Feb. 6, 1962 R. E. WASMUTH 3,019,472

ADJUSTABLE HINGES

Filed March 28, 1958

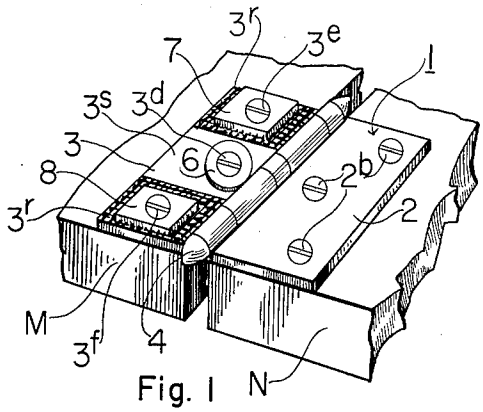


Fig. 1

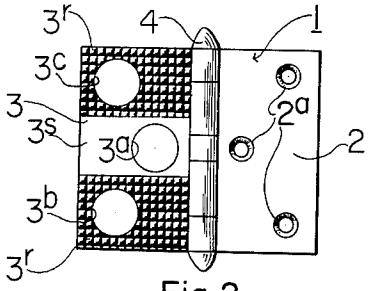


Fig. 2

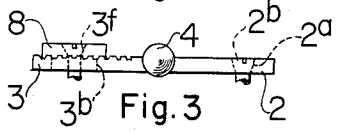


Fig. 3

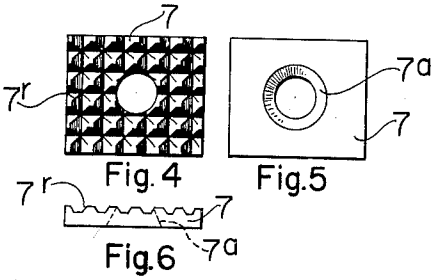


Fig. 4 Fig. 5 Fig. 6

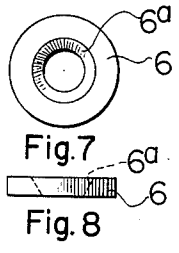


Fig. 7 Fig. 8

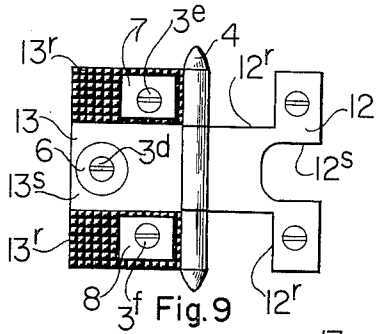


Fig. 9

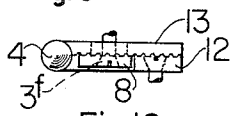


Fig. 10

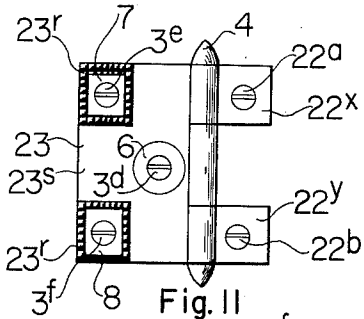


Fig. 11

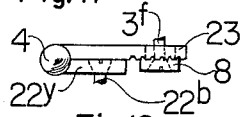


Fig. 12

INVENTOR.
ROBERT E. WASMUTH
BY
Alexander & Dowell

United States Patent Office

3,019,472
Patented Feb. 6, 1962

3,019,472

ADJUSTABLE HINGES

Robert E. Wasmuth, 520 Flaxmill Road, Huntington, Ind.

Filed Mar. 28, 1958, Ser. No. 724,753
6 Claims. (Cl. 16—129)

My invention relates to adjustable hinges, and more particularly relates to novel structure of the hinge leaves and novel cooperating mounting means.

The principal object of my invention is to provide a hinge having improved structure and having associated novel mounting means cooperating with the hinge structure so that the position of the hinge may be adjusted with respect to one or more supporting members to which the hinge is attached, such as a door and/or door frame, it being an important feature of the present invention that while the hinge is being adjusted, it is held snugly against its supporting member.

Another important object of the invention is to provide novel leaf structure and associated mounting means capable of easy and quick adjustment of the position of the leaf with respect to its supporting member both longitudinally and/or transversely of the leaf, such adjustments being made simultaneously while at the same time the leaf is snugly maintained against the supporting member with respect to which it is being repositioned.

