



# UNITED STATES PATENT OFFICE

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## SLIDING DOOR MOUNTING

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1

This invention has to do with improvements in sliding door overhead mountings or suspensions of the general type employing hangers adapted to travel tracks overlying the door openings and having means for attachment to the top edge of the doors. The invention is particularly directed to improvements in the types of hangers and attachments whereby the door connections may be made through interengagement of the attachment parts by bodily movement of the door within its opening and relative to the hangers.

Heretofore sliding doors, particularly as installed in houses and for which purpose the invention is especially adapted, have been mounted by types of hangers requiring lateral movement of the door into its opening while positioned parallel to the plane of the opening, in order to effect interengagement of the hangers with the door-carried brackets. The use of such hangers results in the inconvenience of having to manipulate the door with little clearance from the sides of its opening as the door approaches the position at which it can be engaged by the hangers.

One of my major objects is to provide an improved type of suspension having over prior expedients various advantages, outstanding among which is the greater facility with which the door may be secured to the hangers. Specifically, the invention is characterized in this respect by the fact that the suspension connection can be effected by manipulation of the door in an open position facilitating access to and observation of the hanger parts to be engaged, and can be completed with the door in closed but pre-supported position.

The invention further contemplates a novel form of hanger characterized by its self-locking relation with the door-carried part or keeper, and particularly by its capacity for effecting the door suspension by vertical movement of the door to engage the hanger parts. Specifically contemplated is a latch type hanger carrying one or more latch elements engageable with a keeper part applied to the top edge of the door.

A further object of the invention is to obviate the difficulties encountered in the use of conventional door hangers of the present type, caused by the tendencies of the hanger rollers to bind and jump along the track in the manner characteristic of rollers used singly or in the usual pair arrangement. In accordance with the invention, I employ a stabilized roller assembly to ride between parallel tracks, at least one of which is traveled by a pair of rollers in tandem arrange-

2

ment preventing the binding and jumping tendencies mentioned.

The invention has various additional features and objects, such as various improvements adapting the hanger for simple and economical and yet sturdy construction, all of which will be understood more clearly and to better advantage from the following detailed description of an illustrative embodiment of the invention shown by the accompanying drawing, in which:

Fig. 1 is a perspective view showing the door in open position for attachment to a first hanger;

Fig. 2 illustrates the door position after connection with a second hanger;

Fig. 3 is an enlarged fragmentary cross-section taken through the door header and track assembly, showing the hanger engaged with the door-carried keeper;

Fig. 4 is a side elevation of the hanger; and

Fig. 5 is a perspective view of the keeper.

Referring first to Fig. 3, the sliding door 10 is shown to be received within its wall opening 11 for displacement into and out of the wall recess 12 at one side of the opening. Extending across the top of the door opening is a header, generally indicated at 13, to the bottom sides of which is applied the usual plaster strips 14 below the usual plaster coat 15. The door trim or molding 16 overlies the strips 14 and plaster coat substantially as shown. The header 13 comprises a pair of sections 17 and 18 between which is placed a spacer strip 19 the thickness of which may be predetermined to give any desired overall header width, and spacing between the lower vertical faces 20 and 21. The sections 17 and 18 contain opposed recesses 22 defined by downwardly and outwardly inclined surfaces 23, and the lower downwardly and inwardly inclined surfaces 24 which form smooth parallel and spaced tracks for the hanger rollers.

The top surface 10a of the door carries a pair of spaced keepers 25, see Fig. 5 each consisting of a bracket 26 having terminal flanges containing the screw openings 27, and an intermediate up set portion 28. The keeper proper 29 has a central opening 30 and carries a projection 31 extending through the bracket portion 28, the keeper and its projection being rotatable as and for the purposes later explained. Each hanger 32, see Fig. 4, is given a construction particularly adaptable to formation of its parts as simple stampings. In its preferred form, the hanger comprises a vertically extending sheet metal body 33, having a pair of ears 34 deflected or bent laterally in one direction,

and an intermediate ear 35 symmetrically deflected in an opposite direction. Ears 34 carry a pair of rollers 36 rotatable on pins 37 secured to the ears. Ear 35 similarly carries a roller 38 rotatable on the ear-supported pin 39. The rollers preferably have cylindrical surfaces. The angularity of the ears with relation to the vertical portion of the hanger body 33, is such that the roller axes are parallel the track surfaces 24.

