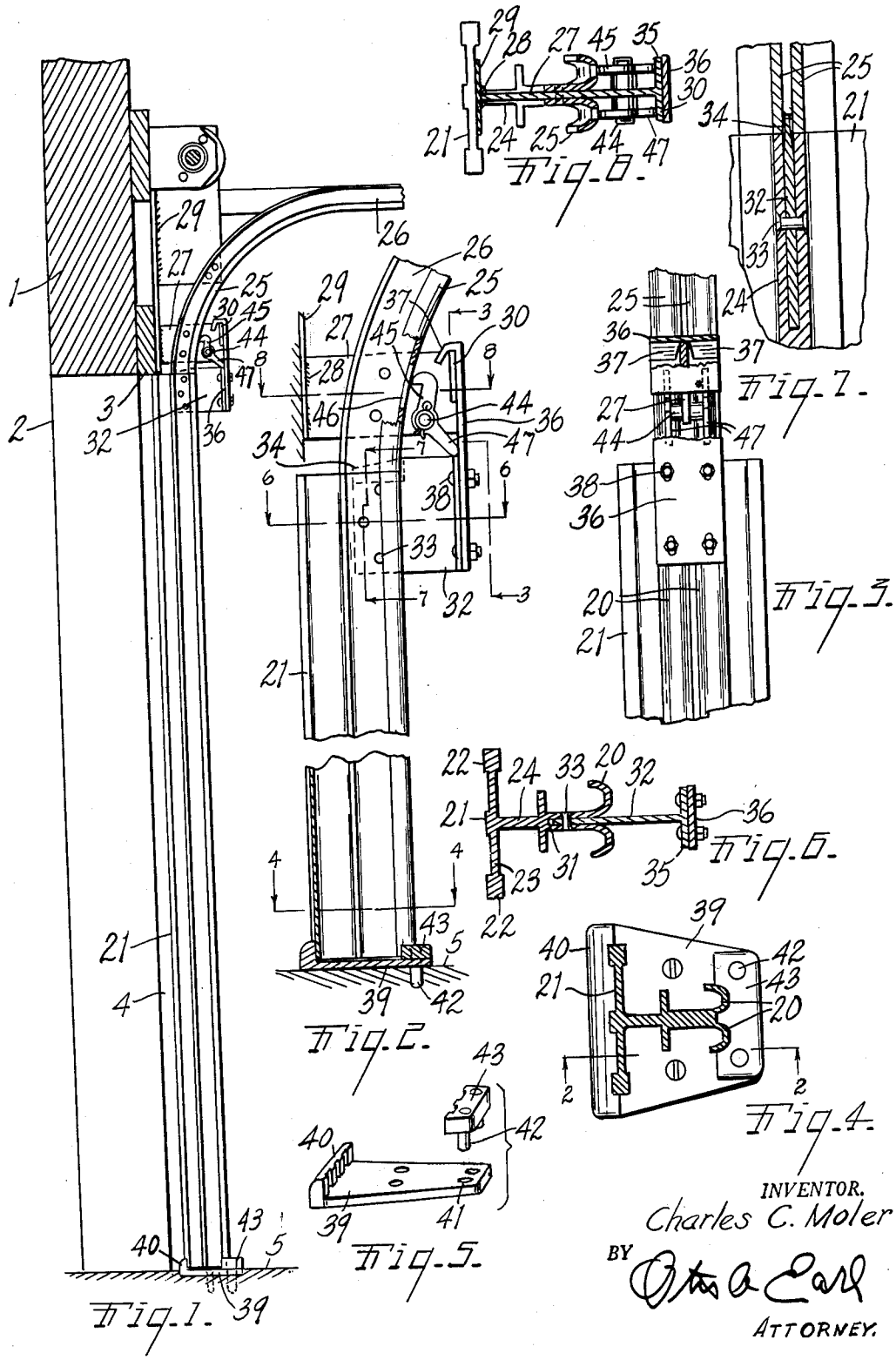
March 13, 1956 C. C. MOLER 2,738,004

MOUNTING FOR MULTIPLE VERTICALLY SLIDING DOORS IN A SINGLE DOOR OPENING

Filed Jan. 21, 1952

2 Sheets-Sheet 1

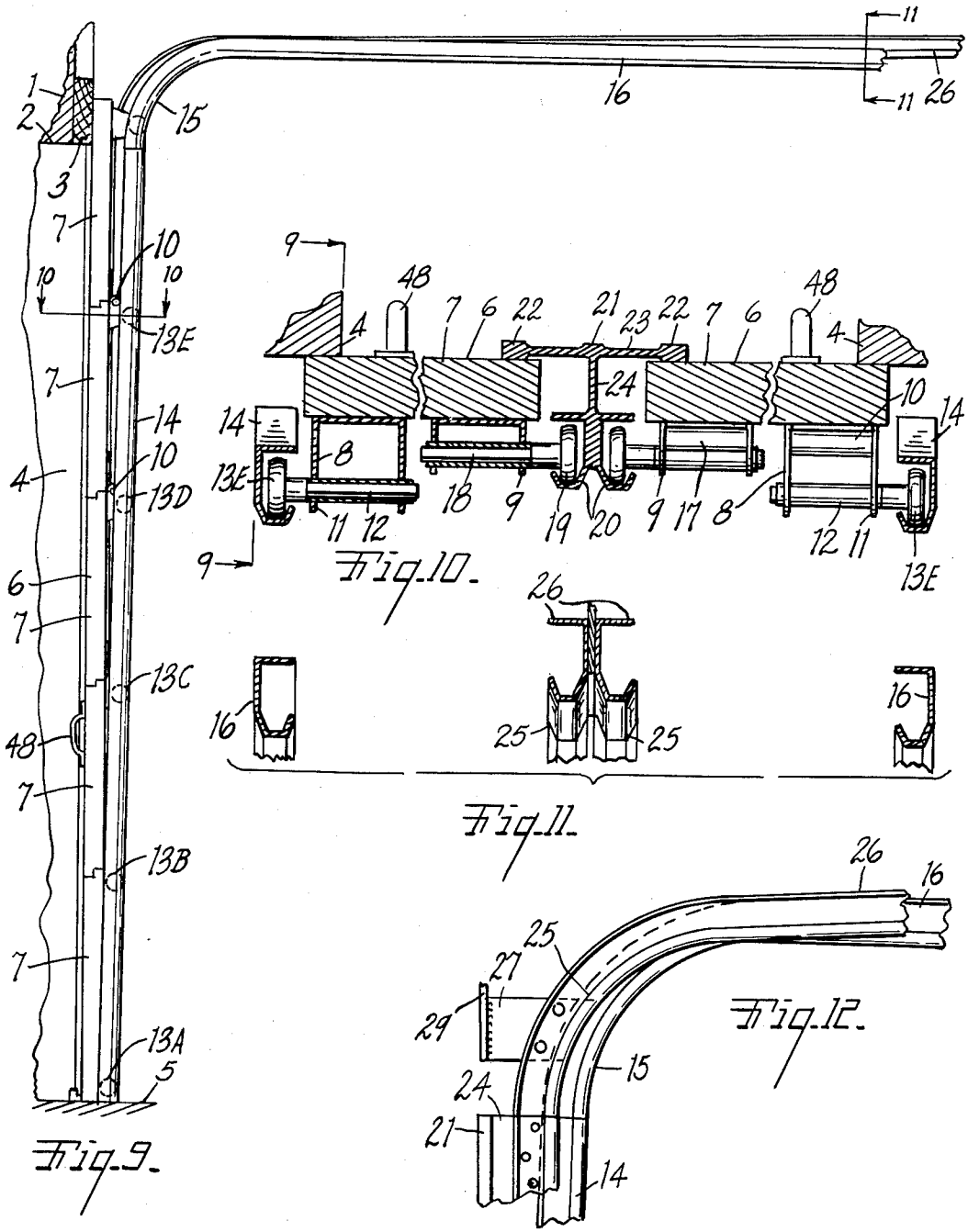


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MOUNTING FOR MULTIPLE VERTICALLY SLIDING DOORS IN A SINGLE DOOR OPENING

Filed Jan. 21, 1952 2 Sheets-Sheet 2



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2,738,004

MOUNTING FOR MULTIPLE VERTICALLY SLIDING DOORS IN A SINGLE DOOR OPENING

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Application January 21, 1952, Serial No. 267,490

11 Claims. (Cl. 160—113)

This invention relates to improvements in mounting for multiple vertically sliding doors in a single door opening.

