

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 Izumicho, 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:—

The present 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 the door having a core of particle board, hardboard, or like comparatively soft material sandwiched between and secured to a pair of face panels as by use of an adhesive.

With the advent of the doors of the above specified type, a problem has arisen in connection with the fastening of hinge leaves to their edges. The particle board, hardboard, or similar material constituting the cores of such doors is not sufficiently rigid to permit the hinge leaves to be screwed directly thereto with a required degree of firmness. 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 a more efficient and durable attachment device for enabling a hinge to be firmly fastened to an edge of the door of the aforementioned type.

The invention also seeks to provide a door hinge attachment device which is simple and inexpensive to manufacture and which can be readily mounted to a door.

The invention further seeks to provide a door hinge attachment device which is equally applicable to either left or right-swinging doors.

According to a first aspect of the in-

vention, there is provided a device for connecting a leaf of a hinge to a door comprising a pair of gripping jaws for mounting on opposite sides of the door, each gripping jaw having a plurality of holes for receiving fastening means for passing through the holes and through the door and a mounting plate coupled to the gripping jaws in a position to lie on the edge of the door, the mounting plate having threaded holes 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 pair of gripping jaws adapted to be disposed on the opposite sides of the door in the adjacency of an edge thereof, each of said gripping jaws having a second set of holes; fastener means for rigidly connecting said pair of gripping jaws to the door, said fastener means being adapted to extend through said second set of holes in the jaws and through the door; and a mounting plate coupled with said pair of gripping jaws so as to be held against said edge of the door, said mounting plate having a third set of tapped holes which are receptive of a plurality of threaded fasteners passing through said first set of holes in said one hinge leaf and threadedly into said third set of tapped holes in said mounting plate.

According to a second aspect of the invention, there is provided a door hinge assembly comprising a pair of gripping jaws mounted on opposite sides of a door adjacent its edge, the jaws and the door having corresponding holes for the passage of fastening means for fastening the jaws together and to the door, a mounting plate coupled to the gripping jaws and lying on the edge of the door and a hinge having a leaf provided with holes through which screws pass, the screws being screwed into threaded holes in the mounting plate for anchoring the hinge leaf thereto.

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Further according to the 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 pair of gripping jaws disposed on the opposite sides of said door and each having a second group of holes; fastener means rigidly connecting said pair of gripping jaws to the door, said fastener means extending through said second group of holes in the jaws and through the door; a mounting plate coupled with said gripping jaws and mounted on an edge of said door, said mounting plate having a third group of tapped holes; and a plurality of threaded fasteners passing through said first group of holes in one of said hinge leaves threadedly into said third 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 an exploded perspective view showing a door hinge attachment in accordance with this invention, together with a door, a butt hinge, and a frame member, with the door and the frame member being shown fragmentarily;

Figure 2 is a horizontal cross-sectional view showing the parts of Figure 1 assembled together and the door swingably connected to a complementary doorframe; and

Figure 3 is a view similar to Figure 2 but showing another preferred embodiment of the invention.

In Figures 1 and 2, a butt hinge 10 connects a door 11 pivotably to a complementary doorframe 12. The butt hinge 10 is of the conventional type comprising a pair of leaves 13, 14 pivotally joined together by a pintle having a headed top end 15 and accommodated in interfitting aligned knuckles 16 on and along the opposed hinging edges of the leaves.

Each of the paired hinge leaves 13, 14 has a set of countersunk holes 17 for the passage therethrough of threaded fasteners such as screws. The left hand hinge leaf 13 is fastened directly to the doorframe 12 by means of cap screws 18 passing through its countersunk holes 17.

This embodiment is specifically directed to an attachment device for fastening the right hand leaf 14 of the butt hinge 10 to an edge 19 of the door 11. The door 10 is of the known construction including a core 20 of particle board, hardboard, or similar relatively soft material that is sandwiched between and adhered to a pair of face panels 21, 21.

The door hinge attachment device includes a pair of first and second gripping

jaws 22, 23 disposed on the opposite sides of the door 11 in the adjacency of its edge 19. The first gripping jaw 22 has a set of holes 24 (one seen in Figure 1) arranged in a vertical row so as to be each in axial registry with the corresponding one of a similar set of holes 25 in the second gripping jaw 23 and further with the corresponding one of another similar set of holes 26 provided transversely and horizontally through the door 11.

Integral with the first gripping jaw 22 is a mounting plate 27 which is disposed in right angular relationship thereto and which has a set of tapped holes 28 disposed in two vertical rows so as to be in registry with the countersunk holes 17 in the right hand hinge leaf 14. The mounting plate 27 has a groove 29 provided in and along its vertical edge away from the first gripping jaw 22, and a corresponding tongue 30 is integrally provided to the second gripping jaw 23 for insertion into the groove 29. A mortise or rectangular recess 31 is provided in the edge 19 of the door 11 for neatly receiving the mounting plate 27 with its surface 32 flush with the surface of the door edge 19.

