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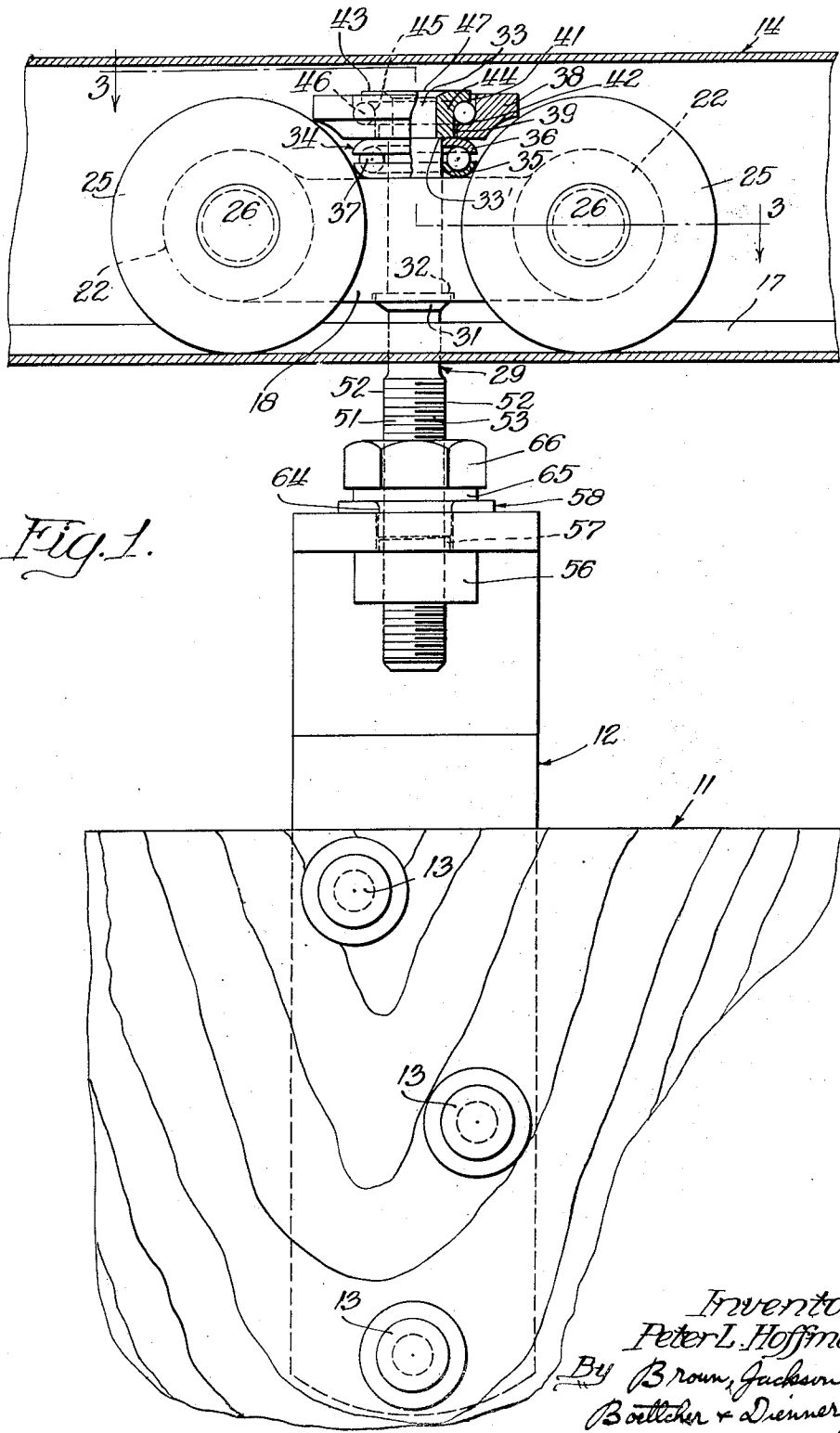
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DOOR HANGER