The principal objects of this invention are:

First, to provide a novel arrangement of supports and guides for a plurality of vertically sliding doors for closing a single door opening so that the opening may be partially or completely opened and closed.

Second, to provide a novel form of removable guide posts for guiding and retaining the adjacent edges of multiple vertically sliding doors in a single door opening.

Third, to provide a novel arrangement of supporting rails for multiple vertically sliding doors, which will permit interior edges of the doors to travel along straight vertical guide tracks while the exterior edges of the doors travel along slightly inclined tracks to have a wedging closing action against the door jamb.

Fourth, to provide a novel arrangement of supporting and guiding roller mountings on a vertically sliding door in which the rollers along one edge of the door are mounted along a line parallel to the door for engagement with a vertical track, while the rollers on the other edge of the door are mounted along a line inclined upwardly away from the door for coaction with an inclined guide rail.

Fifth, to provide a mounting for a vertically sliding door which permits one edge of the door to travel along a truly vertical guide rail while the other edge of the door is guided along an inclined guide rail so that a straight extruded column can be used as the guide rail for the first edge of the door, and so that the opposite edge of the door will move inwardly away from the lintel of the door opening to clear protruding handles and hardware as the door is raised.

Other objects and advantages relating to the details of my invention will be apparent from a consideration of the following description and claims.

The drawings, of which there are two sheets, illustrate a preferred embodiment of my invention.

Fig. 1 is a fragmentary vertical cross sectional view through the door opening of a building illustrating the removable center post and center guide rail of my invention in place therein.

Fig. 2 is a fragmentary enlarged elevational view partially in vertical cross section of the removable center post and mounting illustrating details of construction thereof.

Fig. 3 is an enlarged fragmentary inside elevational view, partially broken away in vertical cross section, of the mounting of the upper end of the center post shown in Fig. 2.

Fig. 4 is a transverse cross sectional view through the center post taken along the plane of the line 4—4 in Fig. 2.

Fig. 5 is an exploded perspective view of the floor plate and retaining block used to locate the lower end of the removable center post.

Fig. 6 is a transverse cross sectional view through the upper end of the center post and its hanger taken along the plane of the line 6—6 in Fig. 2.

Fig. 7 is a fragmentary vertical cross sectional view through the upper end of the centerpost and its interlocking connection to the center guide rails taken along the plane of the line 7—7 in Fig. 2.

Fig. 8 is a transverse cross sectional view through the front anchor for the center guide rails and the connection of the center post hanger thereto taken along the plane of the line 8—8 in Fig. 2.

Fig. 9 is a fragmentary side elevational view of the multiple door mounting illustrating the relative positions of the interior and exterior guide and supporting rails.

Fig. 10 is a fragmentary horizontal cross sectional view through the doors and door mounting taken along the plane of the line 10—10 in Fig. 9.

Fig. 11 is a vertical transverse cross sectional view through the upper overhead reaches of the guide rails taken along the plane of the line 11—11 in Fig. 9.

Fig. 12 is a fragmentary enlarged side elevational view illustrating the relative positions of the curved forward ends of the interior and exterior overhead guide rails.

My invention relates to the mounting of multiple doors of the familiar horizontal hinged articulated sectional type, arranged to be opened by sliding upwardly and horizontally inwardly above the door opening in a building. In the drawings I have conventionally illustrated a building wall 1 having a door opening 2 therein, with a lintel 3 across the top of the opening, and vertical jamb portion 4 along the sides of the opening. The floor of the building is indicated at 5. Slidably mounted to close the opening are a pair of vertically sliding doors indicated generally at 6. The doors consist of a plurality of panel sections 7. The exterior edges of the panel sections 7 are hingedly connected together by hinge fixtures 8, while the interior edges of the panel sections at the adjacent edges of the two doors are hingedly connected by the hinge fixtures 9.

