Aug. 1, 1961 J. W. RICHARDS 2,994,099

FOLDING DOOR HANGERS

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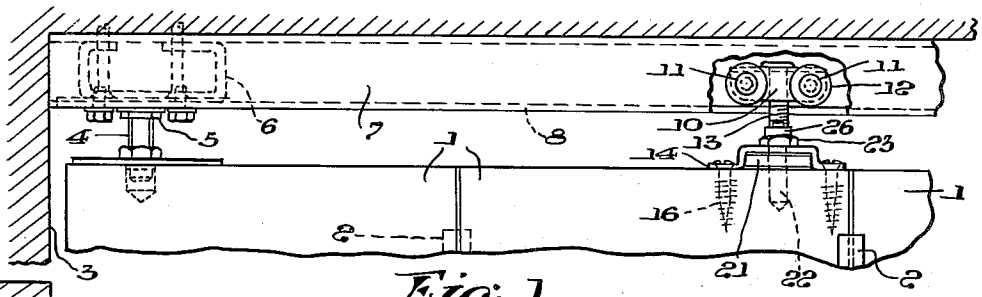

Fig. 1.

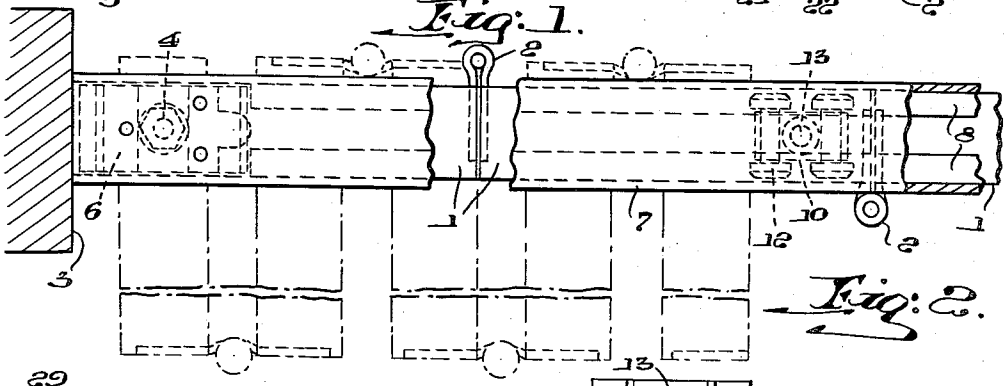

Fig. 2.

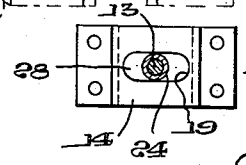

Fig. 3.

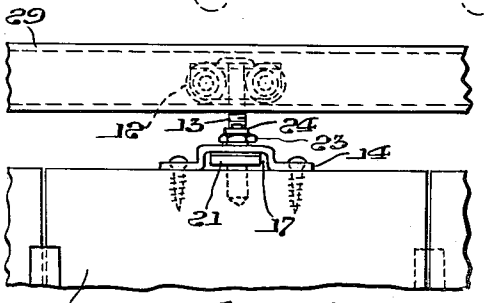

Fig. 5.

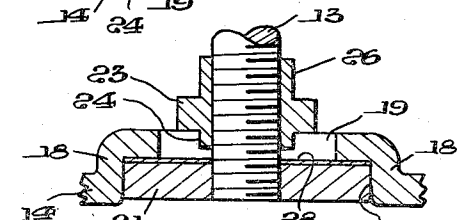

Fig. 4.

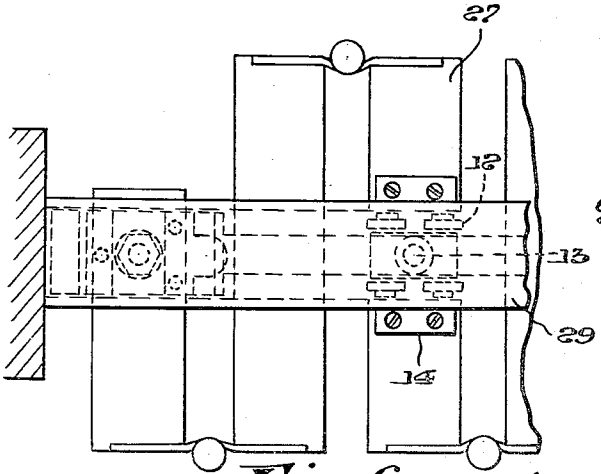

Fig. 6.