Filed Dec. 8, 1930

2 Sheets-Sheet 1



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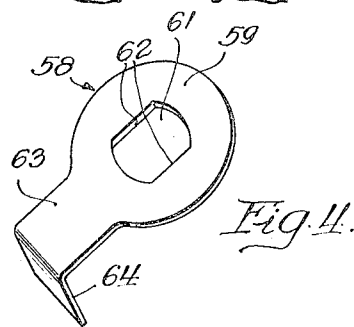
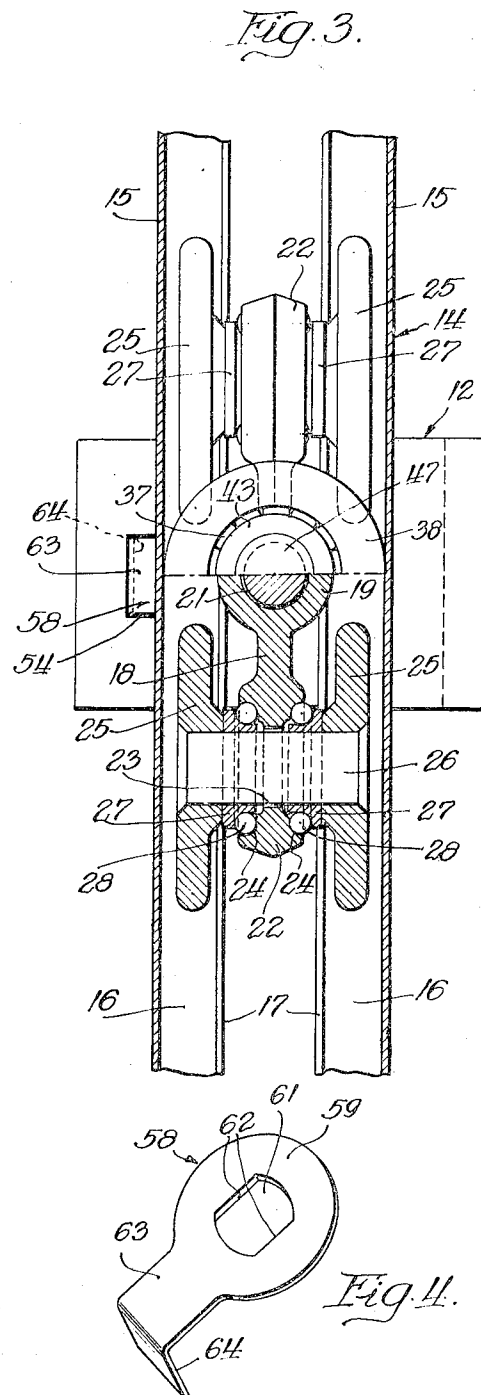
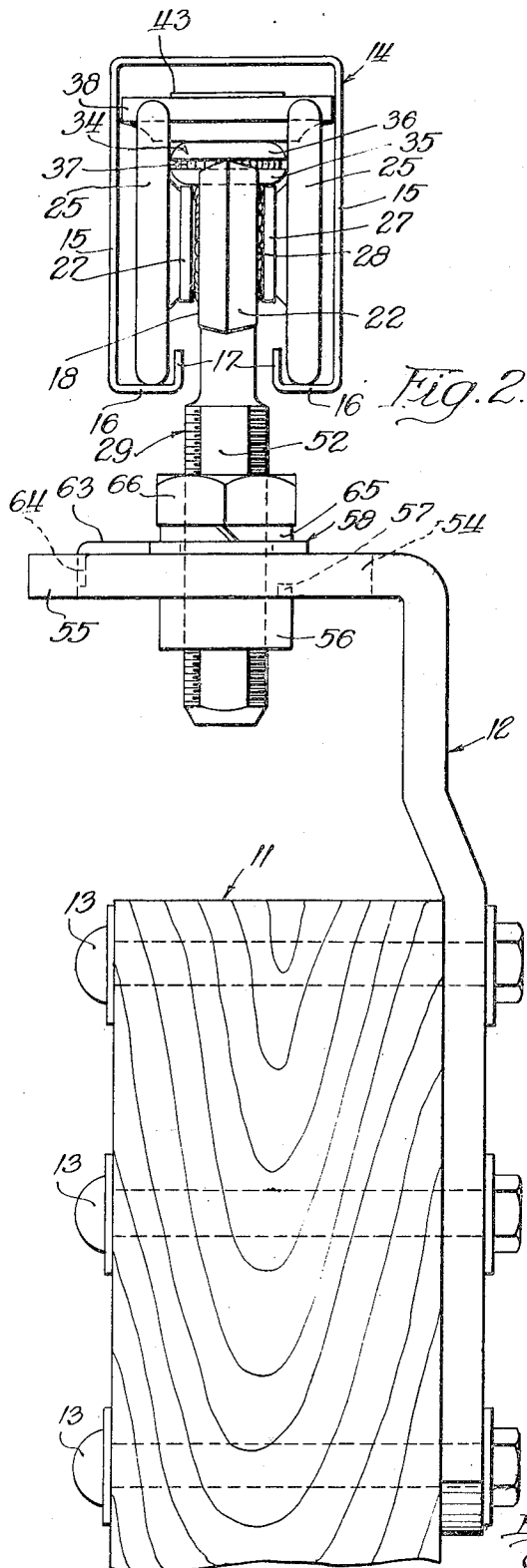
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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DOOR HANGER