Another object is to provide a structure capable of adjustment longitudinally and transversely of the hinge in fine increments by manipulation of mounting means, which then tightened after such adjustment, provide positive locking of the hinge in the selected position.

A further object of the invention is to provide a hinge having improved leaf structure and mounting means such that the hinge may be fully closed with one leaf in full and flat contact with the opposite leaf, whereby this adjustable hinge may be employed wherever a conventional hinge is used without increasing the mounting space occupied by the hinge when closed.

It is a further object of the invention to provide a simplified and improved hinge and mounting means which make it possible and convenient to adjust and relocate the relative positions of the supporting members to which the hinge is attached, such as a door and associated door frame, without removal of the hinge, removal of screws, plugging of holes and relocating screws, or the performance of other carpentry work such as usually becomes necessary when relocating a hinge leaf.

Still another object of the invention is to provide novel cooperating leaf structure and mounting means which may be conveniently applied to a large variety of different hinge types without rendering the hinges unduly expensive, bulky or unsightly. Other types of hinges in which the present novel features may be incorporated include offset, semi-concealed, automotive, straight-leaf, swage-leaf, butt-leaf, and many other standard and special type hinges, whether or not mortised or recessed.

Other objects and advantages of my invention will become apparent during the following discussion of the drawing, wherein:

FIG. 1 is a perspective view of a hinge having two leaves, one of which is conventional and the other of which is of novel structure for mounting to a supporting member by my novel adjustable means, the hinge being shown mounted to said supporting members.

FIG. 2 is a plan view of the hinge shown in FIG. 1.

FIG. 3 is an end view of the hinge and mounting means shown in FIG. 1, but not showing the supporting members to which the hinge is attached.

FIG. 4 is an enlarged view of one of the mounting

washers, showing pyramid-type roughening on one face thereof.

FIG. 5 is a view of the other face of the washer shown in FIG. 4.

FIG. 6 is a side view of the washer shown in FIG. 4.

FIGS. 7 and 8 are respectively enlarged front and side views of another one of the mounting washers.

FIG. 9 is a view of a hinge and associated mounting means similar to that shown in FIG. 1, but modified for the sake of permitting the two leaves of the hinge to come into full and flat engagement with each other when the hinge is closed.

FIG. 10 is an end view of the hinge and mounting means shown in FIG. 9 but with the hinge in closed position.

FIG. 11 shows a further modified form of the hinge with mounting means, modified for the same purpose as the form shown in FIG. 9.

FIG. 12 is an end view of the hinge and mounting means of FIG. 11 but shown in closed position.

Referring now to the drawing, FIG. 1 shows two supporting members M and N, the supporting members being pivotally joined together by means of a hinge **1** including a conventional leaf **2** and a special leaf **3** of special structure according to the invention for the purpose of adjustment. The hinge also includes a hinge pin (not seen) having enlarged ends **4** for the purpose of retaining the pin within the hinge in the well-known manner. The leaf **2** of the hinge includes a plurality of counter-sunk holes *2a* through which ordinary flat-head screws *2b* are passed in order to secure the hinge leaf to the supporting member N.

The adjustable hinge leaf **3**, as can best be seen in FIG. 2, includes three enlarged holes therethrough, the hole *3a* being located in the central portion of the leaf **3** and being surrounded by a surface of the leaf which is smooth. The other two holes *3b* and *3c* pass through the leaf nearer the ends thereof and are located in areas of the leaf which have been roughened for the purpose to be hereinafter stated. The smooth area *3s* of the leaf will be hereinafter referred to as the retaining area, and the roughened areas *3r* will be hereinafter referred to as locking areas.

As best be seen in FIG. 1, in order to secure the leaf **3** to the supporting member M, the screw *3d* is passed through the smooth washer **6**, the washer having a countersunk hole *6a* therethrough, FIGS. 7 and 8. The screw *3d* is a snug fit in the hole *6a* of the washer **6**, but is a very loose fit in the enlarged hole *3a* of the leaf **3**.