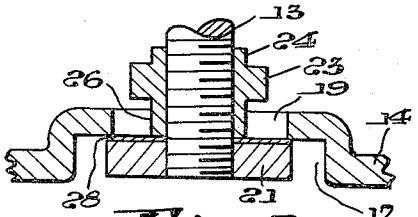

Fig. 7.

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FOLDING DOOR HANGERS

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This invention relates to the hangers by which folding doors are suspended from overhead tracks, and more particularly to a hanger that can be used for either center hung or edge hung door panels.

It is customary to support folding doors by hangers that include trolleys which run along tracks secured to the top of the door frames. The hangers are attached to the top of the door panels, which are hinged together so that they can be folded accordion style. When each hanger is attached to a panel near one edge, the folded panels will project much farther from one side of the track than the other. To help prevent sag, due to this unbalanced condition, the hangers should be connected to the panels as rigidly as possible. On the other hand, if the panels are hung from their centers, the unbalanced condition just mentioned does not occur, but another problem arises which involves the positioning of the hangers. Thus, to permit the door to fold properly and easily and without binding, each hanger should be mounted at the exact center of the panel Unless the workman is very careful this may not occur, especially when he is inexperienced in hanging folding doors.

It is among the objects of this invention to provide a folding door hanger, which can be used for hanging door panels either from their edges or from their centers, and which is convertible to provide a fixed hanger for edge hanging and a self-adjusting hanger for center hanging.

In accordance with this invention a bracket is provided that is adapted to be fastened to the top of a folding door panel. The bracket has a downwardly opening recess with a pair of spaced side walls that will extend across the door. Above the recess the bracket has a central slot extending lengthwise of it. A bolt receiving member, such as a rectangular plate, in the recess has a transverse dimension that is substantially less than the distance between the side walls of the bracket. Above the bracket there is a trolley provided with a central vertical opening. A bolt extends down through this opening and the bracket slot and is screwed into the center of the plate in the bracket recess. Screwed on to the bolt above the bracket is a reversible nut, from the top and bottom of which project collars of different lengths, either of which will fit in the bracket slot. When the bracket is mounted near the edge of a door panel, the nut is arranged on the bolt so that the shorter collar will extend into the slot. This collar is too short to engage the plate so the bracket can be clamped tightly between the plate and nut to form a rigid connection. On the other hand, if the bracket is attached to the center of a door panel the nut is reversed on the bolt so that the longer collar will extend through the bracket slot. This collar is long enough to engage the plate in the recess and also space the nut from the bracket so that the bolt will be free to move lengthwise of the slot in order to make the hanger self adjusting.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which:

FIG. 1 is a fragmentary side view of the upper part of a folding door suspended from a track;

FIG. 2 is a fragmentary plan view showing in dotted lines the folded position of the door;

FIG. 3 is a horizontal section through the hanger in the plane of the upper surface of the bracket;

FIG. 4 is an enlarged fragmentary central longitudinal section through the hanger shown in FIG. 1;

FIG. 5 is a fragmentary side view of the upper part of a center hung door panel.

FIG. 6 is a plan view showing the door folded; and

FIG. 7 is an enlarged fragmentary central longitudinal section of the hanger shown in FIG. 5.

Referring to the first four figures of the drawings, a folding door is formed from a series of panels 1 that are connected together edge to edge by hinges 2 alternately disposed on opposite sides of the door so that it can be folded to open it. The panel nearest the door jamb 3 is supported by upper and lower pivots. Only the upper pivot 4 is shown. It extends up into a bearing 5 supported by a fixture 6 which is mounted in an overhead track 7 fastened to the top of the door frame. The track is an inverted channel with laterally spaced inturned flanges 8 at its bottom for supporting the hangers by which the door is suspended from the track. The hangers are connected to the top of alternate panels near one edge.

Each hanger includes a trolley that may slide or roll along the inside of the track. For heavy doors, a trolley with wheels is best. Such a trolley may have a generally rectangular frame 10, at the opposite ends of which axles 11 are mounted. Wheels 12 are journaled on the ends of the axles and roll along the lower flanges 8 of the track. The center of the trolley frame is provided with a vertical opening, in which a bolt 13 is rotatably mounted. The head of the bolt engages the top of the frame to support the bolt, which extends down between the track flanges and through a bracket 14 secured to the top of the underlying door panel.