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12 Claims. (Cl. 16—98)

This invention relates to door hangers, and more particularly to such hangers of the swiveling type.

More particularly the door hanger of the present invention is adapted for supporting sliding and swinging doors of the multiple leaf type, or sliding doors either of the multiple leaf or single panel or section type. In the case of the former type of doors, a plurality of leaves are suitably hinged together for sliding and swinging movement to one side edge of a door opening being adapted in closed position to fold in accordion fashion. For suitably supporting a door of this type in its travelling movements to open or closed positions, the inner leaf is supported by a door hanger with one or more of the intermediate leaves being similarly supported depending upon the number of leaves comprising the door. Preferably, the hangers are adapted to ride in a trackway or trackways disposed in parallel or slightly angular relation with respect to the door opening, so that in the course of movement of the door leaves the hangers must accommodate swinging as well as sliding movement. In the case of sliding doors comprising multiple leaves or single leaves, movable independently of each other, such doors are usually adapted to be moved to open position along a curved path beyond one side edge of the door opening for disposition in open position along the inner side of a side wall of the inclosure. It will be readily apparent that in such movement, sliding and swinging movements of the leaves, panels or sections relative to the track, result. In the course of swiveling or swinging movements of the usual suspension members of door hangers for doors of the above noted types, the carrier frame of the door hanger is subjected to lateral movement, causing the usual wheels or rollers to engage side portions of the track, resulting in unsteady sliding movement of the door leaves, rendering opening and closing movements of the doors with which the hangers are associated difficult, due to frictional contact, and further resulting in undue wear and tear both as to the track and carrier frame, wheels or rollers.

To eliminate such objectionable features the present invention contemplates in its main feature the provision of a steadying means for swiveling door hangers, wherein lateral play of the hanger frame and associated rollers or wheels is counteracted and borne by the steadying means.

Another feature of the present invention

resides in such a positioning of the steadying means that the lateral play is taken up at a point or along a plane where the lateral play will be counteracted by cooperation of the steadying means and track, by that portion of the track having the greatest resisting effect.

A further feature of the present invention resides in such an arrangement of parts wherein the steadying means cooperates with the track by rolling contact and is antifrictionally supported for such contact, whereby friction incident to such cooperation is maintained at a minimum resulting in efficient, free rolling steadying operation.

Another feature of the present invention contemplates the provision of anti-friction means between the frame and load supporting portions of the door hanger wherein the thrust surfaces therebetween are prevented from transmitting rotational or swinging effect to the hanger frame, such anti-friction means concurrently acting to reduce the friction of the steadying means to a minimum.