With particular reference to Fig. 9 it is pointed out that the hinge fixtures 8 include hinge pins 10 located in a plane parallel to the surface of the door, and further include inwardly projecting flanges 11 for supporting pintle pins 12 at varying distances from the inner surface of the doors for supporting rollers 13–B, 13–C, 13–D etc. These exterior rollers are positioned in a plane that is inclined upwardly and inwardly from the inner surface of the door when the door is in closed vertical position. The inclined series of rollers 13 is supported and guided along a guide rail having an inclined upright reach 14 joined by a curved upper portion 15 with a substantially horizontal overhead reach of guide rail 16. Guide rails of this type are well known and are supported in a well known manner from the walls and ceiling of the building. The rails 14, 15, and 16 are of channel shaped cross section opening transversely inwardly of the door which they support.

The hinge fixtures 9 at the adjacent inner edges of the two doors 6 include hinge pins 17 that are co-planar and aligned with the hinge pins 10 of the exterior hinge fixtures 8. The fixtures 9 further include inwardly projecting flanges that support pintle pins 18 and guide rollers 19 in a plane parallel to the inner surface of the doors.

Where the exterior hinge fixture 8 vary in inwardly projecting depth, the interior fixtures 9 are all of identical size and inwardly projecting depth.

The interior guide rollers 19 are received in and guided along laterally opening channel rail sections 20 formed along the inner side of a vertical center column 21. Desirably, the column 21 is formed by extruding aluminum in the cross sectional shape illustrated, that provides vertical interior jambs 22 connected by a web

23 that forms a closure for the space between the adjacent doors 6. The track sections 20 on the center column are connected to the web 23 by an integral T flange 24. The center column 21 is removably mounted within the door opening 2 as will be described in detail, and the upper ends of the track portions 20 of the column align or connect with the downwardly curved front ends 25 of center rails 26 arranged in back to back fashion to support the adjacent interior edges of the doors when the doors are raised or opened.

Since the exterior rollers 13 lie in a plane that is not parallel to the interior surface of the door, and since the overhead rail 15 at the exterior edge of the door is horizontal, the exterior edge of the door will lie in a slightly forwardly and downwardly inclined position when the door is opened. Since the interior rollers 19 are mounted in a plane parallel to the inside of the door, the overhead rail 26 at the interior edge of the door is inclined downwardly and forwardly toward the door opening by an amount equal to the angle between the plane of the rollers 13 and the inside of the door, thus both internal and external edges of the door are supported in the same forwardly inclined position when the door is opened, and no twisting or misaligning stress is placed upon the several hinge pins 10 or 17.

The forward downturned ends 25 of the interior rails are secured back to back to a supporting plate 27 secured as by welding at 28 to a mounting plate 29 positioned along the lintel 3. A transversely extending T plate 30 is welded or secured to the inner edge of the plate 27 inwardly of the curved rail sections 25. This spaces the adjacent inner flanges of the curved rail portions 25 by the thickness of the supporting plate 27 and by reference to Figs. 1 and 2 it will be noted that the curved rail sections 25 extend below the plate 27 to leave a locating slot between the rail portions.

The upper end of the extruded center column 21 is vertically milled or slotted from its inner edge as at 31 to receive a vertically extending support plate 32 that is secured in place by rivets 33, and which projects upwardly above the center column as at 34 to fit interlockingly between the ends of the rail portions 25 (see Fig. 7). The inner edge of the supporting plate 32 has a T flange 35 to which is bolted a vertically extending hanger plate 36. The upper edge of the hanger plate 36 is bent forwardly or outwardly of the door opening to form laterally spaced hooks 37 that engage over the T plate 30 and on opposite sides of the rail support plate 27.

The hanger plate 36 is vertically adjustably bolted as at 38 to the support plate 32 so that the hooks 37 will support the column with its lower end in clearing vertically spaced relationship to the floor 5. This clearance will accommodate vertical sagging of the lintel 3 or heaving of the floor 5 without interference with the removable character of the center column. Desirably a floor plate 39 having an upstanding front flange 40 is permanently secured to the floor 5 below the lower end of the column 21. The flange 40 is shaped to have transversely interlocking abutting relationship with the lower end of the column, and the floor plate 39 and floor are provided with dowel holes 41 for removably receiving the pins 42 on a removable anchor block 43. The floor plate and anchor block thus securely locate the lower end of the center column.

