

PATENT SPECIFICATION

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(54) DOOR HINGE ATTACHMENT DEVICE

(71) We, YOSHIDA KOGYO K.K., a corporation duly organized under the laws of Japan and existing at No. 1, Kanda Izumi-cho, Chiyoda-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a device for mounting a hinge to a door, and more specifically to an attachment device for fastening one of the leaves of a butt hinge to an edge of a door having a core of particle board, hardboard, or like comparatively soft material sandwiched between a pair of face panels.

With the advent of the doors of the above specified type, a problem has arisen with regard to the fastening of hinge leaves to their edges. The particle board, hardboard or the like constituting the cores of such doors is not sufficiently rigid to permit the hinge leaves to be screwed directly thereto. Heretofore, this problem has been circumvented by screwing the hinge leaves to a metal-made frame or other attachment which is screwed or otherwise fastened to the edge of the door. Such conventional measures are unsatisfactory because the frame or other attachment is itself insecurely connected to the door.

The present invention seeks to provide an improved door hinge attachment device for enabling a hinge to be firmly fastened to an edge of a door, such as a door of the aforementioned type.

The invention further seeks to provide a door hinge attachment device of the above described character which is easy and inexpensive of manufacture and which can be readily mounted to the door.

According to a first aspect of the invention there is provided a device for connecting a hinge leaf to a door comprising a reinforcement member for embedding in the door and having threaded holes therein, and a mounting plate for mounting on a door edge and having a first series of holes

for the passage of headed screws to be screwed into the threaded holes of the reinforcement member and a second series of holes, threaded to receive screws for attachment of the hinge leaf.

Further according to this aspect of the invention, there is provided a device for connecting one of the leaves of a hinge to a door, said one of the hinge leaves having a first set of holes, said device comprising in combination: a reinforcement member adapted to be embedded in the door, and having a second set of tapped holes; a mounting plate having third and fourth sets of holes, said fourth set of holes being tapped; and a plurality of threaded fasteners for connecting said mounting plate to an edge of the door, said plurality of threaded fasteners passing through said third set of holes in said mounting plate and threadedly into said second set of tapped holes in said reinforcement member, said fourth set of holes being receptive of a plurality of threaded fasteners passing through said first set of holes in said one hinge leaf.

According to a second aspect of the invention, there is provided a door hinge assembly comprising a reinforcement member embedded in the door and having threaded holes therein, a mounting plate secured to the door edge by screws passing through a first series of holes therein and screwed into the threaded holes of the reinforcement member and a hinge including a leaf for attachment to the door edge, the leaf having screws passing through a series of holes therein and screwed into a second series of holes in the mounting plate, the said second series of holes being threaded to receive the screws.

Further according to this second aspect of the invention, there is provided a door and hinge assembly comprising: a door having a pair of face panels and a core sandwiched therebetween; a hinge having a pair of leaves each having a first group of holes; a reinforcement member embedded in said core and having a second group of tapped

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holes; a mounting plate mounted on an edge of said door and having a third group of holes and a fourth group of tapped holes; a first group of threaded fasteners passing through said third group of holes in said mounting plate threadedly into said second group of tapped holes in said reinforcement member; and a second group of threaded fasteners passing through said first group of holes in one of the hinge leaves threadedly into said fourth group of tapped holes in said mounting plate.

The invention will now be described in greater detail, by way of example, with reference to the drawings, in which:—

Figure 1 is a horizontal cross-sectional view showing a butt hinge swingably connecting a door to a complementary doorframe with the aid of an attachment device of this invention, with door and the doorframe being shown fragmentarily; and

Figure 2 is an exploded perspective view showing all but the doorframe of the parts illustrated in Figure 1.

With reference to both Figures 1 and 2 of the drawings, it will be seen that a butt hinge 10 swingably connecting a door 11 to a complementary doorframe 12 is of the conventional type comprising a pair of leaves 13 and 14. These hinge leaves are pivotally jointed together by a pintle having a headed top end 15, in the well known manner. In Figure 1 the door 11 is shown in its closed position with respect to the doorframe 12 and is adapted to be opened in the direction indicated by the arrow.

Each of the paired hinge leaves 13 and 14 has a set of countersunk holes 16 for the passage therethrough of threaded fasteners such as screws. The left hand hinge leaf 13 is fastened directly to the doorframe 12 by cap screws 17 passing through its countersunk holes 16. The present embodiment is specifically directed to an attachment device useful in connecting the right hand leaf 14 of the butt hinge 10 to an edge 18 of the door 11. This door is also of the known construction including a core 19 of particle board, hardboard, or similar relatively soft material that is sandwiched between and adhered to a pair of face panels 20, 20.

The door hinge attachment device of this invention includes an elongate reinforcement member 21 embedded uprightly in the core 19 of the door 11 in the adjacency of its edge 18. The reinforcement member 21 has a set of tapped holes 22 extending transversely or horizontally therethrough. In practice the reinforcement member 21 can be a rod of metal snugly received in a hole 23 created by conveniently boring the core 19 of the door 11. However, the reinforcement member 21 may be of other than circular

cross-sectional shape, provided that the member is immovably received in a correspondingly shaped opening in the door core 19.

In the case where the reinforcement member 21 is rod shaped as shown, in particular, the member should be provided with a suitable mark which will serve as a directional guide so that its holes 22 may be directed exactly toward the edge 18 of the door on assemblage. Such a mark may for example be a recess 24 formed in the reinforcement member throughout its length or at its exposed end, or a line or notch cut in the exposed end.

