

A CURTAIN-WALL GLASS SAFETY RETAINER CLAMP

BACKGROUND OF THE INVENTION

[0001] 1. Technical Field

[0002] The utility model relates to the field of fasteners used for building construction, in particular to a clamp used for fastening two adjacent pieces of glass when glass curtain walls are installed.

[0003] 2. Description of Related Art

[0004] In principle, glass may not be attached or secured on metal frames for long term stability using bonding materials such as sealant and adhesive tapes.. During installation, whether or not the functions illustrated by bonding material manufacturers can be fulfilled its life expectancy, performance should depends on the construction quality when the non-mechanical connection is adopted. The requirements for bonding material to cure and picking up the bonding or adhesive strength during construction is high. And the total construction time is fairly long; the system will not completely come into effect until a certain time after construction, namely the bonding material can only fulfill the fixing function after being completely dried or cured. The bonding materials are volatilized in the drying process and will emit hazardous co-solvents which may affect human health and pollute the ambient environment. After construction, the bonding material will be exposed to degradation from the ambient environment and will age at different rates at any given different location or environment with no calculation can be done. ; There is little or almost no sign to indicate the bonding materials on its' time for failure or has becoming ineffective until the real time of failure occurred when the glass is detached from the frame. In this circumstance, stability of the glass become a doubt, in additional, the restoration time is even longer than the original construction time, and the glass may be damaged during restoration.

BRIEF SUMMARY OF THE INVENTION

[0005] The objective of the utility model is to overcome the shortcomings of the prior art by providing a curtain-wall glass safety retainer clamp which adopts mechanical fastening, has a short construction time and low requirements for construction surfaces preparation and construction quality, it is free of pollution, and is barely affected by the ambient environment.

[0006] The technical solution adopted by the utility model to fulfill the above-mentioned objective is as follows: a curtain-wall glass safety retainer clamp comprises a washer, a screw rod, a safety retainer, a nut, and a fixed screw cap arranged at one end of the screw rod, wherein at least two compressible structures are arranged in the safety retainer, and the other end of the screw rod penetrates through the washer to be connected with the safety retainer and the nut. During installation, two adjacent pieces of glass on a glass curtain wall are respectively placed into an upper metal frame and a lower metal frame which are made from sectional bars, and one surfaces of the glass are attached to the metal frames; the safety retainer is horizontally placed and is then pushed into a gap between the upper metal frame and the lower metal frame, then the safety retainer is rotated till two side faces of the safety retainer respectively make contact with the upper metal frame and the lower metal frame, at this moment, one end face of the safety retainer makes contact with an internal baffle of the corresponding metal frame and it might be compressed inside a chamber, the washer connected with the safety retainer through the screw rod is attached to the other surfaces of the two pieces of glass, and accordingly, the connected ends of the two adjacent pieces of glass are located between the metal frames and the washer as well as between the safety retainer and the washer; and the screw rod is rotated to adjust the distance between the safety retainer and the washer according to thicknesses of the glass so that the connected ends of the two adjacent pieces of glass are

closely attached to the washer, the upper metal frame and the lower metal frame, and the glass is fastened.

[0007] Preferably, the number of the compressible structures is two; the safety retainer includes a connecting chamber, the two compressible structures respectively arranged on external walls of two sides of the connecting chambers, and two installation chambers respectively arranged on two symmetrical surfaces of the two compressible structures; an internal hexagonal hole is formed in the connecting chambers, the other end of the screw rod is inserted into the connecting chambers and is connected with the nut arranged in the connecting chambers, and the compressible structures are elastic chambers; and the elastic chambers are made from flexible materials and can be deformed to form the compressible structures of the safety retainer.

[0008] Sections of the elastic chambers are in a regular polygon shape; each installation chamber includes an upper horizontal plate, a lower horizontal plate, a vertical plate and an arc plate which are integrally formed; and two arc plates of the two installation chambers are respectively located on two side faces of the safety retainer. In order to push the safety retainer 3 into a small installation space between glass curtain walls, the two installation chambers are provided with the arc plates. The two arc plates are located on the two side faces of the safety retainer, which means that with the safety retainer in a horizontal state as reference, the arc plate of the installation chambers located on one side of the safety retainer is located at the upper end of this installation chambers and the arc plate of the installation chambers located on the other side of the safety retainer is located at the lower end of this installation chambers. In this structure, when the arc plates are pushed into the gap between the upper metal frame and the lower metal frame which are used for installing the two adjacent pieces of glass, no matter which side of the safety retainer in the horizontal state is pushed forwards, the arc plates make contact with the upper metal frame or the lower metal frame first, and then the safety retainer is

conveniently pushed into the gap and turned to fulfill a fastening effect with or without compression.

