

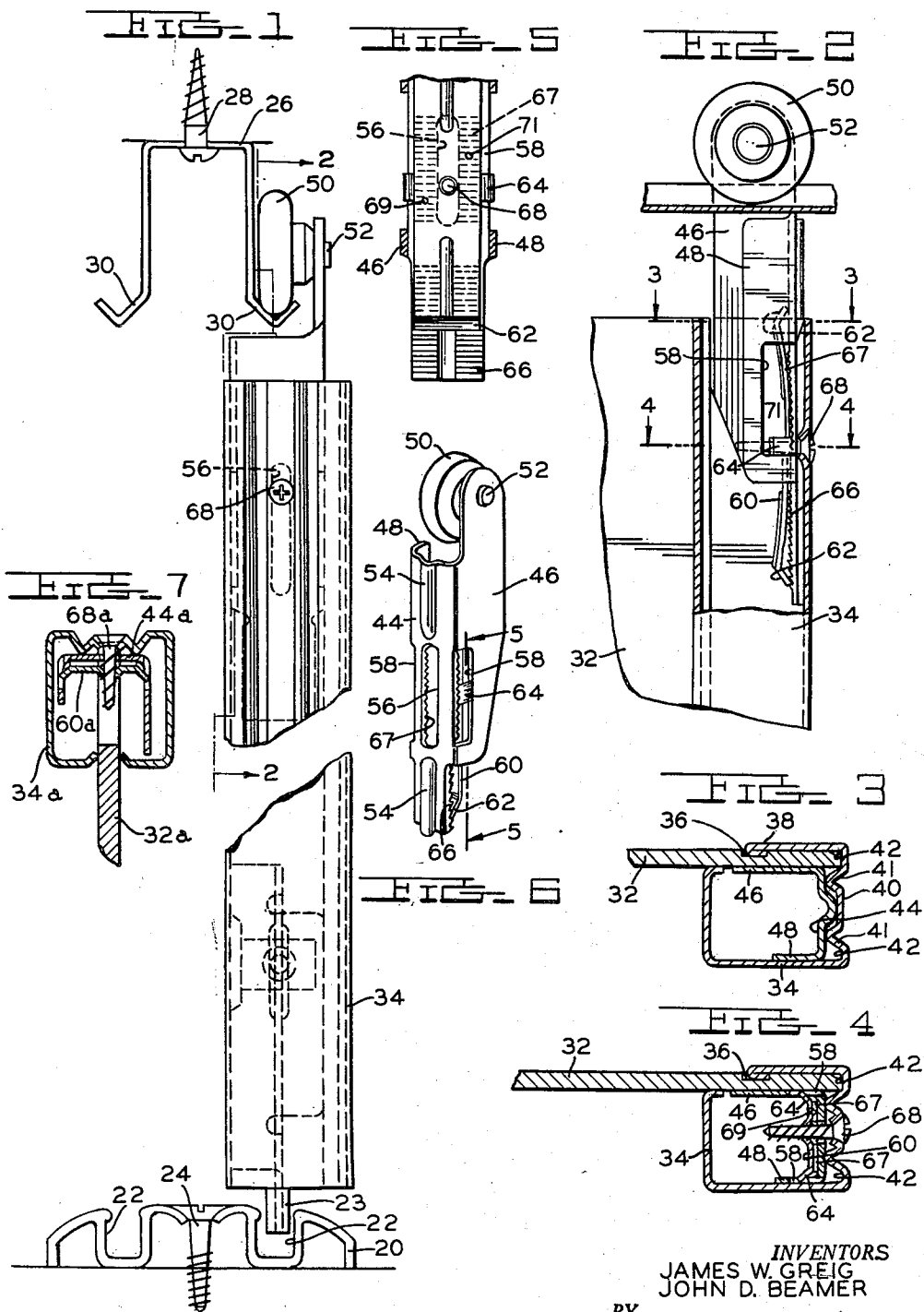
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SLIDING DOOR

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SLIDING DOOR

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10 Claims. (Cl. 16-105)

This invention relates to improvements in sliding doors or the like, and particularly to a sliding door having a tubular marginal reinforcement provided with door hanger hardware secured within the tube for adjustment to different distances of projection beyond an end of the tube.

