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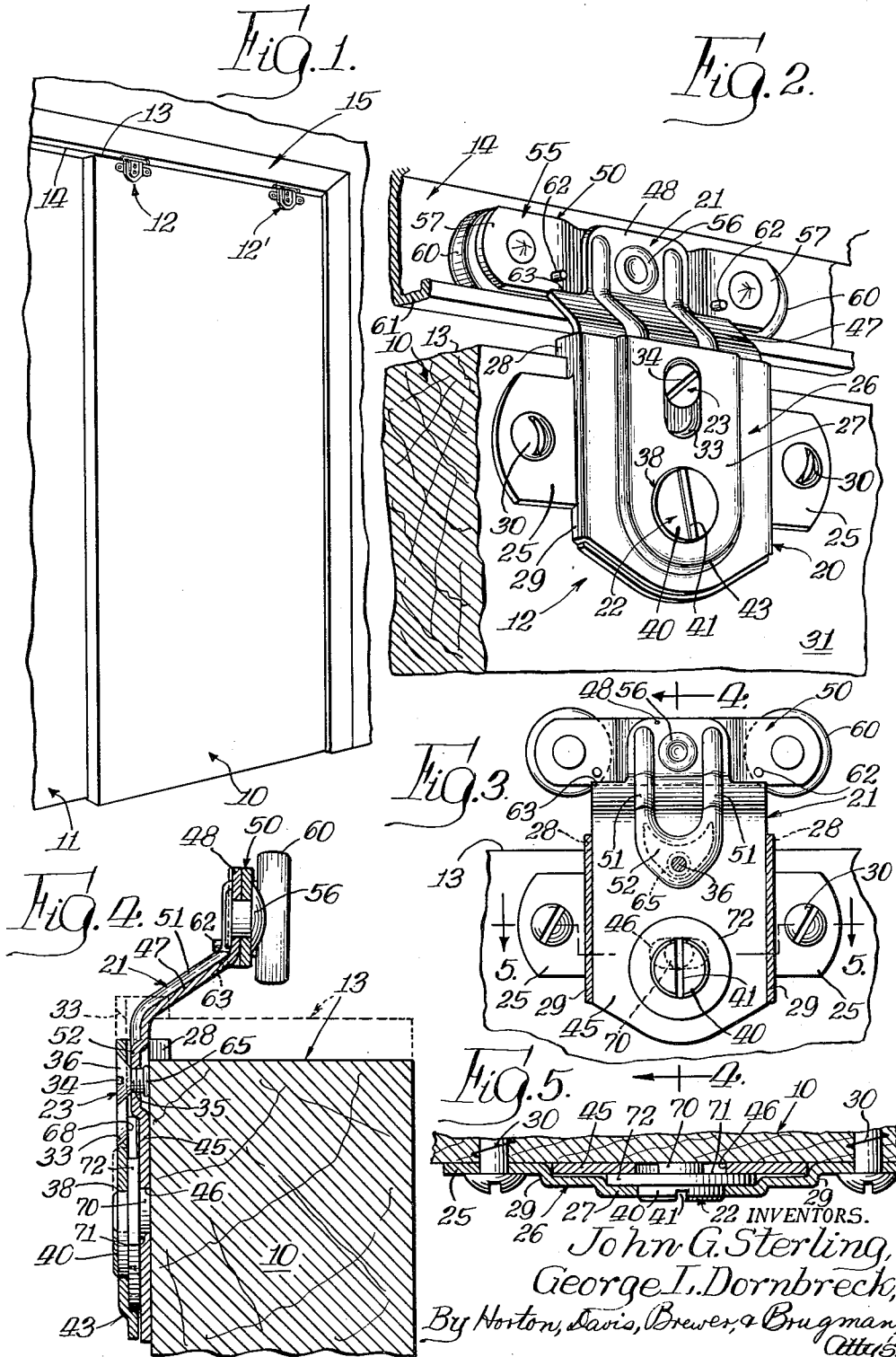
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SLIDING DOOR HANGER ASSEMBLY

