May 22, 1951 G. A. CONROY ET AL 2,554,294

HANGING MEANS FOR SLIDING DOORS

Filed Nov. 21, 1946

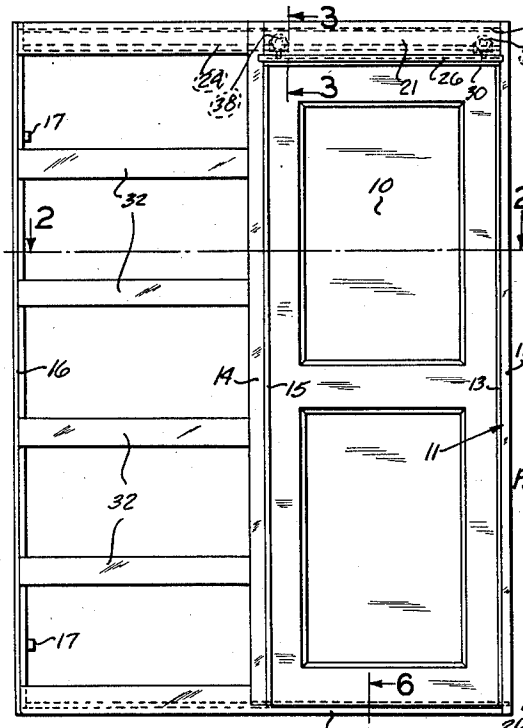


FIG. 1.

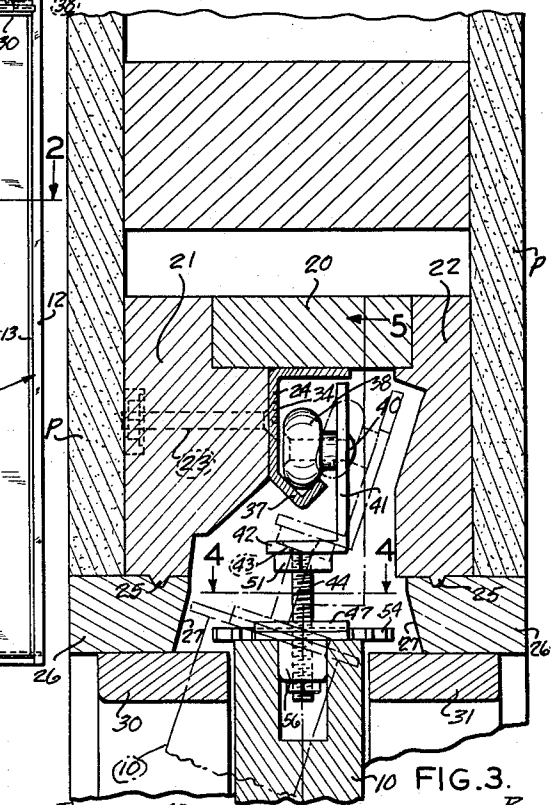


FIG. 3.

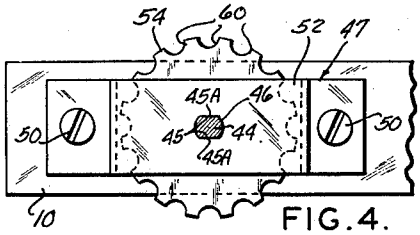


FIG. 4.

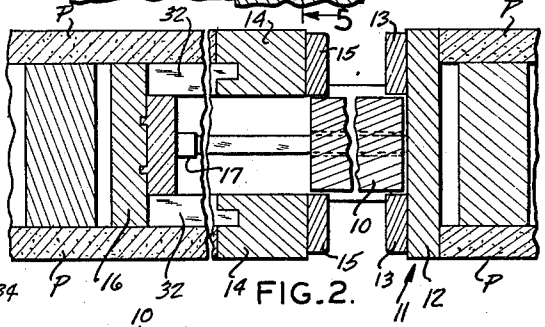


FIG. 2.

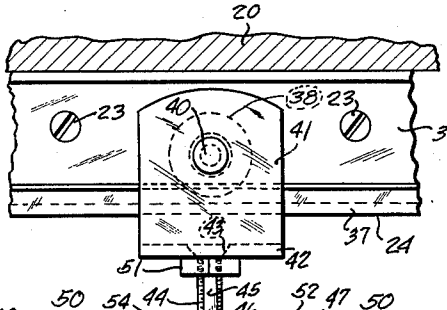


FIG. 5.