More particularly, this invention relates to the combination of door hanger hardware with a marginal tube reinforcement for a door, and mechanism associated with the hanger to secure the same at adjusted positions with respect to the tube whereby the hanger may be adjusted to project different distances beyond one end of the tube to accommodate the door to doorway openings which vary somewhat in height.

An object is to provide an improved marginal tube and hanger assembly combination for a door and an improved hanger assembly for association with the marginal tube of a door and adapted to be telescopically adjusted with respect to its projection beyond the end of the tube.

In the mounting of sliding doors within doorway openings, such doors are commonly provided in determined conventional heights to fit determined conventional heights of openings. Such an opening may be provided with a floor trackway to support rollers mounted upon the bottom of the door for travel over the trackway and with a header guideway adapted to receive guides mounted on the top of the door for sildable guided travel. Alternatively, such an opening may be provided with a header trackway adapted to support door hanger rollers mounted upon the top of the door for travel over the trackway and with a floor guideway adapted to receive door guides mounted on the bottom of the door for guided travel.

Due to variations in building construction, such doorway openings may vary in dimension from that intended and to such an extent that a sliding door designed to be received within a determined size opening will be found to be too high or too short for the opening. Of course the door may be cut off if it is too high.

An object of this invention is to provide improved door hanger hardware and marginal tube assembly mechanism whereby the door hanger may be adjusted relative to the door to accommodate the door to door openings which vary therefrom in size within the range of permitted adjustment of the hanger. It therefore becomes desirable to provide door hanger hardware of such a character that it may be readily adjusted to accommodate for variations within its permitted range of adjustment. It is also desirable that such adjustment may be easily and quickly accomplished by any workman who hangs the door, and with simple tools, and with a minimum of required alteration.

This improved hanger and tubular reinforcement for the margin of the door are cooperatively so designed that the hanger is capable of being securely fastened within an end of the marginal reinforcement tube and is

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capable of being shifted to adjusted positions. The construction is such that the hanger will securely maintain its adjustment with respect to the door.

The tubular reinforcement for the margin of the door is preferably so shaped as to engage the margin of the door panel and be securely held thereto. The configuration of the tube also cooperates with the complementary configuration of the hanger hardware to position the same with respect to the door.

This improvement is designed to be used with doors provided with tubular marginal reinforcements which may be either flush on one side with the surface of the door panel, or which may be so secured to the door panel as to project equally beyond opposite sides thereof. Both of these constructions are in commercial use.

Another object is to provide an improved hanger assembly which embodies a roller supporting hanger frame and a spring nut adjustably associated with the frame, which assembly is receivable within one end of the marginal tube mounted on the door panel, with the spring nut fixed to the door and the roller supported beyond the end of the tube. The roller supporting frame may be adjusted relative to the nut to vary the position of the roller beyond the end of the tube. The construction is such that such adjustment will maintain itself against accidental displacement but may be readily manually adjusted.

Other objects, advantages, and meritorious features will more fully appear from the following description, claims, and accompanying drawing, wherein:

Fig. 1 is a vertical end view of a door having a marginal reinforcement tube secured thereto and projecting from one side of the door panel and provided with a hanger assembly embodying the invention secured to the tube;

Fig. 2 is a vertical sectional view taken on line 2-2 of Fig. 1;

Fig. 3 is a cross-sectional view taken on the line 3-3 of Fig. 2;

Fig. 4 is a cross-sectional view taken on the line 4-4 of Fig. 2;

Fig. 5 is a fragmentary sectional view taken on the line 5-5 of Fig. 6;

Fig. 6 is a perspective of the hanger assembly; and,

Fig. 7 is a cross-sectional view taken on a line corresponding to Fig. 4 but showing the hanger assembly associated with a marginal tube which projects both ways from the door panel.

Figs. 1-6 illustrate this invention applied to a sliding door having a marginal reinforcement tube of such a character and so secured thereto that the tube is substantially flush with the surface of the door panel as shown in Figs. 3 and 4 and projects entirely from the opposite side of the door. This type of door and tube is shown in pending application of Greig Serial No. 398,719.

The door hanger hardware of this application and its cooperation with the marginal reinforcement tube of the door is substantially the same whether the door is of the type shown in the aforesaid application or Greig Patent No. 2,659,939, hereinafter referred to.

