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DOOR HINGE

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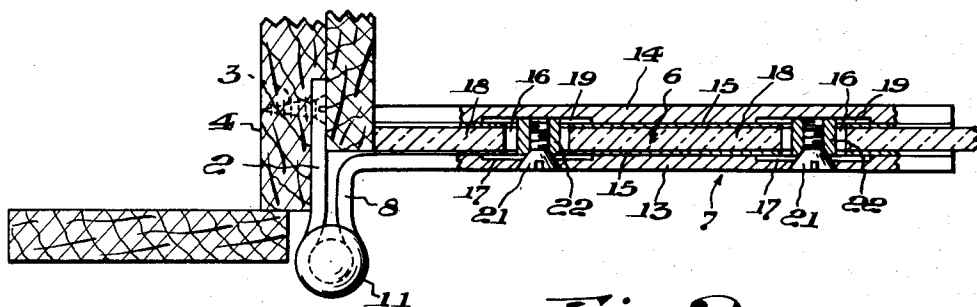


Fig. 2.

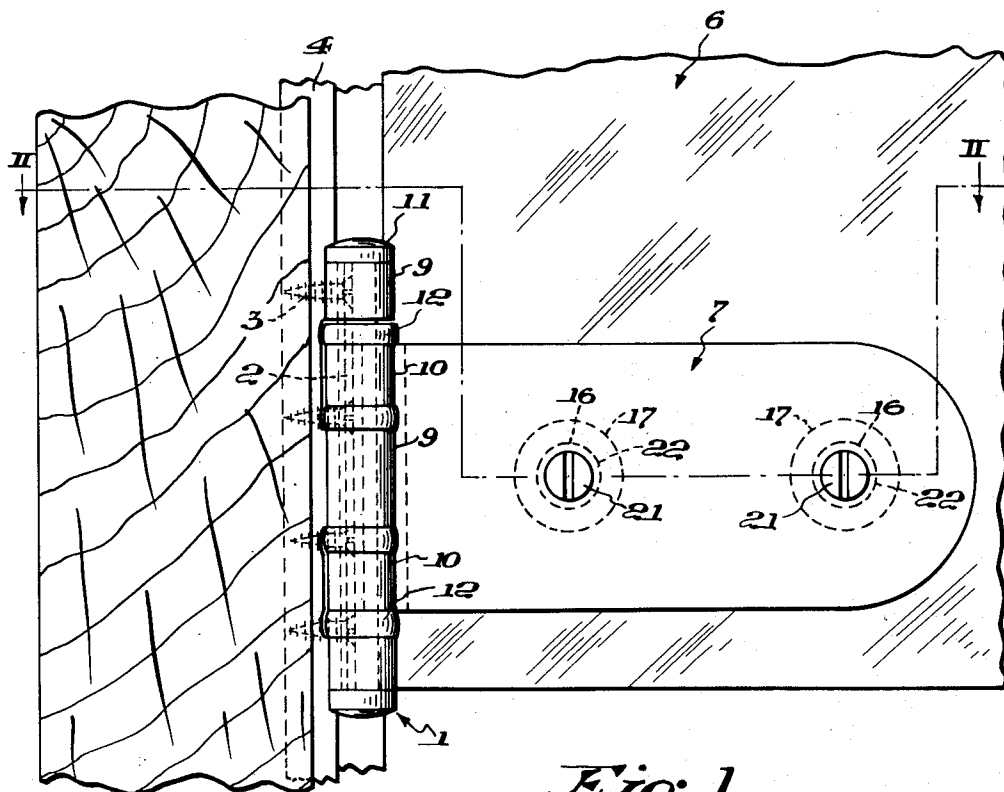


Fig. 1.

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DOOR HINGE

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2 Claims. (Cl. 16—158)

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This invention relates to hinges and, in particular, to a hinge for mounting a glass door formed of a single sheet of glass.

Most glass doors are formed of monolithic sheets of tempered glass which are amply strong to withstand the abuse received by the doors. Considerable difficulty, however, has been experienced in finding a suitable manner of securing metal hardware, such as hinges to the glass. The most common type of hinge is that formed of a pair of hinge leaves pivotally mounted on a pintle, the hinge leaves being secured one to the door frame and the other to the door itself. These hinges are considered preferable because of their strength, as well as the fact that their use avoids the formation of large cracks, or openings, between the door and the door frame as the door is swung.