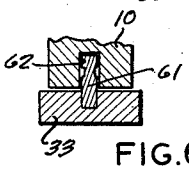


FIG. 6.

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HANGING MEANS FOR SLIDING DOORS

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Application November 21, 1946, Serial No. 711,376

1 Claim. (Cl. 20—19)

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This invention relates to improvements in hanging means for sliding doors, and more particularly to improved mounting and hardware items for use on track-supported doors, and particularly but not exclusively in sliding door assemblies which are or may be manufactured and sold as complete framed units ready for installation after hanging and adjusting the door. The present improvements are particularly but not exclusively designed and applicable for use in and on interior sliding doors, for example, those used in the partitions of residential structures.

Doors of sliding type as distinguished from those of hinged type, possess numerous advantages in interior installations, particularly due to the fact that they obviate the requirement of unserviceable floor space on at least one side of a swinging door. On the other hand, sliding doors heretofore available to the trade have presented numerous serious disadvantages, both in original installation, and in the degree of service attention required after a period of use. Furthermore, unless properly constrained for movement in their predetermined plane, sliding doors have heretofore been notoriously subject to vibrating tendencies, resulting in rattling, and are sometimes noisy, subject to sticking and are very difficult to adjust once installed in a frame structure. The present invention accordingly has as a principal and primary objective, to obviate each and all of the difficulties and shortcomings noted.

Yet another object of the invention is attained in the provision of an improved framing structure for sliding doors, with which is combined in novel manner, improved guiding provisions for the top of the door, improved trackage and an improved arrangement for access to the trackage and hangers for service attention, at any time, without particular tools and with a minimum of special skill.

Yet another important object of the invention is attained in improved door hanger hardware such that the door may be quickly and easily trued or levelled either when originally installed or after a period of usage.

An additional important object of the invention is realized in hanger adjustment provisions such that the door, even though its hangers and track be concealed within a track pocket or the like, may be readily adjusted to varying heights at any time without removal of the door from the track. The facilities for height adjustment enable the door to clear thresholds, rugs or other

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articles or structure in the lower portion of the doorway, to the exact extent needed and desired, and enable easy changes in door and floor clearance at any time, with little effort and no especial skill.

The foregoing and numerous other objectives will more clearly appear from the following detailed description of a presently preferred embodiment, particularly when considered in connection with the accompanying drawing, in which:

Fig. 1 is a side elevational view of an assembled door frame ready for installation, prior to plastering in a partition or interior wall;

Fig. 2 is a horizontal sectional view, considerably foreshortened and enlarged, as taken along line 2—2 of Fig. 1;

Fig. 3 is a greatly enlarged sectional view in a vertical plane as taken along line 3—3 of Fig. 1, and showing certain features of the hanger construction and the relation thereof to the track and track pocket;

Fig. 4 is a fragmentary plan view partly in section as taken along line 4—4 of Fig. 3;

Fig. 5 is a sectional view partly in elevation, showing one of the hangers and the attachment thereof to the door, all as taken along line 5—5 of Fig. 3, and

Fig. 6 is a fragmentary transverse sectional view in the region of the bottom of the door when closed, and as taken along line 6—6 of Fig. 1.

Referring now by characters of reference to the drawing, it is preferred for interior residential installations, as in a partition between rooms, to provide a door frame which may be fabricated as a millwork product and assembled as a substantially operative unit, complete upon hanging the door, for installation in a partition prior to plastering. Such a frame is shown as of rectangular construction and of an interior width slightly exceeding double the width of the door 10, so as to provide for full movement thereof between open and closed positions within the frame.

As shown in Fig. 1, the door occupies the door opening normally appearing after the frame is set in the wall, in which position it will snugly abut a vertical jamb structure indicated at 11, and including a vertical closing stop 12 (Fig. 2), to the face of which are secured vertical bead or guide members 13. These are arranged with slightly more than working clearance with the opposite faces of the closing edge of the door. A pair of pocket jambs 14 are disposed vertically in an intermediate position, and are spaced sub-

stantially as shown by Fig. 2, with the requisite door clearance, these serving to carry guide or beading members 15 analogous to those indicated at 13. The opposite vertical framing structure of the assembly is generally indicated at 16 (Fig. 1.) and is or may be similar to the closing jamb indicated at 12, and, now obviously, will serve as an abutment for the left hand margin (Fig. 1) of the door when the latter is in open position. One or any suitable plurality of door bumpers 17 may be provided so as to minimize impact effects when the door is quickly brought to open position.