A further feature of the present invention resides in the provision of a novel adjusting arrangement for lateral adjustments of the leaf with which the hanger is associated.

Other and further features and advantages of the present invention will appear from the following detailed description of a preferred embodiment of the invention illustrated in the accompanying drawings, in which:

Figure 1 is a side elevation of a hanger embodying the salient features of the present invention, showing its association with a fragmentary portion of the upper end of a door leaf, parts being shown in section;

Figure 2 is an end elevation of the hanger and associated parts;

Figure 3 is a section taken substantially along the line 3—3 of Figure 1; and

Figure 4 is a perspective view of a locking plate employed in the connection between the suspension member and the supporting plate for preventing relative rotation between the supporting member and supporting plate and for accommodating lateral adjustments therebetween.

Referring now to Figures 1 and 2, I have illustrated the preferred embodiment of my invention as applied to the upper end of a door leaf 11, a supporting connection between the door hanger and leaf comprising a substantially L-shaped plate 12 suitably secured to leaf 11 by means of a plurality of staggered bolts 13, although any

other suitable or appropriate securing means may be employed.

- The hanger is adapted to cooperate with a suitable track member 14 preferably comprising
- 5 an inverted substantially U-shaped member having side or leg portions 15 terminating along their lower edges in trackways 16 of trough-like formation providing adjacent upwardly extending flanges 17.
 - 10 The carrier portion of the hanger comprises a preferably one-piece frame 18 provided substantially centrally thereof with an enlarged portion 19 (see Figure 3) provided with a bore 21, the ends of such frame 18 having enlarged co-
 - 15 planar portions 22 having axial bores such as 23 extending transversely therethrough. Each enlarged portion 22 is further provided with suitably formed bearing races 24 of larger diametric dimension than bore 23, said races defining the
 - 20 ends of such bore. A pair of oppositely disposed wheels or rollers 25 are suitably secured to a pin 26 extending axially therethrough, the inner faces of the hubs of wheels 25 abutting the outer faces of bearing rings or races 27. Suitable
 - 25 anti-friction means such as balls 28 are interposed between races 24 and 27 for anti-frictionally supporting wheels 25 upon frame 18.

- As will be readily apparent from Figures 1 and 3, two sets of such wheels are provided, such
- 30 wheels being adapted to run in the trackways 16.

- A suspension member 29 has the upper reduced portion thereof extending upwardly through bore 21 in frame 18, the intermediate portion of
- 35 such member 29 being provided with a collar 31 adapted to seat in a counterbore 32 in the under face of frame 18, and is adapted to have free relative rotation in such bore. The upper end of suspension member 29 is provided with a fur-
 - 40 ther reduced portion 33 providing an annular shoulder 33'. An anti-friction means 34 comprising a lower race 35 and an upper race 36 with suitable anti-friction bearings such as balls 37 interposed therebetween has its lower race
 - 45 35 resting upon the upper face of the frame 18, races 35 and 36 being adapted to freely embrace the upper portion of the suspension member 21 adjacent the reduced portion 33. Seated upon
 - 50 the upper face of the upper race 36 is a horizontally disposed roller 38 provided with a central bore 39 of substantially larger diametric dimension than the upper end of the suspension member 29, such roller being provided with an enlarged counterbore 41 extending downwardly
 - 55 from its upper face, the lower end of such counterbore 41 terminating in a bearing race 42. A thrust collar 43 is fitted over the upper reduced end 33 of the suspension member 29, thrust collar 43 being formed with a reduced portion at
 - 60 its lower end 44, such collar extending into the counterbore 41, the juncture of reduced portion 44 with the upper end of collar 43 providing a bearing race 45. A plurality of anti-friction members such as balls 46 are interposed be-
 - 65 tween races 42 and 45 providing anti-friction connection between thrust collar 43 and roller 38. The upper end of the reduced portion 33 is riveted or peened over at 47 in a countersunk portion of the axial bore of collar 43 to rigidly
 - 70 secure such collar thereto and with its reduced end 44 in engagement with shoulder 33'. Reduced end 44 is of larger cross-sectional dimension than suspension member 29 so that such end will engage the upper race 36 of bearing 34.
 - 75 Roller 38 rests freely upon upper race 36, balls

46 being adapted to take up lateral thrust imposed upon roller 38.