Similarly, two other washers **7** and **8** are laid over the roughened areas *3r* and screws *3e* and *3f* are passed through these washers and into the supporting member M. By reference to FIGS. 4, 5 and 6, it can be seen that the washer **7** has a countersunk hole *7a* therethrough and has one of its faces roughened as at *7r*. The screw *3e* is a snug fit in the countersunk hole *7a*, but is a very loose fit in the hole *3c* in the leaf **3**. The roughening *7r* of the washer **7** is exactly complementary with the roughening of the surface *3r* of the hinge leaf **3**. The washer **8** is identical to the washer **7** and therefore has not been shown in detail, and the roughening of the surface of the washer **8** (not shown) is exactly complementary to the roughening of the surface *3r* of the leaf **3**. The preferred form of the roughening comprises a plurality of mutually perpendicular transverse and longitudinal striations in the surface of the washer and of the leaf **3**, and forming a series of small pyramids which are very closely spaced together. The fineness of the increments through which the leaf may be adjusted depends directly on the fineness of these pyramids or whatever other roughening is used.

It has been found convenient from the point of view

of manufacture to make the washers 7 and 8 rectangular in shape rather than circular as is the case of the washer 6, although this feature is merely a matter of facility of manufacture.

Referring to the modification shown in FIGS. 9 and 10, it will be seen that the left hinge leaf 13 is substantially the same as the left hinge leaf 3 in FIGS. 1, 2 and 3. In particular, in this modification the left hinge leaf 13 has a smooth area 13*s* and two roughened areas 13*r* located on either side thereof. The holes through the leaf 13 are symmetrically spaced but are reversed with respect to the positions of the holes shown in the leaf 3 so that the holes are staggered with the central hole located more remotely from the hinge pin than the two outermost holes. The smooth washer 6 and screw 3*d* are associated with the smooth area 13*s*, and the washers 7 and 8 and associated screws 3*e* and 3*f*, respectively, are associated with the two roughened areas 13*r*. The leaf on the right side of the hinge pin, however, is not conventional, and has three areas of the leaf cut away along the edges 12*r* and 12*s*. The cut-away portions are so located that when the hinge is folded closed in the position shown in FIG. 10, the washers 7 and 8 will not contact the leaf 12, which contact would prevent the leaf from fully closing. Likewise, the center cut-out portion provides clearance for the washer 6 when the leaf is closed.

The modification shown in FIGS. 11 and 12 includes a hinge leaf 23 having a smooth surface portion 23*s* and roughened surface portions 23*r* over which the washers 7 and 8 are mounted by the screws 3*e* and 3*f*, respectively. Washer 6 is mounted over a hole through the smooth portion 23*s* of the leaf by the screw 3*d*, and the manner in which this assembly is to be adjusted is the same as the manner of adjustment of the left leaves in FIGS. 1 and 9. In each case, the mounting screws are a snug fit in the washers but a very loose fit in the holes through the left leaves. The right leaf in FIG. 11 actually comprises two separate leaves 22*x* and 22*y*. Each of these leaves has a countersunk hole for receiving mounting screws 22*a* and 22*b*, respectively, and these leaves are short in the direction transversely of the hinge so that when the hinge is closed, as shown in FIG. 12, the leaves 22*x* and 22*y* will not contact the washers 7 and 8 respectively. Since the center portion of the right leaf in FIG. 11 is entirely omitted, the washer 6 will not be contacted at all when the leaf is closed in the position shown in FIG. 12, and therefore this structure provides ample clearance by which the space occupied by the hinge when in closed position can be kept at a minimum.