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2 Sheets-Sheet 1



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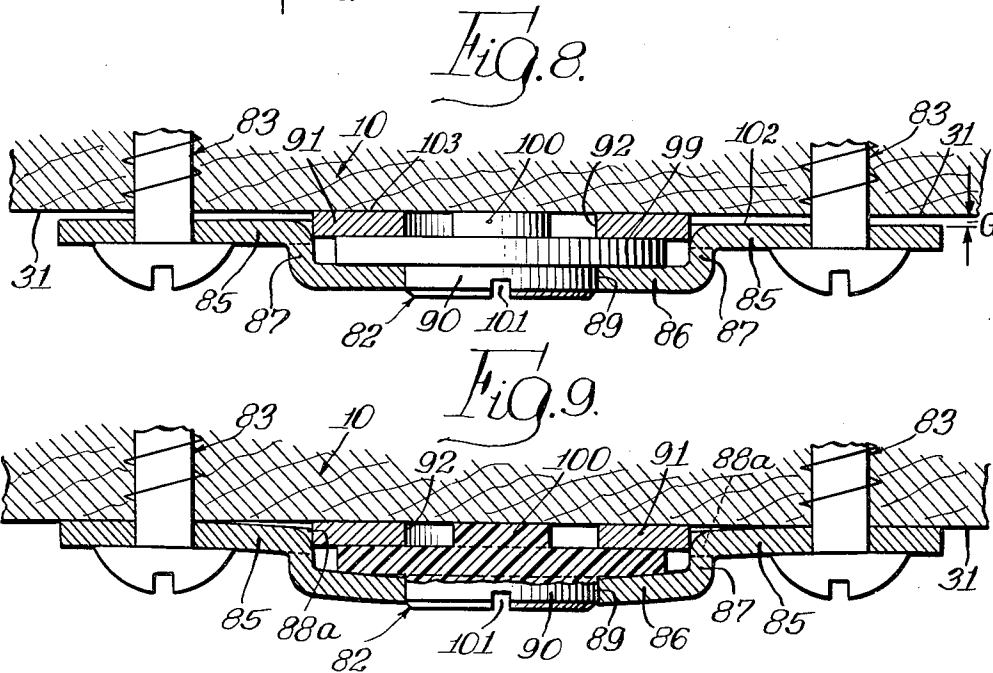
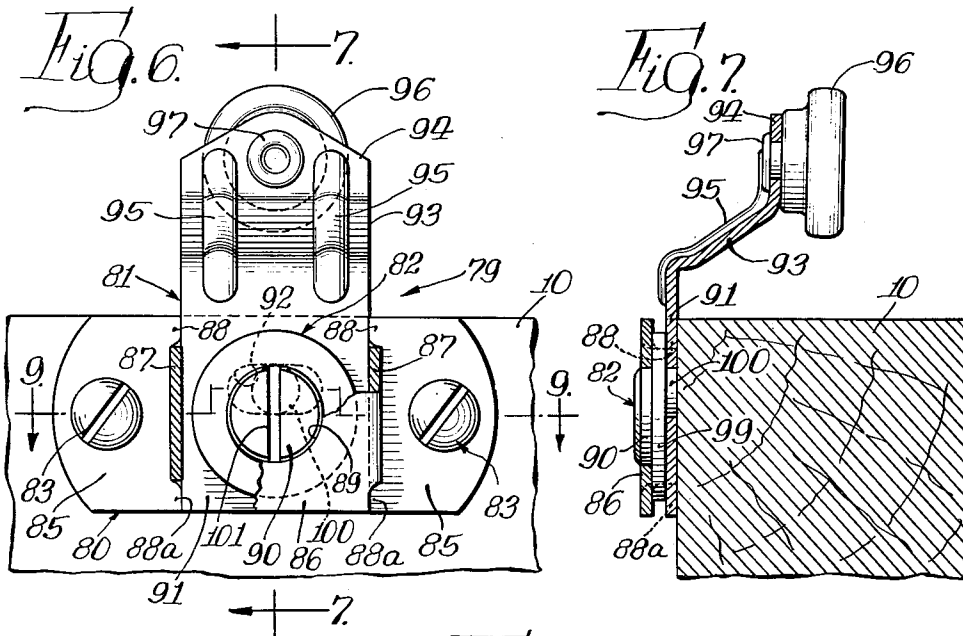
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2 Sheets-Sheet 2



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SLIDING DOOR HANGER ASSEMBLY

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6 Claims. (Cl. 16—105)

This invention relates in general to hardware, and more particularly to improvements in sliding door hanger assemblies utilized for mounting a door or panel on a supporting track.