The bracket preferably is made from a rectangular strip of metal that has a pair of openings in each end, through which extend screws 16 that attach the bracket to the door. The central portion of the bracket is bent or offset upwardly to provide a bottom recess 17 (FIG. 4) that has side walls 18 extending transversely of the door between the recess and the screws. Above the recess the bracket is provided with a slot 19 that extends lengthwise of the bracket; that is, along a line connecting recess side walls 18. It is through this slot that bolt 13 extends. The lower end of the bolt is screwed into a bolt-receiving member in the bracket recess. Preferably, this member is a rectangular plate 21 that for best results has substantially the same length as the recess so that the plate cannot move lengthwise of the slot. The width of the plate, however, is considerably less than the length of the recess. The door directly beneath the bolt may be provided with a vertical bore 22 for receiving the lower end of the bolt in case the door is raised by screwing the bolt farther down through plate 21.

To lock the bolt tightly in the bracket, a jam nut 23 is mounted on the bolt directly above the bracket and is tightened down against the bracket so that the bracket is clamped tightly between the plate and the nut. Since the slot is somewhat wider than the bolt for a purpose that will be described presently, a short collar 24, integral with the bottom of the nut extends down into the bracket slot to fill up the space between the side of the slot and the bolt. The length of this collar is less than the thickness of the top of the bracket and therefore does not engage the plate. The plate 21 and jam nut hold the bolt as tightly as possible in the bracket so that the door will fold properly. Due to the panels being edge hung, normal inaccuracies in the location of the hanger brackets on the panels will not cause any trouble when the door is folded.

It is a feature of this invention that this door hanger can be taken apart and assembled in a different way so that it will be suitable for use with center hung door

panels. Accordingly, the nut **23** is provided with a second collar **26** that projects from its top up around bolt **13** and the length of which is greater than the thickness of the top of bracket **14**. If it is desired to apply the hanger to the center of the top of a door panel **27**, as shown in FIGS. 5 and 6, the bolt is unscrewed from the nut and plate **21**, the plate is turned 90° on its axis, and then the nut is reversed and the parts are reassembled. When this is done, the longer collar will be at the bottom and will extend down through the bracket slot into engagement with the plate in the bracket recess. Due to the length of the collar, it will prevent the nut from being tightened down onto the bracket, as shown in FIG. 7. A small clearance will remain between them so that the bolt can slide lengthwise of the slot. This sliding action is improved if a thin brass, nylon or Teflon washer **28** is located between the plate and the bracket above it.

The converted bracket is screwed to the top of a door panel as close to its center as reasonably possible. However, even if the hanger is not centered exactly on the panel, the door will not bind when it is moved along the track **29** because, due to slot **19**, the bracket will be able to move lengthwise relative to the hanger bolt to compensate for any irregularity in the position of the hanger.

With this door hanger, only one type of hanger has to be stocked by a dealer because by a simple change in the arrangement of its parts, the user can adapt the hanger for use with either an edge hung door or a center hung door.

According to the provisions of the patent statutes, I have explained the principle of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A hanger for suspending a folding door panel by its edge or its center from an overhead track, comprising a bracket adapted to be fastened to the top of such a panel and provided with a downwardly opening recess having a pair of spaced side walls, the bracket above the recess having a central slot therethrough extending along a line connecting said side walls, a bolt-receiving member in said recess having a transverse dimension materially less than the distance between said side walls, a trolley above the bracket provided with a central vertical opening, a bolt-extending down through said opening and slot and screwed into the center of said member, a reversible nut screwed onto the bolt above the bracket, and collars of different lengths projecting from the top and bottom of the nut around the bolt and adapted to fit in said slot, the shorter collar being spaced from said bolt-receiving member if that collar is in the slot and the bracket is clamped tightly between said member and nut, and the other collar if in the slot being engageable with the bolt-receiving member and long enough to space the nut from the bracket so the bolt can move lengthwise of the slot.

2. A hanger in accordance with claim 1, in which said bolt-receiving member is a rectangular plate having a longitudinal dimension substantially as great as said distance between said recess side walls.

3. A hanger in accordance with claim 1, in which said bracket is formed from a metal plate having an upwardly offset central portion forming said recess between its end portions, said end portions being provided with fastener-receiving openings.

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