The upper margin of the frame consists of an inverted trough-like assembly, the recess within which results in a head pocket or track pocket. This is conveniently formed of three interfitted elements best appearing in Fig. 3 and including a horizontal top closure strip 20, set into undercut or shouldered portions of vertical elements forming the sides of the trough and indicated at 21 and 22. The resulting pocket structure is adapted for the reception and enclosure of the track 24, hereinafter described in more detail, and supported as by stove bolts 23, the heads of which are countersunk below the track structure, the bolts extending preferably horizontally through element 21. It will be noted that elements 21 and 22 are both obliquely undercut so as to facilitate lifting and remounting of the roller, when required incident to removal and rehanging of the door. Fitted to the elements 21 and 22 as by a tongue or bead 25 in a corresponding groove, are finishing pieces 26 each relieved along its inner margin, so as to provide downwardly divergent faces 27. These serve, as will later better appear, to permit a wider latitude of swinging movement of the door 10 out of its normal plane, incident to door hanging or removal.

Serving at times as guiding elements for the upper margin of the doors, and as trim pieces, are a pair of beading elements or strips 30 and 31. These are attached to but easily removable from the members 26 and coact therewith, and with the head pocket, in concealing fully or to the extent desired, the hardware of the track and hangers.

Added bracing and additional support incident to plastering-in the frame assembly are attained by the provision of a plurality of pocket cross members 32, four of which are shown at each side of the frame structure, and which bridge the elements 14 and 16, substantially as shown. These are suitably recessed laterally of the frame, as to the extent of plaster depth so as to be normally fully concealed after the frame assembly is set in the wall.

Normally mounted upon a subfloor or the like, is a sole strip 33 which extends the full width of the frame between the jambs 11 and 16 and which may, as is recommended, be of such dimensions that the portion thereof extending into the door opening, may be cut out after the frame is set in the wall. Thus during shipping and erection this element may serve a maximum strengthening and bracing effect, and in the finished assembly so much of the sole strip is cut away that the remainder lies flush with the top surface of the finished floor, whereby to prevent any obstruction within the door opening proper, along the bottom thereof.

Proceeding now to a description of the trackage and hanger features, these items of hardware include in the track 24, an apertured supporting plate 34, the apertures therein serving to receive the bolts 23, heretofore mentioned. The preferably single piece of metal forming the track is continued through a lower portion which is angulately formed to constitute a V-shaped track proper shown at 37. The track is shown in a form which is closed on three of its sides, but which leaves a substantial side opening through which may be inserted and removed the rollers of the hanger, as will appear from Fig. 3.

It is a preference to employ rollers 38 of a non-metallic type, for example but without restriction, the roller material being of a dense hard, long wearing fiber. They may, if desired, be mounted through ball bearings or other anti-friction journals (not shown), each on a pivot pin 40 set into a suitable aperture (not shown) and welded in assembly to a hanger plate 41. The latter is formed to provide a right angled, normally horizontal portion 42. The plate portion 42 is provided with a frusto-conical recess 43 which serves to receive a similarly shaped head of a threaded shank element 44, these parts being assembled as by welding the head into the recess therefor. The shank is provided along at least one side, with a flattened surface or "flat" 45, which as will later better appear, coacts with a similarly shaped aperture 46, provided with an internal "flat" 45A, this opening being provided in an attachment device, such as a mounting strap or fixture generally indicated at 47. The ends of the strap are apertured to receive door-engaging screws 50, preferably one at each end of the element 47. It has been found conducive to better rigidity of attachment of the shank 44 to the portion 42 of the hanger plate, to provide a jamb nut 51 in about the location shown by Fig. 5. The nut 51 may be welded or otherwise secured to part 42 of the plate. It will now appear that the door is limited in its vertical adjustment upwardly, by nut 51, and is similarly limited in its lowering adjustment by a stop element such as nut 51A at or near, and secured to the lower portion of, threaded member 44.

