

1

2,934,784

TORSION ROD HINGE CONSTRUCTION

Longueville H. Price, Jr., Burlingame, Milton P. Du Plessis, San Carlos, and Henry A. Scarlett, Belmont, Calif., assignors to Pricemetal Corporation, Belmont, Calif., a corporation of California

Application February 5, 1957, Serial No. 638,374

3 Claims. (Cl. 16—180)

This invention relates to a new and improved torsion rod hinge construction and has particular application in the hinged suspension of doors and the like, such as, for example, doors for toilet compartments.

One of the principal objects and advantages of the present invention is the provision of a torsion rod which extends vertically along one side of the door and is attached at its upper end to a bracket fixed to a pilaster or panel, the lower end of the rod being attached to a fitting on the lower end of the door and also held in vertical alignment by a bracket fixed to the pilaster or panel. By this method of attachment, when the door is opened, the torsion rod is axially twisted and accordingly, when the door is released, the resiliency of the rod returns the door to closed or other pre-set rest position. Although in perhaps the majority of installations the torsion rod is pre-set to return the door to fully closed position, in toilet door installations it is not uncommon to pre-set the rod to only partially close the door (e.g., 30° open) to indicate an unoccupied cubicle.

One of the principal features and advantages of the present invention is the fact that there are no parts which tend to wear, and particularly there are no close fitting bearings or the like which, with the passage of time, may tend to wear out of proper alignment and position.

Another advantage of the invention is the fact that the use of a torsion rod eliminates the necessity of using coil springs, which are subject to failure, with the result that the device is particularly free of maintenance and repair costs.

Still another feature of the invention is the use of bronze bushings so disposed and journaled that lubrication is not required, which also reduces maintenance problems in connection with the device.

Another important feature of the invention is the fact that the fittings which are attached to the door and to the pilaster or panel are shaped and located in such manner that there are no protruding edges, inasmuch as the fittings are flush with the door panels.

Another feature of the invention is the fact that the parts which are used at the top and bottom are substantially identical in shape, thereby permitting interchangeability of the parts and reducing the stock of parts which must be carried for installation or replacement.

Another advantage of the invention is the fact that adjustment of the torsion rod setting is simply and accurately made.

Another feature of the invention is the fact that the operating components are concealed, thereby enhancing the appearance of the door.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

In the drawings:

Fig. 1 is a fragmentary perspective view of a door

2

hung and hinged in accordance with the present invention showing the associated adjacent pilasters;

Fig. 2 is an enlarged transverse sectional view taken substantially along line 2—2 of Fig. 1;

Fig. 3 is a fragmentary side elevational view with parts cut away in section; and

Fig. 4 is an enlarged fragmentary sectional view taken substantially along line 4—4 of Fig. 3.

The present invention is designed to suspend a door 11 from a pilaster 12 to provide a closure for the opening between pilaster 12 and adjacent pilaster 13. It will be understood that the hinge construction hereinafter described may be used to suspend a door 11 from other supporting and surrounding structure and that the construction illustrated in the accompanying drawings merely shows one conventional installation. In the construction illustrated in the accompanying drawings a fitting 14 is provided attached to pilaster 13 by a fastener 16. Fitting 14 has an extension 17 to which a rubber stop 18 is affixed, extension 17 and rubber stop 18 limiting the movement of the door when in closed position.

Attached to pilaster 12 at the level of the top of door 11 is a bracket 21 fixed to pilaster 12 by means of fasteners 22. Bracket 21 is formed with a pair of projecting flanges 23 parallel to the face of pilaster 12, the flanges locating bracket 21 in proper position. The upper edge of bracket 21 is level with the top of door 11. Bracket 21 is also provided with a projecting portion 24 having adjacent its outer end a hole 26 which is formed at its upper end with a countersink 27. The bottom of projecting portion 24 is shaped with a counterbore 28 and the inner end of bore 28 is formed with a plurality of radially extending serrations 29.

At the bottom of door 11 there is provided a bracket 31 similar to bracket 21. However, instead of hole 26 and countersink 27, the extension 24^a of lower bracket 31 is provided with a cylindrical hole 30 of slightly greater diameter than bearing member 46 hereinafter described.

Seating in counterbore 28 of bracket 21 is a cylindrical bronze bearing member 32, the upper end of which is provided with radially extending serrations 33 similar to serrations 29. When bearing member 32 is seated in the end of counterbore 28, corresponding serrations 29 and 33 prevent rotation of the one part relative to the other. In order to provide for such seating, the upper end of bearing member 32 is formed with an axially extending tapped hole 34. Flat head screw 36 extends through hole 26 in extension 24 and is in threaded engagement with tapped hole 34, thereby drawing member 32 into recess 28 to prevent relative movement. The lower end of bearing member 32 is formed with axially extending hole 37 which receives the upper end of torsion rod 38. Torsion rod 38 is preferably of high-tempered spring steel approximately $\frac{3}{16}$ inch in diameter. Adjacent its opposite ends are flats 39. A threaded first hole 41 is formed in bearing member 32 transverse to hole 37 and directly opposite flat 39. Set screw and lock screw 42 and 43, respectively, are threaded into tapped hole 41 and bear against upper flat 39 to prevent rotative movement of the upper end of torsion rod 38 relative to bearing member 32. At the same level as hole 41 and preferably diametrically opposite thereto is a hole 44, said hole 44 performing no useful function in the upper end of door 11, but being formed in upper bearing member 32 so that upper bearing member 32 is interchangeable with lower bearing member 46. Lower bearing member 46 is identical with member 32 except that it is inverted, and corresponding reference numerals are employed throughout.