In the drawing, a floor guideway is indicated by numeral 20. Such guideway is here shown as exhibiting two parallel spaced channels 22. The guideway track is secured to the floor by screws 24. The bottom of the door may be provided with a guide 23 adapted to travel through a channel 22. The header trackway indicated by numeral 26 may be secured to the header of a door opening by screw 28. Such trackway exhibits two parallel spaced channel tracks. It is understood that the floor guideway and the header trackway would be secured to the floor and

closed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

Having described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A mechanical action for artificial limb joints comprising a relatively stationary member and a ratchet segment rotatably mounted on the member, a lever rotatably mounted on the member with the rotational axis adjacent to the circumference of the ratchet segment, a locking bar on said lever having opposite curved faces positioned generally perpendicular to the radius from the rotational axis of the lever, said segment having a series of spaced generally radially extending bar receiving notches with faces complementary to the respective faces of the bar when in bar receiving position, said rotational axis of the lever being at a point adjacent a line tangent to an arc about the axis of said segment struck through the centers of the faces of said notch.

2. A mechanical action for artificial limb joints comprising a relatively stationary member and a ratchet segment rotatably mounted on the member on the axis of rotation of the joint, a lever rotatably mounted on the member with the rotational axis adjacent to and exterior of the circumference of the ratchet segment, a locking bar on said lever having opposite faces positioned generally perpendicular to the radius from the rotational axis of the lever and the faces, said segment being subject to a rotative load and having a series of spaced generally radially extending bar receiving notches with faces complementary to the respective faces of the bar when in bar receiving position, said rotational axis of the lever being within an angular distance of a line tangent to an arc about the axis of said segment struck through the centers of the faces of said notch such that the component of the force resulting from application of a rotative load tending to disengage the bar from the notch is less than the frictional force on the respective contacting faces.

3. A mechanical action for artificial limb joints comprising a relatively stationary member and a ratchet segment rotatably mounted on the member on the axis of rotation of the joint, a lever rotatably mounted on the member with the rotational axis adjacent to and exterior of the circumference of the ratchet segment, a locking bar on said lever having opposite arcuate faces positioned generally perpendicular to the radius from the rotational axis of the lever and the faces, said segment having a series of spaced generally radially extending bar receiving notches with arcuate faces complementary to the respective faces of the bar when at bar receiving position, said rotational axis of the lever being within an angular distance of five degrees inside of a line tangent to an arc about the axis of said segment struck through the centers of the faces of said notch.

4. A mechanical action for artificial limb joints comprising a relatively stationary member and a ratchet segment rotatably mounted on the member on the axis of rotation of the joint, a lever rotatably mounted on the member with the rotational axis adjacent to and exterior of the circumference of the ratchet segment, a locking bar on said lever having opposite arcuate faces of radius of curvature determined by the distance between the rotational axis of the lever and the respective face, said segment having a series of spaced generally radially extend-

ing bar receiving notches with arcuate faces complementary to the respective faces of the bar, said rotational axis of the lever being at a point within an angular distance of 15 degrees on either side of a line tangent to an arc centered at the axis of said segment and through the centers of the faces of a notch in bar engaging position, the faces of said notches having positions wherein said last faces are in engagement substantially throughout their areas with the respective faces of the bar when in bar engaging position.

5. A mechanical action for artificial limb joints comprising a pair of members wherein one member is adapted for attachment to a natural limb, parallel plates on one of the members, the other of said members comprising a tubular sleeve rotatably mounted on said plates providing thereby an articulating joint for said action, a ratchet segment fixed on said sleeve having a series of spaced generally radially extending notches, a lever pivotally mounted at a center of rotation on said one member, a locking bar fixed transversely on the lever, and an alternator connected between the lever and one of said members adapted to releasably hold said bar out of notch engagement position, said bar having opposite notch contacting faces curved in the same general direction and said notches having opposite curved bar engaging faces complementary to and adapted to engage the respective faces of the bar when in bar engaging position.

6. A mechanical action for artificial limb joints comprising a relatively stationary member adapted for attachment to a natural limb, parallel plates on said member and a tubular sleeve rotatably mounted on said plates providing thereby an articulating joint for said action, a ratchet segment fixed on said sleeve having a series of spaced generally radially extending notches, a lever pivotally mounted at a center of rotation on said member, a locking bar fixed transversely on the lever, a spring on said member normally urging said bar toward a notch engagement position, and an alternator connected between said member and the lever adapted to releasably hold said bar out of notch engagement position, said bar having opposite notch contacting faces of arcuate form and of radius determined by the distance between the respective face and said center of rotation of the lever, said notches having opposite bar engaging faces of arcuate form complementary to and adapted to engage the respective faces of the bar when in bar engaging position.