However, such hinges have not been commonly used for glass doors because of the difficulty of securing the hinge leaf to the glass of the door; this difficulty being due, principally, to the fact that small hinge-leaf, screw-anchoring holes cannot be drilled without unduly weakening the glass. As a result, most glass doors are swung on pintles, or pins, that extend upwardly from beneath the door and downwardly from above it, although such a mounting is not as strong as the hinge leaf mounting, and, further, when doors are swung on these pins wide cracks are formed between the door and its frame which reduce the privacy desired of these partitions. Also, the customary door stops conventionally used with hinge-leaf mounted doors cannot be used when the doors are mounted on these pins, and that fact further reduces the desirable privacy.

It is, therefore, an object of this invention to provide a swingable mounting for glass doors which is as strong as the conventional leaf-type wooden-door hinge and which, to the same degree as that leaf-type hinge, provides privacy when the door is closed.

Another important object is to provide a manner by which such a swingable mounting can be secured to a glass door without weakening the glass.

Briefly described, the invention utilizes a pair of hinges similar to the conventional wooden door leaf hinges except that the faces of the glass near the vertical edge to be hinged are clamped between pairs of plates which frictionally support the door. The door is provided with a transverse opening through which the clamping mechanism extends, but the opening is sufficiently large so that no portion of the glass contacts the clamp; while the clamping elements

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are so arranged that the pressure exerted by the clamp is transmitted to the main body portions of the glass rather than to the cut edges of the glass opening. The diverting of the clamping pressure from the cut edges of the opening is accomplished by forming coextensive, juxtaposed recesses in the interior faces of the plates, these recesses being of greater width than the width of the opening in the glass, so that there is a free, uncontacted and unclamped portion of the glass surrounding, but spaced from, the clamping mechanism. Consequently, clamping pressure acting externally on the plates is transmitted to the glass at points which are spaced from the cut edges of its opening and from these points spreads to the main and strong mass of the door. The opening formed in the door is made sufficiently large so that its edges will acquire full tempered strength and will not form weak points, although, as stated, these edges are protected in the sense that they do not receive the strains, and, further, do not come into contact with the metal of the plate-clamping mechanism. It, also, is desirable to insure a secure frictional engagement of the door by the clamping plates by placing friction tapes between these members.

The preferred embodiment of the invention is illustrated in the accompanying drawings of which Fig. 1 is a side elevation of a lower left-hand corner hinge, showing the hinge attached to the door jamb and to the door, the door being in a closed position; and Fig. 2 is a section along lines II—II of Fig. 1.

Referring to the drawings, hinge 1 includes a hinge leaf 2 that is secured by screws 3 to jamb 4 of the door frame, the hinge also being secured, in a particular manner to be described, to glass door 6 by means of another hinge leaf 7 which, as may be noted in Fig. 2, is provided with an offset flanged portion 8 that assures a 180 degree swing of the door, as well as provides a covering for some of the door screws 3 when the door is closed so that the door cannot be removed simply by detaching hinge leaf 2. To interconnect hinge leaves 2 and 7 they are formed with eyes 9 and 10 through which extends a pintle 11 in the conventional manner, these eyes being spaced apart by bearing rings 12 to insure free swinging of the door.

As has been noted, the invention is concerned with a manner of mounting a conventional hinge leaf, such as hinge leaf 7 to a glass door, the door being formed of a single sheet of glass. The customary manner of securing such conventional hinge leaves to the door is by means of screws

anchored in the door, put this is impractical when dealing with tempered glass doors, because, the contact of the metal screws and glass soon would produce breakage and the door would shatter into a number of small though rounded and relatively uninjurious fragments.

In the present invention, the door is swung on the hinge in such a manner that there is no metal and glass contact, and also, in such a manner that strains to which the glass of the door is subjected are spread out over a large and assuredly strong area of the glass. Generally, the mounting is formed by clamping glass door 6 (Fig. 2) between a pair of cover plates 13 and 14, these plates together forming hinge leaf 7. Between the adjacent surfaces of plates 13 and 14 and the glass are interposed strips 15 formed of a friction tape, or any material that is sufficiently tacky on both sides to resist any relative movement between the plates and the glass, so that the glass of the door is frictionally supported by clamping pressure which presses cover plates 13 and 14 tightly against the interposed friction tape.

