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G. BANSE

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SLIDING DOOR HARDWARE

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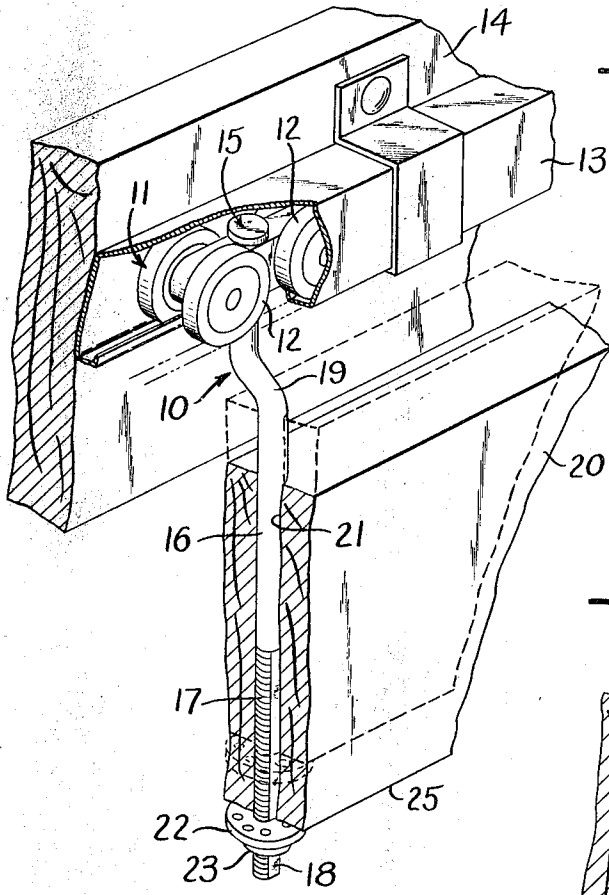


Fig. 1.

Fig. 2.

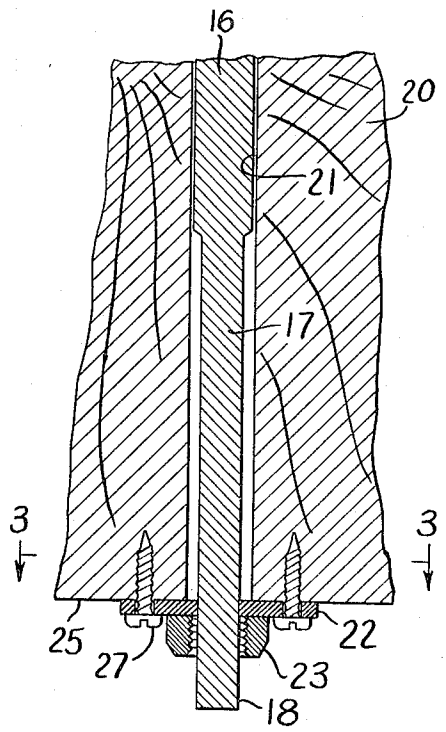
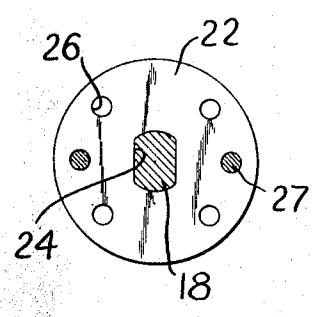


Fig. 3.



INVENTOR
GEORGE BANSE

BY

Fedler, Bradley & Patience
Attys.

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SLIDING DOOR HARDWARE

George Banse, Sterling, Ill., assignor to National Manufacturing Co., Sterling, Ill., a corporation of Illinois
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ABSTRACT OF THE DISCLOSURE

A rod has its upper end attached to a track follower and its lower end offset and passing through a cross-piece at the top of the door, the lower end of the rod having a non-circular threaded cross-section. A washer with a matching non-circular section is positioned around the lower end of the rod and nailed to the bottom of the cross-piece to prevent the rod from turning in an angular direction once it has been positioned to space the door a suitable distance from the doorway. A nut is threaded underneath the washer to support the door vertically.

This invention relates to sliding door hardware of the type capable of providing lateral as well as vertical adjustment of the door relative to a door jamb.

