1, 2 or 3, wherein

the door holding assembly (40) further has:

a first holding panel (41) having an inner surface; and

a second holding panel (42) disposed beside and separate from

5 the first holding panel (41); and

the mounting seat (43) of the door holding assembly (40) is formed on the inner surface of the first holding panel (41).

5. The hinge as claimed in claim 4, wherein

10 the first holding panel (41) further has a rear edge (411);

the mounting seat (43) further has a rear side surface (435) separated from the rear edge (411) of the first holding panel (41); and

the adjusting threaded holes (431) are formed through the rear side surface (435) of the mounting seat (43).

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6. The hinge as claimed in claim 5, wherein

the first holding panel (41) further has a mounting recess formed in the rear edge (411) of the first holding panel (41);

the second holding panel (42) further has a mounting recess formed in
20 the rear edge of the second holding panel (42) and aligning with the mounting recess of the first holding panel (41); and

the pivot base (20) is mounted in the mounting recesses of the first and second holding panels (41, 42).

7. The hinge as claimed in claim 6, wherein
the second holding panel (42) further has an inner surface
corresponding to the inner surface of the first holding panel (41);
the mounting seat (43) of the door holding assembly (40) further has a
5 longitudinal outer surface and two outer lateral surfaces; and
the door holding assembly (40) further has:
three foamed pads (45) respectively mounted on the outer lateral
surfaces and the longitudinal outer surface of the mounting seat (43); and
two cushion pads (46) respectively mounted on the inner
10 surfaces of the first and second holding panels (41, 42).
8. The hinge as claimed in claim 7, wherein
the mounting seat (43) of the door holding assembly (40) further has a
longitudinal inner surface; and
15 the door holding assembly (40) further has a resilient pad (47) mounted
on the longitudinal inner surface of the mounting seat (43) and resiliently
abutting the pivot base (20).