Hanger assemblies to support sliding doors or panels for movement along a track are generally known in the art; such normally including some type of mounting bracket means ordinarily attachable adjacent one end of a door to be supported and having one or more rollers for engaging a normally horizontal overhead track. Usually, two such hanger assemblies are used for each door, one near each upper corner. If the alignment of the hanger assemblies and the door jamb is closely supervised, the door ideally will lie in a generally vertical plane with its lateral edges plumb with the vertical or side jamb members. Such ideal installations are seldom if ever achieved or maintained, however, without adjusting the door alignment, particularly in new buildings which are prone to settling. It is especially desirable, therefore, to provide means for adjusting the door relative to the door jamb and track. This may be accomplished conveniently by embodying adjustment means in the hanger assembly for repositioning the door, as is intended by the present invention.

Previous inventors have presented hanger assemblies embodying a wide variety of means for accomplishing the aforementioned objective, but it has been our experience that such prior devices generally have been ineffective for one reason or another. One familiar type, for example, requires repositioning movement of the entire hanger assembly, particularly the mounting bracket, relative to the door. This manner of accomplishing the needed adjustments is unduly cumbersome and produces excessive wear of the fastener means and its connection with the door, eventually resulting in an insecure mounting for the assembly, which is incapable of maintaining a desired position of door adjustment. As a result the problem of maintaining a sliding door in proper alignment and position for accurate and smooth operation has remained as a serious one to the user.

The present invention meets this problem by providing an improved hanger assembly including an improved means for adjustably positioning the track-engaging rollers thereof relative to a related door. In brief, this invention comprises a mounting bracket adapted to receive screw attachment means for fixing the same stationarily to one face of a door or panel member to be supported for sliding movement along an overhead track. A hanger bracket, carrying roller means at its upper end for engaging the track, is juxtaposed between the mounting bracket and door, and adapted for sliding movement relative to the latter between predetermined limits. Adjustment means, carried on the mounting bracket, comprises a rotatable eccentric pin means which engages an opening in the hanger bracket for rectilinearly reciprocating the latter relative to the mounting bracket and door, thereby achieving an infinite number of adjusted positions for the roller means relative to the associated door. For maximum convenience, the eccentric means is accessible for operational engagement at one face of the mounting bracket and may be rotated by using a screwdriver or like tool. A locking means is also provided for holding the mounting and hanger

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brackets together and for locking the same at selected positions of relative adjustment, determined by the operation of the adjustment means.

The main object of this invention is to provide a new and improved hanger assembly for use in mounting doors or like panel members for movement along a track.

Another object of this invention is to provide a hanger assembly as aforesaid which embodies improved means for its adjustment.

An additional object of this invention is to provide a new and improved hanger assembly which embodies improved means for adjustably positioning, plumbing, and aligning a sliding door in a door opening; the door normally being suspended from an overhead track by a pair of such assemblies.

Another important object of this invention is to provide a hanger assembly which is adjustable to align a related door as aforesaid, without requiring additional means for holding or supporting the door in the desired position while such adjustment is carried out.

A further object of this invention is to provide a new and improved hanger assembly for suspending sliding doors from an overhead track which employs a rotatable eccentric means for adjustably positioning the rollers of the hanger assembly relative to the upper end of an associated door for the purpose of adjusting the position and alignment of the door in a related opening.

Still another object of this invention is to provide a new and improved hanger assembly as aforesaid which in addition to the said adjustment means also includes means for locking the assembly in selected positions of adjustment.

A still further object of this invention is to provide a new and improved hanger assembly embodying improved features of adjustability, convenience, and simplicity of manufacture and operation.