The upper end of door 11 is cut out in a substantially rectangular recess 47, which recess 47 receives a fitting

48 L-shaped in elevation. Horizontally extending leg 49 of fitting 48 lies underneath and parallel to extension 24 of bracket 21 and is formed with a vertical hole 51 which receives and provides a bearing for bearing member 32. The inner end of fitting 48 is a channel-shaped hollow member 52, the upper connecting portion 53 of which is flush with the top of door 11 and the flanges 54 of which are flush with the outer faces of door 11. Door 11 is preferably fabricated with a thin sheet metal skin 57 which is supported by marginal projections 56 of flange 54. Extension 49 is likewise provided with marginal downward projections 58 on opposite sides of the door to provide a support for skin 57. When fitting 48 is installed in recess 47, it merges with door 11 so that there are no projections or rough places which may collect dirt or snag garments. Although it performs no function in the upper end of the door, fitting 48 is provided with a tapped hole 59 extending inwardly from the end of extension 49. A fitting 61 identical with fitting 48 is installed in the bottom of the door and in such instance tapped hole 59 is provided with a set screw 62 having an elongated nose 63 which projects into hole 44 in bearing member 46 and thus insures that bearing member 46 turns with fitting 61. Lock screw 60 secures set screw 62 in place.

Accordingly, in use, when the door is properly installed, upper bearing member 32 remains stationary, since it is rigidly attached to bracket 21. Lower bearing member 46 pivots with door 11. The opposite ends of rod 38 are fixed to bearing members 32 and 46 and accordingly, when door 11 is opened, torsion rod 38 is twisted. Lower bearing 46 turns in bearing hole 30 in lower bracket 31, lower bracket 31 functioning to hold bearing member 46 substantially in vertical alignment with bearing member 32, but providing no vertical support for the door. In this connection the entire weight of the door is suspended from upper bracket 21 which retains and supports the upper end of torsion rod 38. Adjustment of the setting of torsion rod 38 may be accomplished by loosening screw 36 and turning upper bearing member 32 relative to bracket 31 until serrations 33 seat in the proper corresponding serrations 29, whereupon screw 36 is tightened and the parts secured in place. This latter adjustment permits the torsion rod to be pre-set to any desired "rest" position, as, for example, the rod can be initially pre-set to fully or only partially return the door to closed position within the door frame and as earlier mentioned. It is also, of course, possible to employ the present invention with either single or double hung door installations in view of the fact that the torsion rod can twist around its own axis in either direction with equal facility and under the same tension.

Although the foregoing invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be practiced within the spirit of the invention and scope of the appended claims.

What is claimed is:

1. A torsion rod hinge assembly for supporting a vertical closure, such as a door, for swinging movement about a vertical axis relative to a supporting frame, comprising: a torsion rod; a first bearing member fixed to one end of said rod; a second bearing member fixed to the opposite end of said rod; a first bracket and a second bracket each adapted to be fastened to a frame of said

closure; first means for non-rotatably fixing said first member to said first bracket; said second bracket rotatably receiving said second bearing member; a first and a second fitting each adapted to be fastened to said closure; said first fitting rotatably receiving said first bearing member; and second means for non-rotatably fixing said second bearing member to said second fitting; said bearing members being identical to one another and defining exteriorly cylindrical bodies each formed with an axial hole at a first end to receive an end of said torsion rod; each bearing formed with a first tapped hole at its second end to receive said first means in threaded engagement; the second end of each bearing serrated to grip an associated first bracket; each bearing member being formed with a second tapped hole transverse to said axial hole to receive said second means.

2. A torsion rod hinge assembly for supporting a vertical closure, such as a door, for swinging movement about a vertical axis relative to a supporting frame defining an opening comprising: a first bracket adapted to be fixed to said closure; said first bracket having a first projection extending substantially horizontally into the frame opening; a first fitting adapted to be fixed to said closure in said frame; a second projection on said first fitting extending substantially horizontally below said first projection; a cylindrical first bearing member fixed to said first fitting; said first bearing member being rotatably journaled in said second projection; a second bracket adapted to be fixed to said frame; said second bracket having a third projection extending substantially horizontally into said opening; a second fitting adapted to be fixed to said closure; a fourth projection on said second fitting extending substantially horizontally above said third projection; a cylindrical second bearing member fixed to said fourth projection; said second bearing member being rotatably journaled in said third projection; a torsion rod fixed at one end to said first bearing member and at the opposite end to said second bearing member; said first and second fittings being interchangeable with one another; and said first and second bearing members being interchangeable with one another.

3. A torsion rod hinge assembly for supporting a vertical closure for swinging movement about a vertical axis relative to a supporting frame, comprising: a torsion rod; an upper bracket adapted to support fixedly and non-rotatably the upper end of said torsion rod to said frame; a lower bracket adapted to fixedly and non-rotatably support said rod to the lower part of said closure; an upper guide bearing adapted to be fixedly mounted to the upper part of said closure and rotatably encircling the upper regions of said rod; a lower guide bearing in vertical alignment with said upper bearing adapted to be fixedly mounted to the lower part of said frame support and rotatably encircling the lower regions of said rod; the entire weight of said closure being transmitted to said frame via said lower bracket, said torsion rod and said upper bracket.

References Cited in the file of this patent

UNITED STATES PATENTS

124,111	Barrows	Feb. 27, 1872
1,912,289	March	May 30, 1933

FOREIGN PATENTS

513,556	Great Britain	Oct. 16, 1939
---------	---------------	---------------