It will be observed that each hanger has at least one pair of rollers traveling the same track surface in tandem arrangement. As previously indicated this feature is of considerable importance in that it overcomes the common tendency of the ordinary rollers and hangers of this type, to bind and jump along the track, and in so doing to damage either or both the rollers and the track surfaces, as the door is displaced along the track. Where, for example, hangers employ a single pair of directly opposed or co-axial rollers and the hanger body is permitted to rock, sudden movement of the door tends to cause the rollers to lag and bind on the track surface, and then suddenly to release and jump ahead with resultant impact. The present roller arrangement obviates this condition in that the tandem relation of the rollers 36 stabilizes and assures progressive smooth advancement of all the rollers along the track.

Referring again to Fig. 4, the bottom portion of the body plate 33 contains a recess 40 defined by the upwardly and inwardly converging guide surfaces 41 which form a throat for receiving and guiding the top of the keeper 29 into the top of the recess. The keeper is retained therein by a pair of latch elements 42 pivoted at opposite sides of the body on pin 43. As illustrated, elements 42 are hook shaped to provide each with a keeper-receiving recess 44 and a projection 45 to enter the keeper opening 30 and overlie its top bridge in the latched condition of the parts. Each element 42 has an inclined bottom edge 46 which when engaged by the keeper as it is moved upwardly, cams the element in a direction permitting its projection 45 to enter the keeper opening 30. It will be observed that the cam surfaces 46 on the two elements are so related as to intersect, as they are viewed in Fig. 4. Accordingly, when moved upward for retention by the latch elements, the keeper will be engaged against the surfaces 46 at 47 to deflect them in opposite directions and cause their projections 45 ultimately to swing back into the opening 30.

From the foregoing it will be understood that the door may be connected to its suspension mountings by any procedure permitting the keepers 29 to be thrust vertically into engagement with the latch elements. However, as previously indicated, the invention affords a particular convenience in mounting the door, by reason that the first hanger connection may be effected, and the door initially supported, with the door in an open position free of any interference by the wall. Thus as indicated in Fig. 1, the door installation may be started with the door in such open position as will permit the workman to stand in or near the opening 11, and lift the door by grasping its edges free from the sides of the opening. For this purpose, the keeper 29 first to be engaged, may be turned in its bracket to a position paralleling the door, and in which position the keeper will be received between the locking elements of one of the hangers. After the engagement is effected, the door may be turned into its open-

ing and the second keeper 29 elevated into interlocked relation with the second hanger. As illustrated by Fig. 2 connection with the second hanger may be made after the door is thrust partially into the wall recess 12, leaving space at 50 for the workman to stand directly within the door opening while engaging the second hanger.

I claim:

1. A suspension for sliding doors, comprising a roller hanger body adapted to move along a track above the door opening, a keeper to be carried by the top of the door, and a keeper-engaging substantially hook-shaped latching element pivotally carried by said body, said element being pivotally displaceable in one direction by engagement by the keeper upon vertical upward movement of the keeper against the element, and the element then having reverse gravitational swinging movement into holding and suspending engagement with the keeper.

2. A suspension for sliding doors comprising a roller hanger body adapted to move along a track above the door opening, a keeper to be attached to the top of the door and including an upstanding element containing an opening and pivotally movable about a vertical axis, a pivot carried by said body, a pair of substantially hook-shaped latches depending from said pivot and adapted to receive said keeper element between them, said latches being movable apart by the keeper element, and then being movable reversely into said opening and therefore holding and suspending engagement with the keeper element.

3. A suspension for sliding doors, comprising a hanger body adapted to move along and between a pair of horizontally opposed track surfaces above the door opening, said hanger body depending below said track surfaces, a pair of spaced rollers carried by the body in tandem relation to ride one of said track surfaces, a third roller to ride the other track surface, and carried by the body horizontally opposite and in inwardly offset relation to the rollers of said pair, and means carried by the lower portion of said body to be connected to the top of the door.

4. A suspension for sliding doors, comprising a hanger body adapted to move along and between a pair of horizontally opposed track surfaces above the door opening, said hanger body depending below said track surfaces, a pair of spaced rollers carried by the body in tandem relation to ride one of said track surfaces, a third roller to ride the other track surface, and carried by the body horizontally opposite and in inwardly offset relation to the rollers of said pair, and means carried by the lower portion of said body to be connected to the top of the door, the axes of said rollers being inclined inwardly of the body.