The core 19 of the door 11 has a set of holes 25 each extending horizontally between the hole 23 in the door core and a mortise or rectangular recess 26 provided in the door edge 18. These holes 25 are in axial registry with the respective holes 22 in the reinforcement member 21 mounted in position in the door core 19. The mortise 26 in the door edge 18 is adapted to neatly receive a mounting plate 27, which also can be metal made.

Formed through the mounting plate 27 is a set of countersunk holes 28 disposed in a vertical row at its center for permitting the passage therethrough of threaded fasteners such as cap screws 29, and a set of tapped holes 30 disposed in two vertical rows on both sides of the countersunk hole set for receiving another set of threaded fasteners such as cap screws 31. The mounting plate 27 is seated in the mortise 26 and is fastened to the door by the cap screws 29 passing through the countersunk holes 28 in the mounting plate, through the holes 25 in the door core 19, and threadedly into the holes 22 in the reinforcement member 21.

At 32 is shown one of frame members extending along and embracing the peripheral edges of the door 11, with the mounting plate 27 being disposed between the door and the frame member 32. The frame member 32 is substantially I-shaped in cross-section, comprising a web 33 and a pair of flanges 34 formed at and extending along its opposite longitudinal edges. The web 33 of the frame member 32 has a set of holes 35 disposed in two vertical rows so as to be in registry with the respective tapped holes 30 in the mounting plate 27. The pair of flanges 34 of the frame member are recessed at 36 in transverse of horizontal alignment for receiving the right hand leaf 14 of the butt hinge 10.

Figure 1 clearly shows the right hand hinge leaf 14 held against the web 33 of the frame member 32 and fastened to the mounting plate 27 by the cap screws 31 passing through the countersunk holes 16 in the hinge leaf and the holes 35 in the web, and threadedly into the holes 30 in the



mounting plate. The right hand leaf 14 of the butt hinge 10 is screwed to the mounting plate 27 which is screwed to the door 11 by the aid of the reinforcing member 21 firmly embedded therein. As a consequence, there is little or no possibility of the joint loosening between the butt hinge 10 and the door 11.

Although the device of this invention has been shown and described in terms of its specific adaptation, it is not desired to limit the invention to the exact details of this disclosure, since numerous modifications or changes will readily occur to one skilled in the art. For example, there may be provided a single reinforcement member extending all the way from top to bottom of the door so as to be shared by all the hinges in use. The reinforcement member or members may be embedded in the core of the door at the time of its manufacture.

WHAT WE CLAIM IS:—

1. A device for connecting one of the leaves of a hinge to a door, said one of the hinge leaves having a first set of holes, said device comprising in combination: a reinforcement member adapted to be embedded in the door, and having a second set of tapped holes; a mounting plate having third and fourth sets of holes, said fourth set of holes being tapped; and a plurality of threaded fasteners for connecting said mounting plate to an edge of the door, said plurality of threaded fasteners passing through said third set of holes in said mounting plate and threadedly into said second set of tapped holes in said reinforcement member, said fourth set of holes being receptive of a plurality of threaded fasteners passing through said first set of holes in said one hinge leaf.

2. A device according to claim 1, wherein said reinforcement member is a rod adapted to be received in a hole formed in the door so as to extend parallel to said edge.

3. A device according to claim 2, wherein said reinforcement member has a mark serving as directional guide so that said second set of holes therein may be disposed in registry with said third set of holes, respectively, in said mounting plate at the time of assemblage.

4. A device according to claim 1, 2, or 3, wherein said mounting plate is adapted to be received in a recess formed in said edge of the door.

5. A device according to any one of claims 1 to 4, further comprising a frame member for extending along and embracing

said edge of the door, said mounting plate being adapted to be disposed between the door and said frame member, said frame member having a fifth set of holes for the passage therethrough of said last-mentioned threaded fasteners.

6. A device according to claim 5, wherein said frame member is of substantially I-shaped cross-section including a pair of flanged which are recessed to receive said hinge leaf.

7. A door and hinge assembly comprising: a door having a pair of face panels and a core sandwiched therebetween; a hinge having a pair of leaves each having a first group of holes; a reinforcement member embedded in said core and having a second group of tapped holes; a mounting plate mounted on an edge of said door and having a third group of holes and a fourth group of tapped holes; a first group of threaded fasteners passing through said third group of holes in said mounting plate threadedly into said second group of tapped holes in said reinforcement member; and a second group of threaded fasteners passing through said first group of holes in one of the hinge leaves threadedly into said fourth group of tapped holes in said mounting plate.

8. A device substantially as herein described with reference to the drawings.

9. A door and hinge assembly substantially as herein described with reference to the drawings.

10. A device for connecting a hinge leaf to a door comprising a reinforcement member for embedding in the door and having threaded holes therein, and a mounting plate for mounting on a door edge and having a first series of holes for the passage of headed screws to be screwed into the threaded holes of the reinforcement member and a second series of holes, threaded to receive screws for attachment of the hinge leaf.

11. A door hinge assembly comprising a reinforcement member embedded in the door and having threaded holes therein, a mounting plate secured to the door edge by screws passing through a first series of holes therein and screwed into the threaded holes of the reinforcement member and a hinge including a leaf for attachment to the door edge, the leaf having screws passing through a series of holes therein and screwed into a second series of holes in the mounting plate, the said second series of holes being threaded to receive the screws.

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