

AN IMPROVED HINGE CONSTRUCTION

The present invention relates to an improved hinge construction, and more particularly to an improved hinge construction that can effectively provide a substantially noiseless hinge for a door or window frame.

As shown in FIGS. 6 and 7, a conventional hinge construction for a door comprises a fixing plate (90) adapted to be mounted on a frame, a pair of parallel clamping plates (93), a U-shaped block (931), a pivot block (91) attached to the fixing plate (90), a pintle (92), a plurality of positioning balls (95) and a plurality of compression springs (94). The pintle (92) has an elongated V-shaped slot (921) defined in its circumferential surface. As can be seen in FIG. 7, the positioning balls are each urged by a corresponding spring to be located and locked in the elongated V-shaped slot (921).

However, it is found that sharp edges of the V-shaped slot (921) will gradually damage the surfaces of the positioning balls after repeatedly turning a door or window mounted between the two parallel clamping plates (93) from a closed position (see FIG. 7) to an open position where the positioning balls (95) have left the elongated V-shaped slot and moved to engage with the rounded portion of the pintle (92). The damaged surfaces of the positioning balls (95) will lead to a significant noise when turning the door/window.

Therefore, it is an object of the present invention to provide a quietly-acting improved hinge construction.

The primary object of the present invention is to provide an improved hinge construction that can effectively reduce the noise when turning a door.

In accordance with one aspect of the present invention, an embodiment of the present invention comprises:

- a fixing plate adapted to be mounted on a frame;

a pair of parallel clamping plates, between which a U-shaped block is disposed, one of the parallel clamping plates having an opening dimensioned to correspond to a space defined by the U-shaped block and the other clamping plate and the fixing plate, the parallel clamping plates having a dimension greater than that of the U-shaped block to define a receiving space therebetween for a portion of a door or window frame, the U-shaped block having a pair of cutouts formed thereon, the cutouts being arranged facing toward each other;

a pivot block having a pivot hole formed therein and a plurality of transverse through holes communicating with the pivot hole, the pivot block being attached to the fixing plate and fitted in the space defined by the U-shaped block and said the other clamping plate and the fixing plate, the transverse through holes each being used for receiving a positioning ball and a compression spring therein; and

a pintle having a plurality of countersunk recesses defined on a circumferential surface thereof, the countersunk recesses being arranged corresponding to the transverse through holes of the pivot block, the countersunk recesses each being used for receiving a retaining seat therein;

wherein the pivot hole of the pivot block is aligned with the cutouts of the U-shaped block so that the pintle can be rotatably received in the cutouts and the pivot hole, each retaining seat having a concave surface formed thereon, the concave surface having a curvature conforming to that of a corresponding positioning ball for engagement therewith so that each positioning ball can be spring-biasedly locked in a corresponding retaining seat by means of a corresponding compression spring.

Other advantages and novel aspects of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

IN THE DRAWINGS

FIG. 1 is a perspective view of the present invention.

FIG. 2 is an exploded view of the present invention, where a pintle is rotated clockwise 90 degrees for showing the countersunk recesses thereof.

FIG. 3 is a sectional view of the present invention.

FIG. 4 is a schematical view showing a door mounted with the present invention in a closed position.

FIG. 5 is a schematical view showing a door mounted with the present invention in an open position.

FIG. 6 is a perspective view showing a prior art pintle, positioning balls and compression springs.

FIG. 7 is a sectional view of the prior art

Referring to FIGS. 1 and 2, a typical embodiment of the present invention comprises a fixing plate (10), a pair of parallel clamping plates (30)(40), a pivot block (20), and a pintle (50). The fixing plate (10) is adapted to be mounted on a frame. Between the pair of parallel clamping plates (30)(40) is disposed a U-shaped block (41). One of the parallel clamping plates (30)(40), such as the clamping plate (30), has an opening (30a) dimensioned to correspond to a space (41a) defined by the U-shaped block (41) and the other clamping plate (40) and the fixing plate (10). It is to be noted that the U-shaped block (41) can be attached to the clamping plate (40) by any conventional means or the U-shaped block (41) can be made integral with the clamping plate (40). The clamping plate (30) is attached to the U-shaped block (41) by means of a pair of screws (44)(only one is shown) threadedly engaging with a corresponding one of a pair of holes (43). The parallel clamping plates (30)(40) have a dimension greater than that of the U-shaped block (41) to define a receiving space (2) therebetween, which can be used to receive a

a portion of a door or window frame therein. The U-shaped block (41) has a pair of cutouts (42)(42') formed thereon which are arranged facing toward each other.