5. A suspension for sliding doors, comprising a hanger body adapted to move along and between a pair of horizontally opposed track surfaces above the door opening, said hanger body depending below said track surfaces, a pair of spaced rollers carried by the body in tandem relation to ride one of said track surfaces, a third roller to ride the other track surface, and carried by the body horizontally opposite and in inwardly offset relation to the rollers of said pair, and means carried by the lower portion of said body to be connected to the top of the door, said third roller being positioned to extend in the space between the rollers of said pair.

6. A suspension for sliding doors, comprising

5

a hanger body adapted to move along and between a pair of downwardly and inwardly inclined track surfaces above the door opening, said body including a vertically extending sheet metal member having a pair of integral ears extending outwardly and upwardly at one side of the body and an ear extending outwardly and upwardly at the other side of the body, a roller carried by each of said ears to ride said track surfaces, and means carried by the lower portion of said member to be connected to the top of the door.

7. A suspension for sliding doors, comprising a hanger body adapted to move along and between a pair of downwardly and inwardly inclined track surfaces above the door opening, said body including a vertically extending sheet metal member having a pair of integral ears extending outwardly and upwardly at one side of the body and an ear extending outwardly and upwardly at the other side of the body, a roller carried by each of said ears to ride said track surfaces, and a pivoted latch element carried by the lower portion of said member for engagement with a door-carried keeper.

8. A suspension for sliding doors, comprising a hanger body adapted to move along and between a pair of downwardly and inwardly inclined track surfaces above the door opening, said body including a vertically extending sheet metal member having a pair of integral ears extending outwardly and upwardly at one side of the body and an ear extending outwardly and upwardly at the other side of the body, a roller carried by each of said ears to ride said track surfaces, the lower portion of said member containing a keeper-receiving recess, and a movable latch element to lock the keeper in said recess.

9. A suspension for sliding doors, comprising a hanger body adapted to move along and between a pair of downwardly and inwardly inclined track surfaces above the door opening, said hanger including a vertically extending sheet metal member having a pair of integral ears extending outwardly and upwardly at one side of the body and an ear extending outwardly and upwardly at the other side of the body, a roller carried by each of said ears to ride said track surfaces, the lower portion of said member containing a V-shaped keeper-receiving recess, and a pair of latch hooks pivoted to the member at opposite sides of said recess and engageable with a door-carried keeper to lock the keeper in said recess.

10. A suspension for sliding doors, comprising a roller hanger body adapted to move along a track above the door opening, a keeper formed of rigid material separately from and attachable to the top of the door, and latch means including an element formed separately from and carried by the body and displaceable relative thereto by engagement by said keeper upon vertical upward movement of the keeper against the latch means, said latch means being self-operable to reversely move said element from

6

its said displacement into holding and suspending relation with the keeper in which said element and keeper are interengaged at surfaces thereof so disposed as to positively lock the keeper against downward release from the element, the keeper being disengageable from the latch element only by manual release of the latch means.

11. A suspension for sliding doors comprising a roller hanger body adapted to move along a track above the door opening, a keeper formed of rigid material separately from and attachable to the top of the door, and latch means including an element formed separately from and carried by the body and displaceable relative thereto in one direction by engagement by said keeper upon vertical upward movement of the keeper against the latch means, said latch element then being movable in an opposite direction into holding and suspending relation with the keeper in which said element and keeper are interengaged at surfaces thereof so disposed as to positively lock the keeper against downward release from the element, and guide means associated with the body for guiding said keeper into latched engagement with said element.

12. A suspension for sliding doors, comprising a roller hanger body adapted to move along a track above the door opening, a keeper formed of rigid material separately from and attachable to the top of the door, and a pair of latch elements formed separately from the body and movably carried thereby, said elements being adapted to receive the keeper between them upon vertical upward movement of the keeper, said elements being movable apart by engagement with the keeper and said latch means being self-operable to reversely move said elements into holding and suspending relation with the keeper in which said elements and keeper are interengaged at surfaces so disposed as to positively lock the keeper against downward release from the elements, said keeper being disengageable from the latch elements only by manual release of the latch means.

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