In certain classes of sliding doors, it is conventional to provide rod-like hangers to attach the cross-piece at the top of a door to track followers engaged in a track mounted at the top of a door jamb. Such rods are usually threaded at the end thereof remote from the end attached to the follower, and a nut threaded onto the remote end serves to support the cross-piece of the door and permit vertical adjustments to be made. To provide for lateral adjustment of the door relative to the door jamb, it is known to offset the portion of the rod extending between the cross-piece of the door and the follower such that a goose-neck is formed. The door is thus eccentrically mounted on the rod, and angular rotation of the latter relative to the follower causes the door to be moved laterally relative to the jamb until a proper position is reached. To maintain the door in this desired lateral position, it is necessary to hold the rod at its adjusted angular position, and to this end it is known to provide means on the door to prevent relative rotation between the rod and the door. One expedient for achieving this is to lock the height adjusting nut to the rod after the door has been adjusted vertically and laterally, and then to fasten the nut to the cross-piece of the door. This will maintain the door properly positioned relative to the jamb under normal conditions of operation, but in many situations, this is not the case. For example, in some installations, frost heaves in the floor, or structural shifts in the building to which the tracks are connected, tend to cause the door to move vertically toward the tracks. Since the rod of each hanger is, in effect, rigidly attached to the door, this lifting of the door tends to raise the track follower from the track interfering with the proper operation of the door. Therefore, an important object of the present invention is to provide a sliding door hanger which can be used to ameliorate this situation.

A feature of the present invention by which this object is achieved is the provision of a disc having a non-circular aperture therein through which the end of the rod remote from the track follower is inserted, such end having a cross-section matching the aperture in the disc. As a result, the disc, although slideable on the rod, is non-rotatably mounted thereon between the vertical adjusting nut and the cross-piece of the door. With this construction, the nut can be rotated to provide the proper vertical position of the door, and the rod can be rotated to provide the proper lateral position, just as in the prior art devices.

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However, the door is thereafter held in the correct lateral position by fastening the disc to the cross-piece on the door, not the vertical adjustment nut, but by separate fastening elements. As a result of the slideable connection between the disc and the rod, movement of the door relative to the rod in a direction toward the track can take place even while the disc remains attached to the cross-piece.

The more important features of this invention have thus been outlined rather broadly in order that the detailed description thereof that follows may be better understood, and in order that the contribution to the art may be better appreciated. There are, of course, additional features of the invention which will be described hereinafter and which will also form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception upon which this disclosure is based may readily be utilized as a basis for designing other structures for carrying out the several purposes of this invention. It is important, therefore, that the claims to be granted herein shall be of sufficient breadth to prevent the appropriation of this invention by those skilled in the art.

In the drawings:

FIG. 1 is a perspective view, partially in section to better illustrate the construction, of a hanger made according to the invention for attaching a sliding door to a track follower engaged with a longitudinal track mounted at the top of a door jamb;

FIG. 2 is a sectional view of the end of the rod of the hanger shown in FIGURE 1 that is remote from the end attached to the track follower; and

FIG. 3 is a sectional view taken along the line 2—2 of FIG. 3.

Referring now to FIG. 1, reference numeral 10 designates sliding door hardware into which the present invention is incorporated. Hardware 10 comprises a track follower 11 having a body portion mounting two pairs of wheels 12 that are engaged in an inverted U-shaped longitudinal track member 13 attached to the top 14 of a door jamb; and a hanger means 15. The latter includes a rod 16 having one end rotatably attached to the body portion of the track follower 11 and extending downwardly therefrom, terminating in a threaded end 17 having a portion 18 that is, as best shown in FIG. 3, non-circular in cross-section. The portion of the rod 16 immediately adjacent the body portion of the track follower 11 is off-set to define a goose-neck 19. As a consequence of this construction, threaded end 17 of rod 16 is eccentrically mounted on track follower 11.

FIG. 1 also shows a segment of cross-piece 20 at the top of a door, such segment containing a vertically directed aperture 21 that extends through the cross-piece 20 and permits the door to be moved vertically relative to the rod 16. The free end of threaded end 17 extends somewhat beyond cross-piece 20 and has engaged thereon, a disc 22 and a vertical adjusting nut 23. The disc 22 may be circular as shown in FIG. 3 with a non-circular aperture 24 at the center, such aperture matching the cross-section of the portion 18 of the rod 16. This construction permits the disc 22 to be axially, but non-rotatably, slideable on rod portion 18, since the non-circular nature of aperture 24 prevents the disc 21 from being rotated relative to the rod 16. The nut 23, on the other hand, is threaded onto the free end of the rod 16 and is preferably a friction nut that will retain whatever axial position it is set in.

To mount a door on the rod 16, the disc 22 and nut 23 are removed from the rod, and the latter is inserted into aperture 21 in cross-piece 20 until the free end of the rod projects beyond the bottom edge 25 of cross-piece 20. Next, the free end of rod 16 is inserted into aperture 23 of disc 22, and the latter is moved axially on the rod to

provide clearance for threading nut 23 in place. Vertical adjustment of the door is effected by threading nut 23 on the rod until the door is raised to the proper position. During this adjustment, disc 22 merely slides axially on the rod. Thus, nut 23 constitutes what is termed "first adjustment means" which are cooperable with the door to limit movement of the latter relative to rod 16 in a direction away from the track 13.