[0009] To facilitate production and reduce costs, the safety retainer is formed by the connecting chambers, the two elastic chambers and the two installation chambers which are integrally formed.

[0010] Preferably, the washer is square, and installation grooves are formed in four side faces of the washer.

[0011] The utility model has the following beneficial effects: during installation, the two adjacent pieces of glass on the glass curtain wall are respectively placed into the upper metal frame and the lower metal frame which are made from sectional bars, and one surfaces of the two adjacent pieces of glass are respectively attached to the upper metal frame and the lower metal frame; the safety retainer is horizontally placed and is then pushed into the gap between the upper metal frame and the lower metal frame, then the safety retainer is rotated by 90°, namely the safety retainer in the horizontal state is rotated to be vertical, at this moment, the two side faces of the safety retainer respectively make contact with the upper metal frame and the lower metal frame, and one end face of the safety retainer makes contact with the internal baffle of the lower metal frame, the washer connected with the safety retainer through the screw rod is attached to the other surfaces of the two pieces of glass, and accordingly, the connected ends of the two adjacent pieces of glass are located between the upper and lower metal frames and the washer as well as between the safety retainer and the washer; and the screw rod is rotated to adjust the distance between the safety retainer and the washer according to the thicknesses of the glass, so that the connected ends of the two adjacent pieces of glass are closely attached to the washer, the upper metal frame and the lower metal frame, and the glass is fastened. Compared with the prior art, by adoption of the above structure, the glass is mechanically fastened on the upper metal frame and the lower metal frame through the curtain-wall

glass safety retainer clamp instead of glue, so that the construction time is short, the requirements for construction surfaces and construction quality are low, pollution is avoided, and the clamp is barely affected by the ambient environment. The elastic structures of the safety retainer have no influence on normal vertical movement of an upper curtain wall and a lower curtain wall, so that maintenance of the curtain walls is facilitated, the service life of curtain wall systems is prolonged, and potential safety hazards are eliminated.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

- [0012] Fig. 1 is an exploded view of the utility model;
- [0013] Fig. 2 is a front view of a safety retainer of the utility model;
- [0014] Fig. 3 is a sectional view of the safety retainer of the utility model;
- [0015] Fig. 4 is a side view of a washer of the utility model;
- [0016] Fig. 5 is a sectional view of the washer of the utility model;
- [0017] Fig. 6 is an installation diagram of the utility model.

DETAILED DESCRIPTION OF THE INVENTION

[0018] For a better understanding of the solution of the utility model by those skilled in this field, the utility model is further expounded as follows in combination with the accompanying drawings and implementations.

[0019] As shown in Fig. 1 to Fig. 5, a curtain-wall glass safety retainer clamp comprises a washer 1, a screw rod 2, a safety retainer 3, a nut 4, and a fixed screw cap 5 arranged at one end of the screw rod 2, wherein at least two compressible structures 302 are arranged in the safety retainer 3, and the other end of the screw rod 2 penetrates through the washer 1 to be connected with the safety retainer 3 and the nut, namely the safety retainer and the washer are connected through the screw rod.

[0020] In this embodiment, the number of the compressible structures 302 is two; the safety retainer 3 includes a connecting chambers 301, the two compressible structures 302 respectively arranged on external walls of two sides of the connecting chambers 301, and two installation chambers 303 respectively arranged on two symmetrical surfaces of the two compressible structures 302; an internal hexagonal hole is formed in the connecting chambers to accommodate the nut 4, and the other end of the screw rod 2 is inserted into the connecting chambers 301 and is connected with the nut 4 arranged in the connecting chambers. The compressible structures 302 are elastic chambers and are made from flexible materials, the number of the compressible structures is set according to actual conditions, and the compressible structures are generally configured in pairs and are respectively arranged at two sides of the connecting chambers 301.

[0021] Sections of the elastic chambers 302 are in the shape of a regular polygon such as a regular hexagon; each installation chambers 303 includes an upper horizontal plate 303a, a lower horizontal plate 303b, a vertical plate 303c and an arc plate 303d which are integrally formed; and two arc plates 303d of the two installation chambers are respectively located on two side faces of the safety retainer 3. In order to push the safety retainer 3 into a small installation space between glass curtain walls, the two installation chambers are provided with the arc plates 303d. The two arc plates 303d are located on the two side faces of the safety retainer 3, which means that with the safety retainer 3 in a horizontal state as reference, the arc plate of the installation chambers located on one side of the safety retainer is located at the upper end of this installation chambers 303 and the arc plate of the installation chambers located on the other side of the safety retainer is located at the lower end of this installation chambers 303. As shown in Fig. 2, in this structure, when the safety retainer 3 is pushed into the gap between the upper metal frame and the lower metal frame which are used for installing two adjacent pieces of glass, no matter which side of the safety retainer 3 in the horizontal state is pushed forwards, the arc

plates 303d make contact with the upper metal frame or the lower metal frame first, and then the safety retainer 3 is conveniently pushed into the gap.