It will be readily apparent from Figures 2 and 3 that roller 38 is adapted to engage the inner side walls of the depending legs or side portions 15 of track member 14 adjacent the top or intermediate portion of such track member where the lateral resistive effect of the side portions 15 is relatively great. Whereas heretofore, lateral thrust imposed upon the carrier member of hangers of the type disclosed due to swiveling movements of the suspension member was imparted to the wheels 25 causing such wheels to engage the adjacent flanges 17 of the track member 14, in the present construction, such lateral stresses are taken up by the roller 38 due to its cooperation with side portions 15 of track member 14 at a point with respect to the track member where the spreading effect due to lateral stresses is reduced to a minimum. At the same time, roller 38 provides a steadying effect to longitudinal movements of the supporting frame of the hanger relative to the track member 14. It will be further apparent that since roller 38 has free rotational support upon ball bearing 46 and is antifrictionally disposed relative to collar 43, roller 38 will have free rolling contact with the side walls of the track, its steadying effect being accompanied only by a minimum amount of friction.

The lower end of suspension member 29 is provided with an enlarged portion 51 having slabbed off portions 52, such portion 51 being provided with suitable threads 53. Enlarged portion 51 is adapted to take through an elongated slot 54 provided in the horizontally extending portion 55 of the L-shaped plate 12, the width of slot 54 being slightly greater than the largest diametric dimension of the enlarged portion 51. A collar 56 has threaded engagement with the enlarged portion 51 and is provided upon its upper face with an extension or lug 57 adapted to cooperate with the sides of the slot 54 for retaining collar 56 in adjusted positions. A locking plate 58 comprising a substantially circular portion 59 is provided with an axial perforation 61, such perforation being of a configuration to correspond to the transverse configuration of the portion 51 of suspension member 29, being formed with straight parallel sides 62 for non-rotative cooperation with the slabbed off portions 52. Perforation 61 is sufficiently large to freely accommodate portion 51 of suspension member 29. Plate 58 is further provided with a lateral extension 63 terminating in a right angularly disposed leg portion 64 of a width slightly less than the width of the slot 54 provided in plate 12.

Locking plate 58 is adapted to be seated upon the upper face of the horizontal portion 55 of plate 12 with leg portion 64 extending downwardly into the slot 54, the edges of leg portion 64 being adapted to cooperate with the side walls of the slot 54 to restrain rotation of plate 58 with respect to plate 12. Such cooperation will, however, permit of longitudinal movement of plate 58 with respect to the horizontal portion 55 of plate 12. A lock washer 65 cooperating with a lock nut 66 having threaded engagement with the portion 51 of suspension member 29 is adapted to clamp locking plate 58 in desired adjusted positions with respect to the horizontal portion 55 of the plate 12.

When it is desired to move the door leaf 11 to the left as viewed in Figure 2, lock nut 66 may

be unthreaded upwardly and the horizontal portion 55 moved to the left upon the collar 56. Since collar 56 is retained from relative rotation with respect to plate 12 by the cooperation of the lug 57 with the side walls of the slot 54, the vertical displacement of collar 56 with respect to suspension member 29 will take place. When it is desired to adjust the vertical disposition of leaf 11 with respect to suspension member 29, appreciable unthreading of lock nut 66 will permit raising of the plate 12 for disengagement of lug 57 from slot 54 and collar 56 may then be moved upwardly or downwardly along the suspension member 29, as desired. Upon seating of the portion 55 of plate 12 upon collar 56 with the lug 57 in operative position in slot 54, lock nut 66 may be returned to its clamping position and the parts thus maintained after adjustment.