The mounting plate 27 and the pair of gripping jaws 22, 23 are mounted in position on the door 11 (Figure 2), with the mounting plate seated in the recess 31 in the door edge 19 and with the tongue 30 on the second gripping jaw 23 received in the groove 29 in the mounting plate. The pair of gripping jaws 22, 23 are rigidly affixed to the door 11 by means of a set of bolts 33 inserted with clearance in the holes 26 in the door 11 through the holes 25 in the second gripping jaw 23 and a complementary set of nuts 34 inserted with clearance in the door holes 26 through the holes 24 in the first gripping jaw 22 and threadedly engaging the bolts 33. When attached to the door edge 19, the attachment device also serves as a reinforcement for the door edge 19.

The nuts 34 each comprise an internally threaded sleeve 35 having a head 36 at one end. The threaded shanks of the bolts 33 are fitted into and engage the sleeves 35 of the respective nuts 35 in the door holes 26.

Indicated at 37 is 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 11 and the frame member member 37. The frame member 37 is of I-shaped cross-section comprising a web 38 and a pair of flanges 39, 39 extending on and along the opposite longitudinal edges of the web.

The pair of flanges 39, 39 of the frame member 37 have recesses 40 held in transverse or horizontal registry for receiving the right hand leaf 14 of the butt hinge 10. The web 38 of the frame member has a set of holes 41 disposed in two vertical rows so as to be in axial registry with the respective

tapped holes 28 in the mounting plate 27 and with the respective countersunk holes 17 in the right hand hinge leaf 14 received in the frame member flange recesses 40. Held against the web 38 of the frame member 37, the right hand hinge leaf 14 is fastened to the mounting plate 27 by means of a set of threaded fasteners such as countersunk cap screws 42.

For fastening the right hand leaf 14 of the butt hinge 10 to the door 11, the set of holes 26 and the recess 31 are first formed in a desired position in the door. Then, the mounting plate 27 is fitted into the recess 31, with the first gripping jaw 22 held against one of the faces of the door 11, and the tongue 30 on the second gripping jaw 23 is received in the groove 29 in the mounting plate, with the second gripping jaw held against the other door face. The pair of gripping jaws 22, 23 are secured to the door by the bolts 33 and the nuts 34 inserted into the door holes 26 through the gripping jaw holes 24, 25.

The frame member 37 is then placed over the edge 19 of the door with the mounting plate 27 held in place. Held against the web 38 of the frame member 37, the right hand hinge leaf 14 is now fastened to the mounting plate 27 by the screws 42 passing through the counter-sunk holes 17 in the hinge leaf and the holes 41 in the frame member web and threadedly into the tapped holes 28 in the mounting plate.

In another embodiment of this invention shown in Figure 3, a pair of gripping jaws 22a, 23a are both integral with a mounting plate 27a placed in the edge 19 of the door 11. The other details of construction are identical with those set forth in connection with the preceding embodiment. The attachment device of Figure 3 is simpler in construction and easier to mount to the door, but the device shown in Figures 1 and 2 has the advantage that it is applicable to doors of various thickness.

In practical use of the door hinge attachment device of this invention, the construction, finish, and ornamentation of the gripping jaws may be suitably designed for an aesthetic appeal, in a manner not interfering with their mechanical functions. Furthermore, the frame member 37 may be omitted, and the right hand hinge leaf 14 may be fastened directly to the mounting plate 27.

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 pair of gripping jaws adapted to be disposed on the opposite sides of the door in the adjacency of an edge thereof, each of said gripping

jaws having a second set of holes; fastener means for rigidly connecting said pair of gripping jaws to the door, said fastener means being adapted to extend through said second set of holes in the jaws and through the door; and a mounting plate coupled with said pair of gripping jaws so as to be held against said edge of the door, said mounting plate having a third set of tapped holes which are receptive of plurality of threaded fasteners passing through said first set of holes in said one hinge leaf and threadedly into said third set of tapped holes in said mounting plate.

2. A device according to claim 1, said fastener means comprising a set of bolts and a complementary set of nuts.

3. A device according to claim 2, in which each of said nuts comprises an internally threaded sleeve and a head at one end of said sleeve, said sleeves being adapted to fit threadedly over said bolts.

4. A device according to claim 1, 2 or 3, in which said mounting plate is integral with only one of said pair of gripping jaws, said mounting plate having a groove and the other gripping jaw having a tongue snugly received in said groove.

5. A device according to claim 1, 2 or 3, said mounting plate being integral with both of said pair of gripping jaws.

6. A device according to any one of claims 1 to 5, said mounting plate being adapted to be received in a recess in said edge of the door.

7. A device according to any one of claims 1 to 6, including 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, and said frame member having a fourth set of holes for the passage therethrough of said threaded fasteners.

8. A device according to claim 7, in which said frame member is of I-shaped cross-section including a pair of flanges which have recesses to receive said one of the hinge leaves.