The above and further objects, features, and advantages of this invention will appear to those familiar with the art from the following detailed description of preferred and modified forms of the invention, illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a perspective pictorial representation of a typical by-passing sliding door installation in which hanger assemblies of this invention find utility;

FIGURE 2 is an enlarged partial perspective view of a single hanger assembly according to this invention, showing its features of operation with a sliding door panel shown in FIGURE 1;

FIGURE 3 is a front elevational view of the hanger assembly showing portions of the mounting bracket broken away in section to illustrate the hanger bracket in full elevation;

FIGURE 4 is a cross-sectional view of the same, taken substantially at line 4—4 of FIGURE 3 and looking in the direction of the arrows thereon;

FIGURE 5 is an enlarged cross-sectional view, taken substantially transverse to the cross-section in FIGURE 4, at vantage line 5—5 of FIGURE 3, and looking in the direction of the arrows of that line;

FIGURE 6 is a front elevational view with parts in section, similar to FIGURE 3, of a modified form of hanger assembly according to the present invention;

FIGURE 7 is a cross-sectional view of the same taken at line 7—7 of FIGURE 6;

FIGURE 8 is an enlarged cross-sectional view of the modified hanger assembly seen in FIGURE 6, taken substantially at the longitudinal center line of the mounting bracket thereof and illustrating the position of the parts thereof prior to locking the adjustments means of the assembly; and

FIGURE 9 is a cross-sectional view similar to FIGURE 8, taken at line 9—9 of the FIGURE 7 assembly and showing the position of the parts thereof after locking the adjustment means.

A typical sliding door installation is illustrated in FIGURE 1, showing the general operational features and mode of employing hanger assemblies according to this invention. In by-passing door installations as shown therein, two doors 10 and 11 are normally guided at their bottom ends to move in parallel vertical planes along the parallel paths defined by overhead track means 14 from which they are suspended by hanger assemblies 12 and 12'. Briefly, each of two sliding doors 10 and 11, aligned in parallel vertical planes as therein shown, is equipped with a pair of hanger assemblies 12, 12' according to this invention; one such assembly being located adjacent each upper corner and top edge 13 of the door or panel 10, for instance. The two hanger assemblies 12, 12' on door 10, therefore, constitute the only means connecting and supporting the door from overhead track 14, the latter of which is mounted substantially horizontally across the upper end of the door opening as defined by structural frame and jamb members indicated generally by numeral 15 in FIGURE 1.

With reference to FIGS. 2-5 of the drawing, it will be recognized and understood that a first form of hanger assembly 12 is therein illustrated which includes a mounting bracket 20, a cooperating hanger bracket indicated generally by the numeral 21, adjustment means 22 associated with both brackets 20 and 21, and locking means 23 for fixing brackets 20 and 21 in desired positions of adjusted movement, as determined by operation of adjustment means 22. The details of the various elements and means 20 to 23 will now be set out along with their related appurtenances.

Mounting bracket 20 is preferably stamped from sheet metal or like material to include a pair of coplanar aligned lateral mounting flange portions 25, 25 flanking a central body portion 26 thereof; the latter comprising a generally rectangular plate set out from the plane of flange portions 25, 25 and further distinguished by a central offset, or raised longitudinal-platform portion 27. The body portion also has a pair of ears 28, 28 extending at right angles thereto, one at each of its upper corners, and comprising integral extensions of sidewall portions 29, 29 which define the lateral limits of the body portion. Walls 29, 29 are laterally spaced and perform as guideways for locating and piloting the hanger bracket 21 for rectilinear reciprocating movement behind the main body portion 26, as will presently appear. The ears 28 are particularly utilized to locate the mounting bracket 20 at a desired upright position at the upper end of the door 10; such ears extending over and engaging the upper end 13 of the door (see FIG. 2).

The mounting flanges 25, 25 are each suitably provided with a central opening receptive of fastening means, such as a wood screw 30. Thus, with the location of the mounting bracket 20 over one face 31 of the door, and in an upright position set by the locating ears 28, 28, fastening bracket 20 to the door 10 is easily accomplished by passing the wood screws 30, 30, or like fastening devices, through the openings in the mounting bracket portions 25 for threading engagement with the door therebeneath. It is a feature of this invention that once so fixed in position, mounting bracket 20 need not thereafter be removed or therein to accomplish any desired adjustment of the hanger bracket 21 when plumbing and aligning the door in the jamb 15.