As shown in Figure 2, the maximum movement of suspension member 29 to the left is defined by the abutment of the portion 64 of lock plate 58 with the left-hand end of the slot 54, while the limit of movement of such suspension member to the right is defined by the abutment of lug 57 with the right-hand end of the slot 54. To increase the limit of movement of the suspension member to the right, collar 56 may be rotated one hundred eighty degrees (180°) to dispose lug 57 to the left of suspension member 29 instead of the position illustrated. This, of course, entails raising or lowering of the plate 12 to the degree of one-half (1/2) of the pitch of the threads 53. Transposition of collar 56 and responsive raising or lowering of leaf 12 to such a slight degree will involve a negligible effect on desired vertical adjustments of the door, since normally tolerated working clearance between the lower edge of the door and the ground, or door frame threshold is substantially more than one-half (1/2) the pitch of the threads 53.

To accommodate movement of the extension member 29 to the left for a greater distance than the limit shown in Figure 2, lock nut 66 may be moved in unthreading direction to permit of raising of the lock plate 58 upwardly along the suspension member 29 until portion 64 thereof is out of engagement with the side walls of the slot 54 and upon such displacement of the lock plate 58, the plate may be transposed one hundred eighty degrees (180°) to position the portion 64 to the right of suspension member 29. Thus it will be apparent that the transposition of lock plate 58 to the extent of one hundred eighty degrees (180°) permits of adjustment of the position of such plate whereby movement of suspension member 29 relative to the horizontal portion 55 of plate 12 may be had within predetermined limits of adjustment.

It will be, of course, understood that while door leaf or section 11 is shown as being associated with plate 12 to the left thereof as illustrated in Figure 2, such leaf or section may be disposed to the right thereof if so desired in the event that the hanger and track are required to be further laterally spaced with respect to the operative plane of the hanger and track.

While I have disclosed a preferred embodiment of my invention I do not wish to be limited thereto. As will be readily understood by those skilled in the art, certain changes may be made therein without departing from the essence of the invention or the spirit and scope of the appended claims.

What I claim and desire to secure by Letters Patent is:

1. A door hanger comprising the combination of a track member comprising spaced side walls, spaced parallel trackways associated with said track member, a frame, track wheels associated with said frame and cooperating with said trackways, a suspension member extending through said frame, guide wheel means rotatably mounted on said suspension member and cooperating with said side walls above said frame upon lateral movement of said suspension member, said guide wheel means being disposed within said track member, and means antifrictionally swiveling said suspension member relative to said frame, said last named means cooperating with said guide means to provide antifrictional support for said guide means.

2. A door hanger comprising a frame, track wheels carried by said frame, a suspension member, means carried by said suspension member cooperating with said frame for supporting a load, steadying means carried by said suspension member and disposed between said supporting means and said frame, and antifriction means interposed between said first named means and said steadying means, and between said steadying means and said frame providing free swiveling movement for said suspension member relative to said frame and free swiveling support for said steadying means, said steadying means being confined substantially within the vertical extent of said wheels.

3. A door hanger comprising a frame, track wheels carried by said frame, a suspension member, means rigidly associated with said suspension member and rotatably with said frame and providing a swiveling load supporting connection between said frame and suspension members, anti-friction means interposed between said rigidly associated means and said frame, and steadying means interposed between said rigidly associated means and said anti-friction means for free rotation independent of said swiveling load supporting connection of said suspension member.

4. A door hanger comprising the combination of a track member having side walls terminating at their lower edges in spaced parallel trackways, a frame, track wheels associated with said frame, a suspension member associated with said frame, a guide roller rotatably associated with said suspension member and adapted to cooperate with said side walls to steady longitudinal and lateral movement of said frame relative to said track member, and anti-friction means interposed between said roller and said frame and between said roller and said suspension member providing for free rolling cooperation between said roller and said track independent of the disposition of said suspension member relative to said frame.