9. 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 pair of gripping jaws disposed on the opposite sides of said door and each having a second group of holes; fastener means rigidly connecting said pair of gripping jaws to the door, said fastener means extending through said second group of holes in the jaws and through the door; a mounting plate coupled with said gripping jaws and mounted on an edge of said door, said mounting plate having a third group of tapped holes; and a plurality of threaded fasteners passing through said first group of holes in one of said hinge leaves threadedly



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tapped holes 28 in the mounting plate 27 and with the respective countersunk holes 17 in the right hand hinge leaf 14 received in the frame member flange recesses 40. Held against the web 38 of the frame member 37, the right hand hinge leaf 14 is fastened to the mounting plate 27 by means of a set of threaded fasteners such as countersunk cap screws 42.

For fastening the right hand leaf 14 of the butt hinge 10 to the door 11, the set of holes 26 and the recess 31 are first formed in a desired position in the door. Then, the mounting plate 27 is fitted into the recess 31, with the first gripping jaw 22 held against one of the faces of the door 11, and the tongue 30 on the second gripping jaw 23 is received in the groove 29 in the mounting plate, with the second gripping jaw held against the other door face. The pair of gripping jaws 22, 23 are secured to the door by the bolts 33 and the nuts 34 inserted into the door holes 26 through the gripping jaw holes 24, 25.

The frame member 37 is then placed over the edge 19 of the door with the mounting plate 27 held in place. Held against the web 38 of the frame member 37, the right hand hinge leaf 14 is now fastened to the mounting plate 27 by the screws 42 passing through the counter-sunk holes 17 in the hinge leaf and the holes 41 in the frame member web and threadedly into the tapped holes 28 in the mounting plate.

In another embodiment of this invention shown in Figure 3, a pair of gripping jaws 22a, 23a are both integral with a mounting plate 27a placed in the edge 19 of the door 11. The other details of construction are identical with those set forth in connection with the preceding embodiment. The attachment device of Figure 3 is simpler in construction and easier to mount to the door, but the device shown in Figures 1 and 2 has the advantage that it is applicable to doors of various thickness.

In practical use of the door hinge attachment device of this invention, the construction, finish, and ornamentation of the gripping jaws may be suitably designed for an aesthetic appeal, in a manner not interfering with their mechanical functions. Furthermore, the frame member 37 may be omitted, and the right hand hinge leaf 14 may be fastened directly to the mounting plate 27.

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 pair of gripping jaws adapted to be disposed on the opposite sides of the door in the adjacency of an edge thereof, each of said gripping

jaws having a second set of holes; fastener means for rigidly connecting said pair of gripping jaws to the door, said fastener means being adapted to extend through said second set of holes in the jaws and through the door; and a mounting plate coupled with said pair of gripping jaws so as to be held against said edge of the door, said mounting plate having a third set of tapped holes which are receptive of plurality of threaded fasteners passing through said first set of holes in said one hinge leaf and threadedly into said third set of tapped holes in said mounting plate.

2. A device according to claim 1, said fastener means comprising a set of bolts and a complementary set of nuts.

3. A device according to claim 2, in which each of said nuts comprises an internally threaded sleeve and a head at one end of said sleeve, said sleeves being adapted to fit threadedly over said bolts.

4. A device according to claim 1, 2 or 3, in which said mounting plate is integral with only one of said pair of gripping jaws, said mounting plate having a groove and the other gripping jaw having a tongue snugly received in said groove.

5. A device according to claim 1, 2 or 3, said mounting plate being integral with both of said pair of gripping jaws.

6. A device according to any one of claims 1 to 5, said mounting plate being adapted to be received in a recess in said edge of the door.

7. A device according to any one of claims 1 to 6, including 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, and said frame member having a fourth set of holes for the passage therethrough of said threaded fasteners.

8. A device according to claim 7, in which said frame member is of I-shaped cross-section including a pair of flanges which have recesses to receive said one of the hinge leaves.

9. 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 pair of gripping jaws disposed on the opposite sides of said door and each having a second group of holes; fastener means rigidly connecting said pair of gripping jaws to the door, said fastener means extending through said second group of holes in the jaws and through the door; a mounting plate coupled with said gripping jaws and mounted on an edge of said door, said mounting plate having a third group of tapped holes; and a plurality of threaded fasteners passing through said first group of holes in one of said hinge leaves threadedly

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into said third group of tapped holes in said mounting plate.

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

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

10 12. A device for connecting a leaf of a hinge to a door comprising a pair of gripping jaws for mounting on opposite sides of the door, each gripping jaw having a plurality of holes for receiving fastening means for passing through the holes and through the door and a mounting plate coupled to the gripping jaws in a position to lie on the edge of the door, the mounting plate having threaded holes to receive screws for attachment of the hinge leaf.

13. A door hinge assembly comprising a pair of gripping jaws mounted on opposite sides of a door adjacent its edge, the jaws and the door having corresponding holes for the passage of fastening means for fastening the jaws together and to the door, a mounting plate coupled to the gripping jaws and lying on the edge of the door and a hinge having a leaf provided with holes through which screws pass, the screws being screwed into threaded holes in the mounting plate for anchoring the hinge leaf thereto.

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