As indicated in the foregoing, bracket 20 includes a central raised platform portion 27, formed by suitable stamping or die-forming operations which offset a central area of the main body 26, as illustrated in FIGS. 4 and 5. Platform portion 27, as shown best in FIG. 2, is provided with a first elongated oval opening 33 normally aligned substantially vertically and located on the length-

wise axis of the mounting bracket for cooperation with a locking means 23, such as a screw having a slotted head 34 adapted to receive the blade of a screwdriver or like instrument.

The shank of the locking screw extends through the slotted opening 33 of the mounting bracket and threadingly engages the wall of an opening 35 in the hanger bracket 21, as viewed best in FIG. 4. With this arrangement, the enlarged head 34 of the locking means 23 is adapted to engage the sloping sidewalls of opening 33 to frictionally pull the hanger bracket to the mounting bracket at desired adjusted positions of relative movement thereof as will be described.

Platform portion 27 also includes an enlarged circular opening 38 below slot 33 through which a circular head portion 40 of the adjustment means 22 projects; said head end also having a slotted opening 41 receptive of a screwdriver blade or the like, used to operate the adjustment means 22. It will be recognized additionally that the lower end of the platform portion 27 is formed with a semi-circular wall portion 43. This accommodates and provides a guideway for the circular-shaped adjustment means 22, especially as the latter is rotated.

As best seen in FIGS. 3 and 4, the hanger bracket 21 is stamped or otherwise formed to include a main body portion 45 which bears a profile configuration conforming to the main body portion 26 of the mounting bracket. Such body portion 45 is provided with an elongated oval opening 46 symmetrically aligned on the longitudinal center line of the body portion 45 and generally located to one side of the latter's midpoint. Opening 46 is further aligned with its longitudinal axis transverse to the lengthwise axis of body portion 45 so that it may cooperate with the adjustment means 22, as will be described. Additionally, the upper end of the body portion 45 is turned inwardly at an angle to form an inclined arm portion 47 which is adapted to overhang the upper end 13 of the door, all in the manner best seen in FIG. 4.

Arm portion 47 further is formed integrally with a substantially vertically extending upper finger portion 48 which approximately parallels the plane of the bracket's body portion 45 and is provided for the purpose of supporting connection with a single roller or a cross-arm assembly 50 associated with multiple rollers. It will be seen that the main body portion 45, the inclined arm portion 47, and the finger portion 48 of the hanger bracket, are ribbed by parallel extending raised projections or ribs 51, 51 integrally joined at their one end with a raised island section 52 formed near the upper end of the body portion 45 and containing threaded opening 35 which cooperates with the locking means 23. Such rib and island configuration adds strength and rigidity to the hanger bracket and particularly reinforces the inclined arm portion 47 which offsets the main body and cross-arm assembly 50.

The cross-arm assembly 50 includes, as its name implies, a cross-arm member 55 pivotally attached at its midpoint to the hanger bracket finger portion 48 by a single central rivet 56 or other suitable connecting device. The cross-arm 55 is preferably offset centrally to receive the extending finger portion 48 of the hanger bracket and provides, adjacent its opposite ends, a pair of coplanar end portions 57, 57 adapted each to support a rotatable roller wheel 60. The wheels 50 are preferably made of nylon or a similar substance having good wearability and configured especially to engage and roll along a bottom rail trough portion 61 of the overhead track member 14. This provides a rolling or movable support connection between the overhead track and the door 10, as desired. To prevent violent or extreme pivotal activity of the cross-arm assembly 55 about its pivot 56, a pair of projecting buttons 62, 62 are provided, one extending outwardly of each cross-arm end portion 57, to engage the upper end 63 of the hanger bracket's

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inclined arm portion 47. Location of the buttons 62, 62 is selected to provide a desired rotational tilting or floating action for the cross-arm of less than 360° rotation.