Operation

Whichever type of hinge is employed, the adjustment of the lefthand leaf will be substantially the same. Namely, when all three screws 3*d*, 3*e* and 3*f*, are loose, the lefthand hinge may be shifted about with respect to the supporting member M to the extent permitted by the difference in diameter between the holes 3*a*, 3*b* and 3*c*, FIG. 2, and the screws 3*d*, 3*e* and 3*f*. Thus, adjustment of these relative diameters will determine the total increment by which the hinge leaf may be adjusted on the supporting member M. However, in order to avoid the necessity of greatly loosening all three of the screws 3*d*, 3*e* and 3*f* and thereby permitting the contact between the lefthand hinge leaf and the supporting member M to become loose and difficult to manage, the screw 3*d* may be loosened only very slightly, so that the washer 6 may slide on the smooth surface 3*s* of the lefthand leaf 3. With the screw 3*d* snug but not tight and the screws 3*e* and 3*f* loosened enough to permit disengaging of the roughened pyramids on the washers 7 and 8 from the roughened leaf surfaces 3*r*, the hinge leaf 3 may then be pressed or tapped into the desired position of adjustment. This repositioning of the hinge leaf 3 on the supporting member M while the leaf is still snugly held against the supporting member is an important advantage. Once a satisfactory position of the leaf 3 has been reached, the screw 3*d* can then be fully retightened, and the washers 7 and 8 can be again screwed up tightly against the roughened surfaces 3*r* to lock the hinge leaf in place against the supporting member M. It is to be noted that the hole through the center of each of the washers 6, 7 and 8 is countersunk and is of such diameter as to exactly fit the associated screws 3*d*, 3*e* and 3*f*. Thus, when the screws 3*e* and 3*f* are tightened, the washers 7 and 8 cannot move with respect to these screws. Moreover, since the pyramids on the washers 7 and 8 have reengaged complementary pyramids on the roughened surfaces 3*r*, the hinge leaf 3 can therefore not move with respect to the washers 7 and 8. By this means, positive locking of the hinge leaf 3 with respect to the supporting member M is obtained in addition to whatever salutary effect is gained by the frictional engagement of the other face of the hinge leaf 3 with the adjacent surface of the supporting member M.

The adjustment with respect to the position of the left hinge leaf 13 in FIG. 9, and 23 in FIG. 11, is made by substantially the same procedure as that just outlined above with respect to the hinge leaf 3.

It is to be understood that my invention is not to be limited to the exact number of smooth and roughened washers and leaf surfaces shown in the drawings, or to the particular locations of the respective smooth and roughened surfaces, for obviously changes may be made therein within the scope of the appended claims.

I claim:

1. In a hinge having leaves pivotally joined together along an axis of rotation, said leaves having holes through which headed securing means are passed for affixing the leaves to supporting members, improvements in the mounting of the hinge permitting adjustment of the hinge position with respect to a supporting member in at least two different mutually crossing directions, comprising on at least one leaf separate retaining and locking areas, each area surrounding at least one hole and the diameters of the holes through said areas being large in comparison with the diameters of the associated securing means, the surfaces of the leaf facing away from the supporting member being respectively of smooth character and of roughened character in the retaining and in the locking areas; separate washers respectively overlying a portion of each area, a securing means passing through each washer and being a snug fit therein and the surface of each washer which contacts an area being of the same character as the associated area, said roughened locking surfaces being provided with at least two series of parallel grooves, the respective series being disposed in mutually intersecting directions to leave pyramid-like roughening elements which lock with similar elements on the associated washers.

2. In a hinge as set forth in claim 1, said retaining area being located substantially centrally of the leaf and separating at least two locking areas symmetrically disposed with respect thereto.

3. In a hinge as set forth in claim 1, said hinge having two leaves which overlie each other when the hinge is closed, the holes in one leaf being offset from the holes in the other leaf and at least one leaf being cut-away opposite the locations of the holes in the other leaf as determined when the hinge is closed.

4. In a hinge as set forth in claim 3, the leaf opposite the cut-away leaf being the adjustable leaf having the retaining and locking surfaces.

5. In a hinge having leaves pivotally joined together along an axis of rotation, said leaves having holes through which headed screws are passed for securing the leaves to supporting members, improvements in the mounting of the hinge permitting adjustment of the hinge position with respect to a supporting member, comprising on at least one leaf separate smooth retaining and roughened locking areas, each area surrounding at least one hole and the diameters of the holes through said areas being large in

comparison with the diameters of the associated screws; a washer overlying a portion of each area, a screw passing through each washer and being a snug fit therein and the surface of each washer which contacts an area being of the same character as the associated area, said hinge having two leaves which overlie each other when the hinge is closed, the holes in one leaf being offset from the holes in the other leaf and at least one leaf being cut-away opposite the locations of the holes in the other leaf as determined when the hinge is closed.

6. In a hinge as set forth in claim 5, the leaf opposite the cut-away leaf being the adjustable leaf having the retaining and locking surfaces.

References Cited in the file of this patent

UNITED STATES PATENTS

686,025	Cannon	Nov. 5, 1901
959,001	Tritsch	May 24, 1910
1,050,092	Beall	Jan. 14, 1913
2,373,955	Fuller	Apr. 17, 1945