To laterally adjust the door relative to the door jamb, it is necessary to rotate rod 16 relative to follower 11 since such angular rotation of the rod effects lateral movement of the door in a direction normal to the plane of longitudinal movement of the door. This is achieved by grasping the free end of the rod that projects beyond edge 25 of cross-piece 20 and rotating until the desired lateral adjustment is effected. The non-circular nature of the free end of the rod facilitates use of a wrench for this purpose. Accordingly, the free end of the rod is considered to have "second adjustment means" by which the angular position of the rod can be adjusted.

In order to hold the rod 16 in its selected angular position, disc 22 is utilized. As shown best in FIG. 3, disc 22 has a plurality of holes 26 around its periphery, each of which is adapted to receive a drive-screw 27 for securely attaching disc 22 to the edge 25 of the cross-piece 20. Thus, after the rod 16 is rotated to its correct angular position, one or more drive screws 27 may be inserted into the holes in disc 22 and driven into the cross-piece. The drive-screws so used, in cooperation with holes 26 in disc 22, constitute "lock means" engageable with the door to maintain the rod in its adjusted angular position.

With completion of the assembly and adjustment procedure outlined above, it can be seen that the door is free to move vertically on rod 16 in a direction toward track 13 without regard to the fact that disc 22 is rigidly attached to cross-piece 20 by drive screws 27. Thus, should frost heaves in the floor tend to raise the door toward the tracks 13, the door is free to move upwardly as suggested by the broken lines of FIG. 1 without disturbing the vertical positioning of rod 16. In this manner, the primary object of the present invention is achieved with a device that is relatively simple in terms of component parts and hence is easy to fabricate, install and use.

While this disclosure shows and describes in detail a presently preferred embodiment of a hanger for the sliding door, it is obvious that modifications of this device will occur to others working in the art. Accordingly, the invention should not be limited only to the particular embodiment shown and described, but by the scope of the following claims.

I claim:

1. A hanger for attaching a sliding door to a track follower engaged with a longitudinal track mounted at the top of a door jamb, said hanger comprising:
 - (a) a rod adapted to be attached to the cross-piece at the top of said door and to said follower to support said door for longitudinal sliding movement relative to said jamb;
 - (b) first adjustment means on said rod cooperable with said door to limit movement of the latter relative to said rod in a direction away from said track for vertically positioning the door relative to the track

and for permitting movement of said door toward said track while said rod is stationary;

- (c) said rod being constructed and arranged so that angular rotation of the rod relative to said follower effects lateral movement of the door in a direction normal to the plane of longitudinal movement of the door;
- (d) second adjustment means on said rod to adjust the angular position of said rod for laterally positioning the door relative to the jamb; and
- (e) lock means engageable with said door to maintain said rod in its adjusted angular position and for permitting vertical movement of said door toward said track.

2. A hanger in accordance with claim 1 wherein the end of said rod remote from said follower is non-circular in cross-section and said second adjustment means includes a disc containing a non-circular aperture matching said cross-section and engaged therewith whereby rotation of said rod imparts rotation to said disc, and axial movement of said disc on said rod can be effected without rotating said disc.

3. A hanger in accordance with claim 2 wherein the non-circular end of said rod is also threaded, and said first adjustment means is a threaded nut engaged with the threads on said rod, said disc being interposed between said nut and the cross-piece of said door such that rotation of said nut effects a vertical adjustment to said door.

4. A hanger in accordance with claim 3 wherein said disc is provided with at least one aperture means, and said lock means is a drive screw inserted into said aperture means for non-rotatably attaching said disc to the cross-piece of said door after said rod is rotated to an angular position that properly positions the door laterally of the jamb.

5. A hanger in accordance with claim 4 wherein said rod has a goose-neck bend therein in the region where it extends beyond said cross piece.

6. Sliding door hardware comprising:

- (a) a track follower adapted to engage a track;
- (b) a rod having one end attached to said follower and extending therefrom and terminating in a threaded end having a portion that is non-circular in cross-section;
- (c) said rod having a portion intermediate its ends that is off-set to define a goose-neck;
- (d) a disc having a non-circular aperture matching the cross-section of said portion on the threaded end of said rod, the last mentioned portion being slideably inserted into the aperture in said disc; and
- (e) a nut threaded on the threaded end of said rod to retain said disc thereon.

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MARVIN A. CHAMPION, *Primary Examiner.*
 JOSEPH H. McGLYNN, *Assistant Examiner.*