To hold the hanger bracket 21 in its desired assembled relationship with the mounting bracket 20, the locking screw means 23 is employed; such being riveted over at its inner end 65 (see FIG. 4) behind the island section 52, thereby preventing its dissociation from hanger bracket 21 while providing threaded movement along the threaded opening 35. Clockwise rotation of screw means 23 serves to draw the raised island portion 52 tightly against the opposing inside face 68 of the mounting bracket, frictionally locking the hanger and mounting bracket together, pressing opposing facial areas of said two brackets against the adjustment means 22 to lock the latter as well. Conversely, unthreading screw means 23 releases the two brackets and adjustment means when it is desired to adjust the hanger bracket and rollers 60 relative to the mounting bracket.

The adjustment means 22 in the preferred form of hanger assembly illustrated in FIG. 2 comprises a substantially cylindrical disc of nylon or like material capable of being machined or moulded and having features of good wearability and a coefficient of friction sufficient to prevent its free rotation over the adjacent contacted surfaces and opposing areas of the brackets 20 and 21 between which it is mounted. While the formation of the adjustment means 22 is generally disc-like, a cylindrical eccentric pin portion 70 projects from the rearward face 71 of its main cylindrical body portion 72. This projecting pin 70 is adapted to enter and cooperate with the elongated transverse opening 46 of the hanger bracket; and to that end is disposed off-center, or eccentrically, with respect to the central axis of the body portion 72. It will be recalled that the projecting head end 40 of the adjustment means extends, from the frontal face of the body portion 72, into opening 38 formed in the mounting bracket's central platform portion 27. Rotation of the body portion 72, effected by engaging slot 41 of head portion 40 with a screwdriver or the like, results in the rectilinear reciprocating displacement of the hanger bracket as the pin follows a circular path according to familiar principles.

Due to the frictional interference of the projecting member 70 and the sidewalls of the slotted opening 46, however, as well as the interfacial engagement between adjustment means 22 and adjacent bracket faces, free rotation of the adjustment means is deterred. This is particularly true when the load of the door is on the hanger assembly. Therefore the eccentric may readily be rotated to an infinite number of adjustment positions to correspondingly adjust the position of the hanger bracket and rollers 60 relative to the mounting bracket, as selected. Thereafter the locking means 23 may be operated to maintain the adjusted position of the hanger and mounting brackets. Thus the door 10, equipped with two assemblies 12, 12', may be plumbed and aligned in the doorway opening in an easy, convenient, and improved manner by adjusting either or both assemblies 12, 12' as needed.

Turning now to the modified hanger assembly 79 illustrated in FIGS. 7-9 of the drawings, it will be recognized that such is generally simplified over assembly 12 above described, yet without loss or sacrifice of the essential and desirable features of this invention. For instance, assembly 79 does not employ the particular locking screw means 23 of assembly 12, yet the necessary locking function is provided for in assembly 79. Also, the dual rollers 60, 60 and related cross-arm 50 have been removed from assembly 79; the same being replaced with a single, track-engaging roller means. With few exceptions, assembly 79 otherwise closely parallels the elements and features of hanger assembly 12.

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Specifically, assembly 79 comprises a mounting bracket 80 attached to door 10, a hanger bracket 81, adjustment means 82 associated with both brackets, and means for locking brackets 80 and 81 in selected positions of adjusted movement comprising screw means 83, 83 which also serve to attach bracket 80 to door 10 and to hold the two brackets together.

Mounting bracket 80, like bracket 20 of assembly 12, is preferably stamped of metal to provide a pair of coplanar aligned lateral mounting flanges 85, 85 flanking a central body portion 86. The body portion 86 is set out of the plane of the flanges by transversely related interconnecting wall portions 87, 87 (shown in cross-section in FIG. 6), each flanked at their opposite ends by short ear extensions of the mounting arms, indicated at 88 and 88a. These extensions provide guideways to pilot the hanger bracket 81 as the latter rectilinearly reciprocates between walls 87.

Mounting flanges 85, 85 are each suitably provided with a central opening receptive of fastening means such as screw means 83, whereby the bracket 80 is easily attached to one face of door 10 adjacent an upper corner thereof, as in assembly 12 of FIG. 1.

The body portion 86 is provided with a central circular opening 89 through which a circular head portion 90 of the adjustment means 82 extends. In this regard such body portion is adapted to superpose a portion of the hanger bracket 81 as the latter reciprocates in response to operation of the adjustment means.