In order to prevent the doors from being accidently lowered when the center column is not in place, the support plate 27 for the front ends of the internal rails 25 carries a transversely extending pin 44 on which are mounted a pair of spring operated safety levers 45. The levers have their upper arms individually biased forwardly to project through slots 46 formed in the inner flanges of the rail sections 25 to obstruct the rail sections and prevent downward movement of the doors. Lower arms 47 on the levers project downwardly and inwardly to be engaged by the hanger plate 36 when the center column is hung in position. Thus, placing the center column in position automatically retracts the safety arms 45 so that the doors can be lowered.

It is pointed out that the combination of equally spaced rollers along the interior edges of the doors, with the inclined rollers along the exterior edges of the doors, permits the interior edges to close snugly against the vertical jamb portions 22 of the center post with the upper edge of the door also seated against the lintel 3. At the same time outwardly projecting hardware on the outer surface of the door, such as a handle 48, will clear the lintel when the door is opened provided the handle is mounted along the side of the door where the inclined rollers and rails cause the lower portion of the door to move substantially inward of the building as the door is opened.

I thus describe a highly practical commercial embodiment of my door mounting so that others skilled in the art may reproduce the same. I have not attempted to describe other possible variations of the mounting, and the present description is intended only as an example and not as a definition of the limits of my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination with a building having a horizontally elongated door opening and a pair of sectional vertically slidable doors adapted to close said opening, means for supporting and guiding said doors comprising, external rails having horizontal overhead portions and downwardly and forwardly inclined upright portions positioned adjacent the exterior edges of said doors, a series of rollers mounted along the exterior edge of each door and disposed in a plane inclined upwardly and inwardly from the door, interior rails arranged in back to back relation and having forwardly and downwardly inclined overhead portions curving downwardly at their forward ends adjacent the interior edges of said doors, a support plate connecting the forward ends of said interior rails to each other and to the building and projecting inwardly of the rails, a T member on the inner end of said support plate, a removable center column of straight extruded metal construction positioned between the adjacent edges of said doors, said column having a transversely extending outer portion forming jambs for said doors and an inwardly projecting portion forming laterally opening track portions vertically aligned with the ends of said interior rails, a hanger member on the upper end of said column having a removable hooked suspending engagement with said T member to support said column with its lower end in spaced relationship with the floor, means on the floor transversely engaging and anchoring the bottom of said column, and a plurality of guide rollers mounted along the interior edges of said doors and disposed in a plane parallel to the doors to travel along the straight track portions of said column and said interior rails.

2. In combination with a building having a horizontally elongated door opening and a pair of sectional vertically slidable doors adapted to close said opening, means for supporting and guiding said doors comprising, external rails having horizontal overhead portions and downwardly and forwardly inclined upright portions positioned adjacent the exterior edges of said doors, a series of rollers mounted along the exterior edge of each door and disposed in a plane inclined upwardly and inwardly from the door, interior rails having forwardly and downwardly inclined overhead portions curving downwardly at their forward ends adjacent the interior edges of said doors, a support connecting the forward ends of said interior rails to the building and projecting inwardly of the rails, a T member on the inner end of said support, a removable center column of straight extruded metal construction positioned between the adjacent edges of said doors, said column having a transversely extending outer portion forming jambs for said

doors and an inwardly projecting portion forming laterally opening track portions vertically aligned with the ends of said interior rails, a hanger member on the upper end of said column having a removable hooked suspending engagement with said T member to support said column with its lower end in spaced relationship with the floor, means on the floor transversely engaging and anchoring the bottom of said column, and a plurality of guide rollers mounted along the interior edges of said doors and disposed in a plane parallel to the doors to travel along the straight track portions of said column and said interior rails.