As best appears from Figs. 3 and 5, the fixture or strap 47 is formed to provide an upstruck portion 52 which results, as the strap is applied to the upper stile of the door, in a recess between the portion 52 and the adjacent surface of the upper door stile. This recess is preferably of a depth to accommodate a nut of substantial diameter, the central bore 53 of which is threaded so that this nut 54 constitutes an adjusting wheel of a diameter somewhat exceeding the thickness of the door 10, and preferably projects beyond the adjacent margin of the door in order to facilitate manual rotation of the nut for adjusting purposes. This relation best appears from Fig. 4, wherein it will appear that the adjusting wheel is of a diameter considerably exceeding the width of the fixture 52, as well as exceeding considerably the thickness of the door. The door is preferably provided in the region of the hanger with a drilled recess or pocket 55, and the wheel 54 is preferably provided with an elongate hub 56 which snugly interfits the recess 55 so as to provide a desirable frictional effect in this region with a view of retaining the adjusting wheel or nut, in any predetermined rotative position.

It will now have become obvious that the door is supported through the strap fixture 52, directly from the face of nut 54 while the latter is, now obviously, supported from the threaded shank 42 of the hanger which in turn includes and is

suspended through the rollers 38 on portion 37 of the track.

A prevalent difficulty in original installation of doors of this type, is that of keeping the door plumbed with the framing elements. It will now be apparent that, with only a very minor angular divergence between the closing margin of the door, and the closing stile or jamb, an incomplete closure results, with added likelihood of rattling, and an unsightly, unworkmanlike appearance of the assembly. The present improvements of course contemplate a plurality, preferably and usually a pair of the hanger assemblies substantially as shown by Fig. 1, one such hanger being located near each opposite margin of the door 10.

It will now have appeared that adjustment may be easily effected at any time, to plumb the door and assure its operation along straight lines, with perfect parallelism thereof with the frame members, merely by removal of the beading elements 30 or 31. This provides, partly by reason of the relieved portions 27 of elements 26, easy manual or finger access to each of the adjusting wheels 54. Digital actuation of the adjusting wheels is further facilitated by the relieved or serrated conformities 60 characterizing the wheel periphery. It will be further noted that incident to rotation of the nut or wheel 54, any tendency to rotation of the rollers 38 about a vertical axis, is obviated by the provision of the flat 45 and the similar flat 45A provided in aperture 46 of fixture 52. Thus element 44 will maintain a constant position about its own axis; the plate 41 will always remain parallel to the longitudinal line of track 37, and any cocking tendency of the hanger with respect to the track, is avoided. Following adjustment, it is of course easy to replace the element 30 or 31, so as fully to conceal the hardware elements in the track and hanger pocket.

A further conducing to a fully guided relation of both top and bottom of the door incident to movement thereof within its frame, it is preferred to provide, as set in the sole strip, a spline 61 operating in a bottom groove 62 of the door 10. This spline is incomplete, and is augmented by certain retractible fixtures constituting the subject of a separate application of Earl M. Trammell, Sr. and identified with Serial Number 711,377 and filing date November 2, 1946, being entitled Sliding Door Assemblies.

It will have appeared that the construction of the frame as well as of the hangers and suspension hardware serves to facilitate the operation of setting the assembly in the wall. This will appear, for example, in the relation between elements 21—26 and on the opposite side those indicated at 22 and 26, such that the relative projection of elements 26 serves as a supporting ledge for the layers of plaster P. Similarly, the relative recession of the pocket cross members 32 serves in the finished installed unit, to provide a flush relation between the members 14, 12 and other members of the frame, and the finished surface of plaster P.

Although the invention has been described by making a particularized reference to a preferred

embodiment, the description is to be understood as illustrative rather than limiting, because of the numerous possible structural variants within the full intended scope of the invention as defined by the appended claim.

We claim as our invention:

The combination with a sliding door and a door receiving frame structure, of an inverted trough-like assembly spanning the width of the frame and secured along the upper margin thereof, said assembly including spaced side elements each being obliquely undercut to define opposite side wall recesses, a top closure element, and longitudinally extending, laterally spaced finishing elements positioned below said side elements and defining a downwardly flared opening to the inverted trough-like assembly; track means carried by one of said side elements; door suspending and height adjustment means including a flat nut rotatably attached at the upper margin of the door, the suspending means arranged to pass into the trough-like assembly for engagement with said track means, the obliquely undercut recesses in said side elements permitting entrance of said suspending means at an oblique angle for facilitating installation and removal of the door; said flat nut being of disc form, yoked to the top edge of the door and projected edgewise therefrom, and located in the lowermost portion of said flared opening whereby to provide a substantial clearance for working access to the edge of the flat nut, and a beading element carried by each of said finishing elements immediately below said nut and mounted to conceal the door suspending and adjusting means while permitting working clearance with the door, at least one of the beading elements being detachable for access to the nut, whereby to enable height adjustment of the door while suspended on the track means.

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