The hanger bracket, as seen best in FIGS. 6 and 7, is formed with the generally rectangular body portion 91 which is adapted to be positioned upright in operating assembly between walls 87, 87 and the guide ears 88, 88a of the mounting bracket. An elongated oval opening 92 is provided in body portion 91, symmetrical of the latter's lengthwise axis and generally to one side (above) the midpoint thereof. Opening 92 further is aligned with its own lengthwise axis transverse to the lengthwise axis of the hanger bracket, thereby to cooperate with adjustment means 82.

The body portion 91 is also angled inwardly at its upper end to provide an inclined arm portion 93, adapted to overhang the upper end of door 10 in operation. The outer end of arm portion 93 is formed with an integral finger portion 94 extending in an offset plane paralleling the plane of body portion 91. Parallel raised reinforcing ribs 95, 95 strengthen both portions 93 and 94, with the latter serving to directly support a single rotatable track-engaging roller means 96. To this latter end, roller 96 is rotatably carried on a rivet axle 97 fixed transversely to the bracket finger portion 94 (see FIG. 7). It will be understood that adjustment of the roller means toward and away from the upper end of door 10 depends on and occurs with the operation of adjustment means 82 to move the hanger bracket.

Adjustment means 82 is similar in all respects of structure and operation with adjustment means 22 of the previously described hanger assembly 12. Thus the same comprises a generally cylindrical form having a disc-like body portion 99 from one end face of which extends the coaxially aligned head portion 90. An eccentrically disposed pin portion 100 projects from the opposite end face of the body portion and is received in the elongated opening 92 of the hanger bracket. This arrangement serves to produce rectilinear reciprocating movement of the hanger bracket in response to rotation of the adjustment means; head portion 90 of the latter having a slot 101 receptive of a screwdriver blade for the purpose of engaging and rotating the adjustment means. Thereafter operation of locking means 83 maintains a desired adjusted position for the brackets 80 and 81.

More particularly, the locking means 83 operates in the manner illustrated in FIGS. 8 and 9 to hold the assembly in operating position and selectively lock the

adjustment means and brackets together. As therein shown, screw means 83, 83 are threaded into the door 10 through openings in the mounting bracket flange portions 85. This serves to mount and position the hanger assembly 79 on door 10. Additionally, screws 83 serve to maintain the assembled relation of the two brackets and intermediately disposed adjustment means 82, and in that respect they function as the connective means for three major portions or elements of modified hanger assembly 79.

Of equal importance is the further functioning of screw means 83 as locking means. This latter function is produced in conjunction with the wall portions 87 of the mounting bracket and the body portion 99 of the adjustment means. As shown in FIG. 8, walls 87 intentionally are of insufficient depth or dimension to permit face 102 of the mounting flanges 85 to lie flush with face 103 of the hanger bracket when the adjustment means, particularly body portion 99 thereof, is assembled between the two brackets. Thus a gap G is provided between door face 31 and face 102 of each flange 85 when the assembly is mounted on door 10 and with screw means 83 in snugging position, as seen in FIG. 8. In this condition the adjustment means is free to rotate for purposes of adjusting the roller position. However, when the screw means 83 are drawn up tight, forcing flanges 85 into engagement with the door (as illustrated in FIG. 9), the mounting bracket is deflected and bowed about its points or areas of contact with the body portion 99, thereby pinching and binding the latter under a compressive load to securely lock the adjustment means. The body portion 99 in turn grips the hanger bracket with frictional engagement and thus the entire hanger assembly is locked as desired. Subsequent turning of screws 83 a partial turn counterclockwise releases the adjustment means for rotation and adjusting operation.

From the foregoing it will be understood and appreciated that we have described herein the features of a new and improved assembly particularly adapted for hanging sliding doors which demonstrates improved features of convenience, and of use and adjustability, productive of improved operating results in this art. Further it will be understood that while the present invention has been described in association with preferred and modified embodiments of its features as appearing in the accompanying drawings, nevertheless numerous changes, modifications, and substitutions of equivalents may be made therein without necessarily departing from the spirit and scope of our invention. As a consequence it is not intended that this invention be limited to the particulars hereinabove described and shown as may appear in the following appended claims.