The pivot block (20) defines a pivot hole (21) therein and further defines a plurality of transverse through holes (23) which communicate with the pivot hole (21). The transverse through holes (23) are each used for receiving a respective one of a plurality of positioning balls (25) and a respective one of a plurality of compression springs (24) therein. The pivot block (20) is attached to the fixing plate (10) by means of screws (15) which are threadably received in respective screw holes (22) defined in the pivot block (20). The pivot block (20) is fitted in the space (41a) defined by the clamping plates (40) and the U-shaped block (41) and the fixing plate (10).

The pintle (50) has a plurality of countersunk recesses (51) defined on a circumferential surface thereof. The countersunk recesses (51) are arranged corresponding to the transverse through holes (23) of the pivot block (20). As can be seen in FIG. 2, a top engagement end (52) and a bottom engagement end (52') are formed on the pintle (50). The countersunk recesses (51) are each used for receiving a respective one of a plurality of retaining seats (60) therein. The retaining seats (60) are made of a low surface friction, hard material, such as a plastic material or a ceramic material.

In assembling the aforementioned parts to a door or window frame, the pivot block (20) is fitted such that the pivot hole (21) is in alignment with the cutouts (42)(42') of the U-shaped block (41) whereby the pintle (50) can be rotatably received in the cutouts (42)(42') and the pivot hole (21). The retaining seats (60) each have a concave surface (61) formed thereon. The concave surface (61) has a curvature conforming to that of a corresponding positioning ball (25) for engagement therewith so that

each positioning ball (25) can be spring-biasedly engaged with a corresponding retaining seat (60) by means of a corresponding compression spring (24).

In operation, when a door or window frame (70) is in an open position (see FIG. 5), the door or window frame (70) can be smoothly moved to a closed position (see FIG. 4) upon a counterclockwise rotation thereof; when the door or window frame (70) is in the closed position (see FIG. 4), it can be smoothly moved to the open position (see FIG. 5). As described above, since the retaining seats (60) are made of a low surface friction, hard material, such as a plastic steel material or ceramic material, minimal noise is caused by the smoothly-sliding engagement between each concave surface (61) and each positioning ball (25).

Furthermore, referring back to FIG. 2, the pintle (50) may include a top ring (53) and a bottom ring (53') which are respectively placed on the top and bottom engagement ends (52)(52') of the pintle (50).

It is to be understood, however, that even though numerous characteristics and advantages of the present invention have been set forth in the forgoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.



CLAIMS:

1. An improved hinge construction for a door, comprising:

a fixing plate adapted to be mounted on a frame;

a pair of parallel clamping plates, between which a U-shaped block is disposed, one of said parallel clamping plates having an opening dimensioned to correspond to a space defined by said U-shaped block and the other clamping plate and said fixing plate, said parallel clamping plates having a dimension greater than that of said U-shaped block to define a door-receiving space therebetween, said U-shaped block having a pair of cutouts formed thereon, said cutouts being arranged facing toward each other;

a pivot block having a pivot hole formed thereon and a plurality of transverse through holes communicating with said pivot hole, said pivot block being attached to said fixing plate and fitted in said space defined by said U-shaped block and said the other clamping plate and said fixing plate, said transverse through holes each being used for receiving a positioning ball and a spring therein; and

a pintle having a plurality of recesses defined in a circumferential surface thereof, said recesses being arranged corresponding to said transverse through holes of said pivot block, said countersunk recesses each being used for receiving a retaining seat therein;

wherein said pivot hole of said pivot block is aligned with said cutouts of said U-shaped block so that said pintle can be rotatably received in said cutouts and said pivot hole, each said retaining seat has a concave surface defined therein, said concave surface having a curvature conforming to that of a corresponding positioning ball for engagement therewith so that each said positioning ball can be spring-biasedly locked in a corresponding retaining seat by means of a corresponding spring.



2. An improved hinge construction for a door as claimed in claim 1, wherein said pintle including a top engagement end and a bottom engagement end, said top and bottom engagement ends each being rotatably received in a corresponding cutout of said U-shaped block.

3. An improved hinge construction for a door as claimed in claim 2, wherein said pintle further including a top ring and a bottom ring, which are respectively placed on said top and bottom engagement ends of said pintle.

4. An improved hinge construction for a door as claimed in claim 1, wherein said retaining seats each are made of a low surface friction, hard material.

5. An improved hinge construction for a door as claimed in claim 4, wherein said low surface friction, hard material is a plastic material.

6. An improved hinge construction for a door as claimed in claim 1, wherein said low surface friction, hard material is a ceramic material.