3. In combination with a building having a horizontally elongated door opening and a plurality of sectional vertically slidable doors adapted to close said opening, means for supporting and guiding said doors comprising, external rails having horizontal overhead portions and downwardly and forwardly inclined upright portions positioned adjacent the edges of said opening, a series of rollers mounted along the exterior edge of the two exterior doors and disposed in planes inclined upwardly and inwardly from the doors, interior rails arranged in back to back paired relation and having forwardly and downwardly inclined overhead portions curving downwardly at their forward ends adjacent the interior edges of said doors, a support plate connecting the forward paired ends of said interior rails to each other and to the building and projecting inwardly of the rails, a T member on the inner end of said supported plate, a removable column of straight extruded metal construction positioned between the adjacent edges of said doors, said column having a transversely extending outer portion forming jambs for adjacent doors and an inwardly projecting portion forming laterally opening track portions vertically aligned with the ends of said interior rails, a hanger member on the upper end of said column having a removable hooked suspending engagement with said T member to support said column with its lower end spaced from the floor, means on the floor transversely engaging and anchoring the bottom of said column, and a plurality of guide rollers mounted along the interior edges of said doors and disposed in planes parallel to the door to travel along the straight track portions of said column and said interior rails.

4. In combination with a building having a horizontally elongated door opening and a plurality of sectional vertically slidable doors adapted to close said opening, means for supporting and guiding said doors comprising, external rails having horizontal overhead portions and downwardly and outwardly inclined upright portions positioned adjacent the edges of said opening, a series of rollers mounted along the exterior edge of the two exterior doors and disposed in planes inclined upwardly and inwardly from the doors, interior rails having forwardly and downwardly inclined overhead portions curving downwardly at their forward ends adjacent the interior edges of said doors, means connecting the forward ends of said interior rails to the building and projecting inwardly of the rails, a T member on the inner end of said connecting means, a removable column of straight extruded metal construction positioned between the adjacent edges of said doors, said column having a transversely extending outer portion forming jambs for adjacent doors and an inwardly projecting portion forming laterally opening track portions vertically aligned with the ends of said interior rails, a hanger member on the upper end of said column having a removable suspending engagement with said T member to support said column with its lower end spaced from the floor, means on the floor transversely engaging and anchoring the bottom of said column, and a plurality of guide rollers mounted along the interior edges of said doors and disposed in planes parallel to the door to travel along the straight track portions of said column and said interior rails.

5. In combination with a building having a horizontally elongated door opening and sectional vertically slidable door adapted to close said opening, means for supporting and guiding said doors comprising, external rails having horizontal overhead portions and downwardly and forwardly inclined upright portions positioned adjacent the edges of said opening, a series of rollers mounted along exterior edges of said doors and disposed in planes inclined upwardly and inwardly from the doors, interior rails having forwardly and downwardly inclined overhead portions curving downwardly at their forward ends adjacent the interior edges of said doors, a support means connected to the building and projecting inwardly of the interior rails, a removable column of straight extruded metal construction positioned between adjacent edges of said doors, said column having a transversely extending outer portion forming jambs for adjacent doors and an inwardly projecting portion forming laterally opening track portions vertically aligned with the ends of said interior rails, a hanger member on the upper end of said column having a removable hooked suspending engagement with said support means to support said column with its lower end spaced from the floor, means on the floor transversely engaging and anchoring the bottom of said column, and a plurality of guide rollers mounted along the interior edges of said doors and disposed in planes parallel to the doors to travel along the straight track portions of said column and said interior rails.

6. A door mounting for a series of vertically sliding doors comprising, guide rollers mounted along the adjacent interior edges of said doors and at the same distance from the inside of the doors, other rollers mounted along the exterior edges of exterior doors of said series of said doors with each superimposed roller positioned further inwardly from the door than the subadjacent roller, supporting and guiding rails cooperative with said other rollers and having downwardly and outwardly inclined upright reaches joined by curved upper portions to substantially horizontal overhead reaches, a removable post positioned between adjacent edges of said doors and having straight vertical track portions coacting with said rollers along the interior edges of said doors, interior guide rails having downwardly and forwardly inclined overhead reaches joined with downwardly curved forward ends terminating closely adjacent and aligned with the track portions on said post, and means at the upper end of said post having a releasable suspending engagement with a support fixed relative to said interior rails.