We claim:

1. In a hanger assembly adapted to support a door for movement along an overhead track, a mounting bracket having a platform portion and flange means offset therefrom whereby the same is adapted to be mounted to one face of the door with its said platform portion spaced outwardly of said face; a hanger bracket supporting track-engaging roller means and comprising a body portion disposed in the spacing between said platform portion and one door face and guided for rectilinear sliding movement parallel to the latter, adjustment means journaled for rotation between adjacent opposed faces of said body and platform portions, means providing driving connection of said adjustment means with said hanger bracket and arranged to rectilinearly drive the latter in response to rotation of said adjustment means, means for rotating said adjustment means, and locking means selectively operable to effect relative movement of said body and platform portions to pinch said adjustment means between the said opposed faces thereof whereby said adjustment means and said hanger bracket are locked in selected positions.

2. The combination as set forth in claim 1 in which

said locking means comprises threaded screw means extending through said mounting bracket and having threading engagement with an opening in said hanger bracket whereby threading movement of said screw means serves to move said platform portion and said body portion of said hanger bracket toward each other to pinch and lock said adjustment means.

3. The combination as set forth in claim 1 in which said locking means comprises means for attaching the mounting bracket to said one door face, the said mounting bracket normally being disposed away from the said one door face when the said adjustment means is free to rotate; whereby operation of said attachment means to move said mounting bracket toward said door face serves to pinch and lock said adjustment means.

4. A hanger assembly adapted to support a door for movement along an overhead track comprising, a mounting bracket having coplanar flange portions receptive of means for securing the same to one face of the door and including a planar platform portion offset from the plane of said flange portions, a hanger bracket having a body portion extending into the space between said one door face and said offset platform portion and piloted for rectilinear adjusting movement relative to said mounting bracket, adjustment means having a portion contacting opposing faces of said body and platform portions and serving with the latter and the offset between said platform and flange portions to normally dispose said flange portions in spaced relation to said one door face when the said hanger assembly is mounted thereon, means journaled said adjustment means for rotation, means providing driving connection between said adjustment means and the said body portion of said hanger bracket to rectilinearly adjust the latter in response to rotation of said adjustment means, and selectively operable means for moving said mounting bracket toward said hanger bracket and one door face to clamp said adjustment means between the said opposing faces of said body and platform portions and thereby effectively lock the same in selected positions of rotation.

5. A hanger assembly for supporting a door for movement along an overhead track comprising, a mounting bracket adapted to be attached to one face of the door and having coplanar flange portions flanking an integrally related central planar platform portion, the general plane of said platform portion being normally offset parallel to the plane of said flange portions; a hanger bracket carrying track-engaging means and having an elongated portion extending beneath said platform portion and guided for sliding movement substantially parallel to the one door face, the said elongated bracket portion normally lying spaced from said platform portion, adjustment means having a body portion disposed in the spacing between said elongated bracket portion and said platform portion and including a head portion journaled for rotation in an opening formed in said platform portion, pin means on said adjustment means eccentric of the latter's rotational axis and projecting into an elongated opening formed in said hanger bracket, the axis of said elongated opening being aligned to effect adjustable sliding movement of said hanger bracket in response to rotation of said adjustment means, and locking means selectively operable to pinch the body portion of said adjustment means between said elongated bracket portion and said platform portion thereby to lock said adjustment means and said hanger bracket in selected positions.

6. The combination as set forth in claim 5 in which said locking means comprises means for attaching said mounting bracket to the door, the offset between said flange and platform portions thereof being such as to maintain said flange portions spaced outwardly of said one door face when the said adjustment means is free to rotate in the hanger assembly; the said adjustment means being pinched and locked by operation of said

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attachment means to move said flange portions toward engagement with the one door face.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,999,267

September 12, 1961

John G. Sterling et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 46, after "portion" strike out the period; line 66, strike out "or therein"; column 7, line 51, after "shown" insert -- except --.

Signed and sealed this 16th day of January 1962.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

DAVID L. LADD

Commissioner of Patents