To form the clamp, holes 16, of a certain diameter are formed in appropriate positions in the glass door and cover plate 13 is provided on its interior surface with a pair of recesses 17 which, it may be noted, are of a greater width than the diameter of holes 16 so that there is a free, uncontacted and unclamped portion of glass 18 projecting into these recesses. In a similar manner, cover plate 14 has its interior surfaces provided with recesses 19 which align in juxtaposed positions with recesses 17 of cover plate 13 so that portions 18 of the glass extend into these recesses.

The clamping pressure is obtained by means of screws 21 which are threadably anchored in bosses 22 suitably attached to plate 14, formed of steel or other sufficiently hard material, and projecting outwardly from the central portion of recesses 19 of plate 14; plate 13 being provided with openings through which flat-headed screws are insertable, the bosses of plate 14 being provided centrally with threaded openings in which the screws are anchored.

One essential feature of the invention is that bosses 22 be less in width, or diameter, than the diameter of holes 16 in the glass of the door, so that there can be no contact between the bosses and the cut edges of holes 16. Most preferably, bosses 22 project outwardly from the bottom surface of recesses 19, a distance which is short of the inner faces of recesses 17 so that the two plates may be pulled tightly together to clamp the glass as the screws are threaded into the bosses.

In forming the openings, certain dimensional limitations should be adhered to so as to prevent breakage of the glass. Thus, it is known that the distance between the edges of the glass sheet and the edges of holes 16 should be a minimum equal to the thickness of the glass and, preferably, considerably greater than this thickness. This and other limitations now are quite generally understood by those familiar with the working of glass that is to be tempered and, it is believed, they need no further amplification for the proper reproduction of the hinge of this invention.

With the arrangement described above, any strains transmitted from the hinge to the glass, or from the glass to the hinge structure, are transmitted at points which are spaced from the

edges of holes 16 and, consequently, these strains spread throughout assuredly strong areas of the glass, the cut edges of holes 16 absorbing no appreciable portion of them. This is highly desirable, because these cut edges are the points which are most likely to fracture and result in breakage if they are subject to strains, or if they are brought into contact with any metal of the clamps. As a result of this arrangement, it will be recognized that a hinge is provided for swingably mounting a glass door, the strength of the hinge being as great as the conventional leaf type hinges used to swingably mount wooden doors. A further advantage of this arrangement lies in the simplicity of the structure as compared with those door mountings in which the upper and lower edges of the door are pivoted about vertically projecting pins. In still another respect this hinge construction is an improvement over prior glass door hinges, since the privacy assured by doors swung on conventional wooden door leaf hinges is obtained.

According to the provisions of the patent statutes, I have explained the principle, preferred embodiment and mode of operation of my invention, and have illustrated and described what is now considered to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A pintle hinge for swingably supporting a vertically hung glass door of a building, the hinge having a leaf adapted to be attached to the vertical face of a door frame, a plate pintlely connected to said leaf and adapted to overlie one face of a glass door, a second plate adapted to overlie the other face of such a door opposite to said first-named plate, a detachable clamp adapted to extend through an opening in the body of such a door, said clamp engaging each of said plates for clamping them tightly on the opposite faces of such a door and so formed and proportioned that it is free from engagement with any portion of such a door, the inner face of each of said plates being provided with a recess surrounding and spanning said clamp whereby said plate faces bear only on flat portions of such a door that are spaced from the wall of an opening therethrough, a layer of adhesive material adapted adhesively to engage the inner face of each of said plates, each of said layers being adapted adhesively to engage flat faces of such a door so that when said plates are attached to each other and clamped as aforesaid tightly upon such a door the door when hung is adapted to be supported solely by vertical shear on said layers of adhesive material.

2. A pintle hinge for swingably supporting a vertically hung glass door of a building, the hinge having a leaf adapted to be attached to the vertical face of a door frame, a plate pintlely connected to said leaf and adapted to overlie one face of a glass door, a second plate adapted to overlie the other face of such a door opposite to said first-named plate, a detachable clamp adapted to extend through an opening in the body of such a door, said clamp engaging each of said plates for clamping them tightly on the opposite faces of such a door and so formed and proportioned that it is free from engagement with any portion of such a door, there being between the inner face of each of said plates a recess surrounding and spanning said clamp where-

by said plate faces bear only on flat portions of such a door that are spaced from the wall of an opening therethrough, a layer of adhesive material adapted adhesively to engage the inner face of each of said plates, each of said layers being adapted adhesively to engage flat faces of such a door so that when said plates are attached to each other and clamped as aforesaid tightly upon such a door the door when hung is adapted to be supported solely by vertical shear on said layers of adhesive material.

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