7. A door mounting for a series of vertically sliding doors comprising, guide rollers mounted along the adjacent interior edges of said doors and at the same distance from the inside of the doors, other rollers mounted along the exterior edges of exterior doors of said series of said doors with each superimposed roller positioned further inwardly from the door than the subadjacent roller, supporting and guiding rails cooperative with said other rollers and having downwardly and outwardly inclined upright reaches joined by curved upper portions to substantially horizontal overhead reaches, a removable post positioned between adjacent edges of said doors and having straight vertical track portions coacting with said rollers along the interior edges of said doors, interior guide rails having downwardly and forwardly inclined overhead reaches joined with downwardly curved forward ends terminating closely adjacent and aligned with the track portions on said post, and means at the upper end of said post having a releasable engagement with a support fixed relative to said interior rails.

8. A door mounting for a series of vertically sliding doors comprising, guide rollers mounted along the adjacent interior edges of said doors and at the same distance from the inside of the doors, other rollers mounted along the exterior edges of exterior doors of said series of said doors with each superimposed roller positioned further inwardly from the door than the subadjacent roller, sup-

porting and guiding rails cooperative with said other rollers and having downwardly and outwardly inclined upright reaches joined by curved upper portions to substantially horizontal overhead reaches, a removable post positioned between adjacent edges of said doors and having straight vertical track portions coacting with said rollers along the interior edges of said doors, and interior guide rails having downwardly and forwardly inclined overhead reaches joined with downwardly curved forward ends terminating in aligned adjacent relationship with said track portions on said post.

9. A releasable hanger connection for a post removably positioned in an opening and between two vertically sliding doors mounted in side by side relation in a building, said post being of extruded metal construction and having a transversely extending outer flange forming jambs for said doors, an inwardly projecting flange on said post having straight guide rail portions thereon adapted to coact with rollers carried on the adjacent edges of said doors, a support plate secured in a vertical slot in the upper end of said flange and projecting inwardly therefrom, a transversely and vertically extending hanger plate secured to the inner edge of said support plate and extending upwardly thereabove, laterally spaced outwardly turned hooks on the upper edge of said hanger plate and having divergent adjacent edges forming a downwardly opening notch, a fixed plate secured to said building above said post and extending inwardly of said opening, a cross member on the inner end of said fixed plate supportingly engaging said hooks with the upper and inner corner of the fixed plate disposed in said notch, and fixed guide rails within said building having ends aligned with the ends of the guide rail portions of said post when said post is suspended from said fixed plate, said fixed rails being secured on opposite sides of said fixed plate, said support plate projecting above said post and between said fixed rails to transversely align said post with said fixed rails.

10. A releasable hanger connection for a post removably positioned in an opening and between two vertically sliding doors mounted in side by side relation in a building, said post being of extruded metal construction and having a transversely extending outer flange forming jambs for said doors, an inwardly projecting flange on said post having straight guide rail portions thereon adapted to coact with rollers carried on the adjacent edges of said doors, a support plate secured in a vertical slot

in the upper end of said flange and projecting inwardly therefrom, a transversely and vertically extending hanger plate secured to the inner edge of said support plate and extending upwardly thereabove, laterally spaced outwardly turned hooks on the upper edge of said hanger plate and having divergent adjacent edges forming a downwardly opening notch, a fixed plate secured to said building above said post and extending inwardly of said opening and supportingly engaged in said notch between said hooks, and fixed guide rails within said building having ends aligned with the ends of the guide rail portions of said post when said post is suspended from said fixed plate, said fixed rails being secured on opposite sides of said fixed plate, said support plate projecting above said post and between said fixed rails to transversely align said post with said fixed rails.

11. A releasable hanger connection for a post removably positioned in an opening and between two vertically sliding doors mounted in side by side relation in a building, said post being of extruded metal construction and having a transversely extending outer flange forming jambs for said doors, an inwardly projecting flange on said post having straight guide rail portions thereon adapted to coact with rollers carried on the adjacent edges of said doors, a support plate secured in a vertical slot in the upper end of said inwardly projecting flange and projecting inwardly therefrom, a transversely and vertically extending hanger plate secured to the inner edge of said support plate and extending upwardly thereabove, an outwardly turned hook on the upper edge of said hanger plate, said hook having a downwardly and transversely opening notch therein, a fixed plate secured to said building above said post and extending inwardly of said opening and supportingly engaged in said notch in said hook, and fixed channel shaped guide rails within said building having ends aligned with the ends of the guide rail portions of said post when said post is suspended from said fixed plate, said fixed rails being secured on opposite sides of said fixed plate.

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