[0022] To facilitate production and to reduce costs, the safety retainer 3 is formed by the connecting chambers 301, the two elastic chamberss 302 and the two installation chamberss 303 which are integrally formed.

[0023] In this embodiment, the washer 1 is square, and installation grooves 101 are formed in four side faces of the washer and are used for installing LED lamps.

[0024] As shown in Fig. 6, during installation, two adjacent pieces of glass 6 on a glass curtain wall are respectively placed into the upper metal frame 7 and the lower metal frame 8 which are made from sectional bars, and one surfaces of the two adjacent pieces of glass 6 are respectively attached to the upper metal frame and the lower metal frame; the safety retainer 3 is horizontally placed and is then pushed into the gap between the upper metal frame 7 and the lower metal frame 8, then the safety retainer 3 is rotated till the two side faces of the safety retainer 3 respectively make contact with the upper metal frame 7 and the lower metal frame 8, and at this moment, one end face of the safety retainer 3 makes contact with an internal baffle 9 of the lower metal frame, the washer 1 connected with the safety retainer 3 through the screw rod 2 is attached to the other surfaces of the two pieces of glass 6, and accordingly, connected ends of the two adjacent pieces of glass are located between the upper and lower metal frames and the washer 1 as well as between the safety retainer 3 and the washer 1; and the screw rod 2 is rotated to adjust the distance between the safety retainer 3 and the washer 1 according to the thicknesses of the glass, so that the connected ends of the two adjacent pieces of glass 6 are closely attached to the washer 1, the upper metal frame 7, and the lower metal frame 8, and the glass is fastened. Compared with the prior art, by adoption of the above structure, the glass is mechanically fastened on the upper metal frame and the lower metal frame through the curtain-wall glass safety retainer clamp instead of glue, so that the

construction time is short, the requirements for construction surfaces and construction quality are low, pollution is avoided, and the clamp is barely affected by the ambient environment. The elastic structures of the safety retainer have no influence on normal vertical movement of an upper curtain wall and a lower curtain wall, so that maintenance of the curtain walls is facilitated, the service life of curtain wall systems is prolonged, and potential safety hazards are eliminated.

[0025] The utility model is described with reference to the above embodiments, but those ordinarily skilled in this field would appreciate that many transformations and changes of the utility model can be made without deviating from the spirit of the utility model, and these transformations and changes obtained without deviating from the spirit of the utility model are expected to be included in the appended claims.

What is claimed is:

1. A curtain-wall glass safety retainer clamp, comprising
a washer;
a safety retainer having at least two compressible structures are arranged therein;
a nut ;
a screw rod that penetrates through the washer to be connected with the safety retainer
and the nut; and
a fixed screw cap arranged at an end of the screw rod;
wherein the safety retainer includes a cylindrical connecting chamber, where two
elongated compressible structures each have one surface symmetrically arranged on the
external walls of the connecting chamber for the connecting chamber to be sandwiched
in-between, with two installation chambers each systematically arranged for each of the
compressible structure to be housed in between the installation chamber and the
connecting chamber, the connecting chamber further including the nut arranged therein,
for receiving the end of the screw rod when the screw rod inserted into the connecting
chamber.

2. The curtain-wall glass safety retainer clamp according to Claim 1, wherein the
compressible structures are elastic chambers, and an internal hexagonal hole is formed in
the connecting chamber for the nut to be arranged therein.

3. The curtain-wall glass safety retainer clamp according to Claim 1, wherein sections
of the elastic chambers are in a regular polygon shape; each said installation chambers
includes an upper horizontal plate, a lower horizontal plate, a vertical plate, and an arc
plate which are integrally formed; and two arc plates of the two installation chambers are
respectively located on two opposite longitudinal side faces of the safety retainer.

4. The curtain-wall glass safety retainer clamp according to Claim 1, wherein the safety retainer is formed by the connecting chamber, the two elastic chambers and the two installation chambers which are integrally formed.

5. The curtain-wall glass safety retainer clamp according to Claim 1, wherein the washer is square shaped, and further comprises installation grooves on four side faces of the washer.