7. A ratchet resistant mechanical action for artificial limb joints comprising a base, a ratchet segment rotatably mounted on the base and a locking bar having a pivotal mounting on said base, said locking bar having opposite segment-engaging faces curved in the same general direction about the axis of said pivotal mounting, said segment having a series of peripheral bar receiving notches with opposite faces respectively complementary to the faces on said bar.

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grippingly engage the hanger as the spring is drawn down against the hanger by the screw.

3. The construction defined in claim numbered 2 characterized in that the spring has opposite ends bent downwardly toward the hanger, and that surface of the hanger directly opposed to one end of the spring is serrated to engage the end of the spring.

4. The construction defined in claim numbered 2 characterized in that the bottom wall and the two side walls of the hanger are provided with slots extending lengthwise thereof and the leaf spring disposed within the hanger overlies the slot in the bottom wall and is provided with ears extending into the slots in the side walls.

5. A reinforcing tube for the margin of a door and hanger assembly therefor comprising, in combination, a tube substantially rectangular in cross section and provided with a split extending along one longitudinal corner, the two side walls of the tube terminating at the split short of each other, said hanger being generally channel-shaped in cross section and telescopically received within one end of the tube, said hanger having a bottom wall of a width substantially equal to the width of one wall of the tube which terminates at the split whereby one side wall of the hanger has its margin disposed substantially in a line with the margin of said one side wall of the tube which terminates at the split, and means connecting the hanger with the tube permitting telescopic adjustment of the hanger with respect to the tube.

6. A reinforcing tube for the margin of a door and hanger assembly therefor comprising, in combination, a split tube substantially rectangular in cross section having a bottom wall provided with an internal groove adapted to receive an edge of a door panel and having side walls tensioned to grip opposite sides of a panel received through the split in the tube and having its edge seated in said groove, said hanger being generally channel-shaped in cross section and telescopically received within an end of the tube with the bottom of the hanger overlying the bottom of the tube and one side wall of the hanger projecting beyond its bottom wall, a roller journaled upon the projecting end of said side wall overhanging the channel of the hanger, the bottom wall of the hanger provided with a lengthwise extending slot, a leaf spring seated within the channel-shaped hanger having a portion bent toward the bottom thereof, a screw extending through the bottom of the tube and through the slot in the bottom of the hanger and threadedly engaged with the spring, said screw being rotatable to adjust the spring toward or away from the bottom of the hanger.

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7. A marginal tube reinforcement for a door and hanger assembly comprising a reinforcement tube for the margin of a door, a hanger having one end received within one end of the tube and its opposite end projecting beyond the same end of the tube, said hanger having a slotted wall portion overlying a wall of the tube, fastening means comprises a screw rotatably mounted within said wall of the tube and extending through the slot in the hanger and provided with a leaf spring nut rotatably mounted thereupon and disposed within the hanger to be threadably adjusted relative to the screw toward and away from the hanger upon rotation of the screw, said wall of the hanger being serrated for a portion of its length, one end of the spring nut being intumed toward the serrated wall of the hanger to engage in the serrations therein, said spring nut provided with supplemental protuberances projecting toward the hanger and adapted to releasably engage in the serrations therein.

8. A reinforcement tube and hanger assembly for the margin of a door as defined in claim 2 characterized in that the spring has one end bent toward the hanger and the surface of the hanger directly opposed to such bent end of the spring is serrated to be engaged by the end of the spring.

9. A reinforcement tube and hanger assembly for the margin of a door as defined in claim 2 characterized in that the spring overlies the slot in the hanger and such spring has a portion bent toward the hanger to be held by the screw in yielding engagement with the hanger, said hanger having a serrated surface extending parallel to the slot and engaged by said bent portion of the spring.

10. A reinforcement tube and hanger assembly for the margin of a door as defined in claim 2 characterized in that the spring overlies the slot in the hanger and such spring has a portion bent toward the hanger to be held by the screw in yielding engagement with the hanger upon both sides of the slot, said hanger having serrated surfaces extending along both sides of the slot and engaged by said bent portion of the spring.

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