5. A door hanger comprising a frame, wheels carried by said frame, a suspension member, a collar disposed on said suspension member, anti-friction bearing means interposed between said frame and collar, a guide roller rotatably mounted on said suspension member between said collar and said frame and adapted to steady movement of said frame relative to a cooperating track, and a second anti-friction means between said roller and suspension member whereby a load supporting connection through said collar and one of said anti-friction means is provided between said suspension member and said frame.

6. An adjustable door hanger comprising a frame, an attaching plate adapted to be secured

to a closure and having an elongated aperture therein, a suspension member rotatably associated with said frame and extending through said aperture, means for retaining said plate in adjusted position axially of said suspension member, and means comprising a coaxial locking plate cooperating with said suspension member and said aperture in said plate to restrain rotation of said suspension member relative to said plate, said last named means being adapted to accommodate translational movement of said suspension member relative to said plate in a plurality of directions within predetermined limits of adjustment, and being transposable to accommodate translational adjustment within other predetermined limits.

7. An adjustable door hanger comprising a frame, a suspension member secured to said frame, an attaching plate secured to a closure and having an elongated aperture therein, said aperture being adapted to receive said suspension member, a coaxial closure plate non-rotatably secured about said suspension member, means carried by said closure plate and engaging the side walls of said aperture for restraining the rotation of said suspension member, said means serving as a stop for limiting translational movement of said suspension member in said aperture, and means carried by said suspension member to restrain translational movement of said suspension member, said restraining means being adjustable to secure said suspension member in a plurality of positions with respect to said attaching plate.

8. An adjustable door hanger comprising a frame, a suspension member secured to said frame, an attaching plate secured to a closure and having an elongated aperture therein adapted to receive said suspension member, a coaxial locking plate non-rotatably secured about said suspension member, a depending lip portion carried by said locking plate and engaging the side walls of said aperture for restraining the rotation of said suspension member, said portion being adapted to abut the end walls of said aperture to limit endwise movement of said suspension member, and means carried by said suspension member engaging the under surface of said attaching member to restrain translational movement of said suspension member, said restraining means being adjustable to secure said suspension member in a plurality of limited positions with respect to said attaching plate.

9. A door hanger comprising a frame, track wheels carried by said frame, a suspension member secured to said frame, and having load sup-

porting means at the upper end thereof, a track member fitting about said frame and track wheels and providing a pair of spaced trackways for said track wheels, and a guide wheel rotatably mounted on said suspension member between said load supporting means and said frame, said wheel being disposed within said track member.

10. The combination with a track member including a top wall, side walls and a pair of parallel trackways, of a frame, a plurality of wheels carried by said frame and engaging said trackways, a suspension member extending through said frame and having load supporting means at the upper end thereof, a guide wheel rotatably mounted on said suspension member between said load supporting means and the top wall of said frame, and swiveling means between said local supporting means and said frame providing for rotation of said suspension member.

11. The combination with a track member including a top wall side walls depending therefrom and a pair of parallel trackways, of a frame, a plurality of wheels carried by said frame and engaging said trackways, a suspension member extending through said frame and having load supporting means at the upper end thereof, a guide wheel rotatably mounted on said suspension member between said load supporting means and said frame and disposed substantially within the confines of said frame and said wheels, and swiveling means between said load supporting means and said frame providing for rotation of said suspension member.

12. An adjustable door hanger comprising a frame, a suspension member secured to said frame, an attaching plate secured to a closure and having an elongated aperture therein receiving said suspension member, a coaxial closure plate non-rotatably secured about said suspension member above said aperture, an integral portion of said closure plate engaging a side wall of said aperture to restrain rotation of said suspension member, said rotation restraining means in one position providing for limited translational adjustment of said suspension member within said aperture, and in a transposed position providing for a different limited translational adjustment of said suspension member within said aperture, and means carried by said suspension member engaging said closure plate and adapted to hold said suspension member in adjusted translational position within said aperture.

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