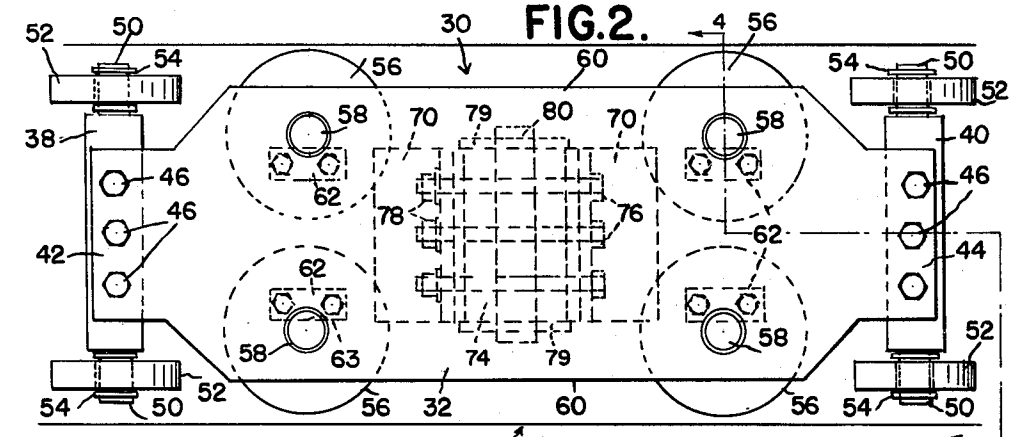
Oct. 6, 1964 T. L. URQUHART 3,151,349

TOP ROLLER ASSEMBLY

Filed Nov. 2, 1961 3 Sheets-Sheet 1

FIG.2.



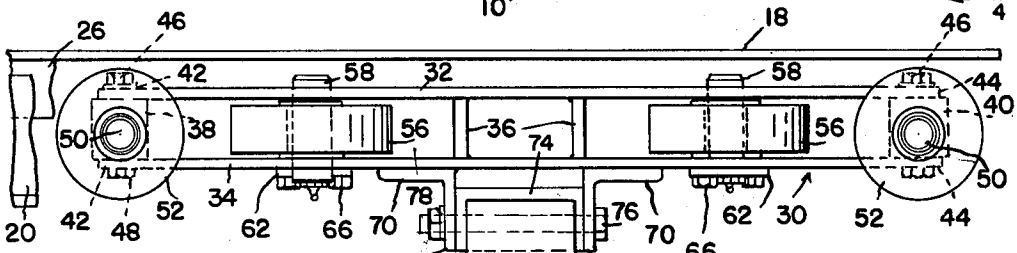
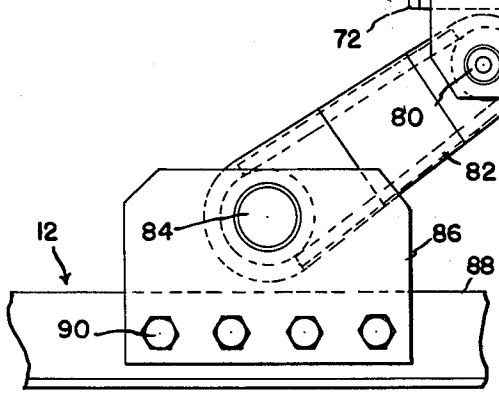


FIG.3.



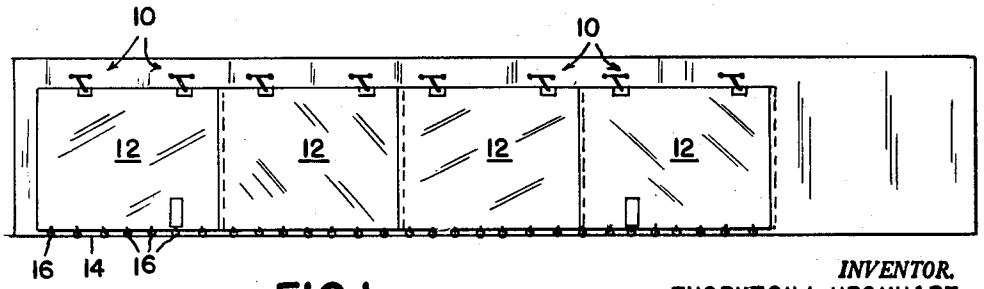


FIG.1.

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TOP ROLLER ASSEMBLY

Filed Nov. 2, 1961 3 Sheets-Sheet 2

FIG.4.

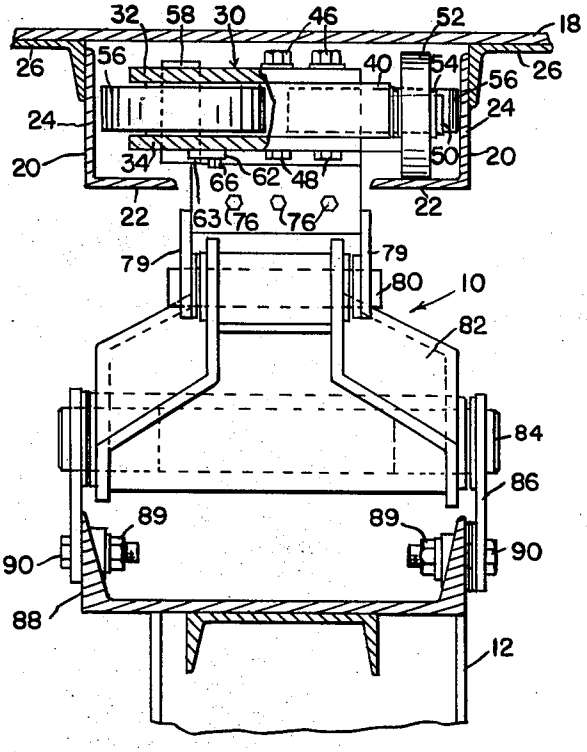
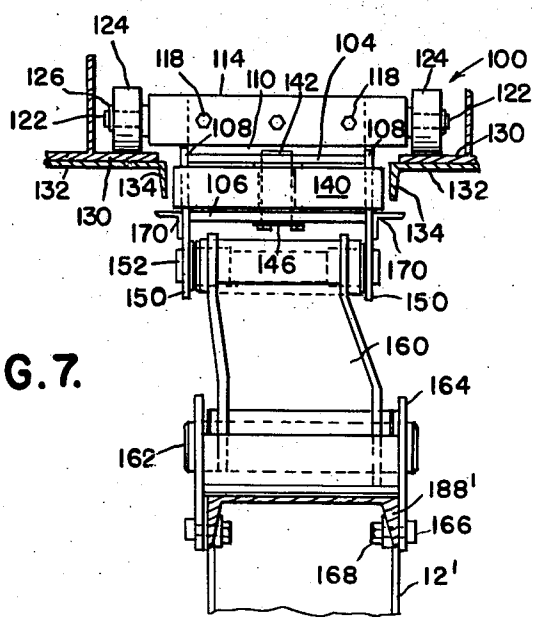


FIG.7.



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TOP ROLLER ASSEMBLY

Filed Nov. 2, 1961 3 Sheets-Sheet 3

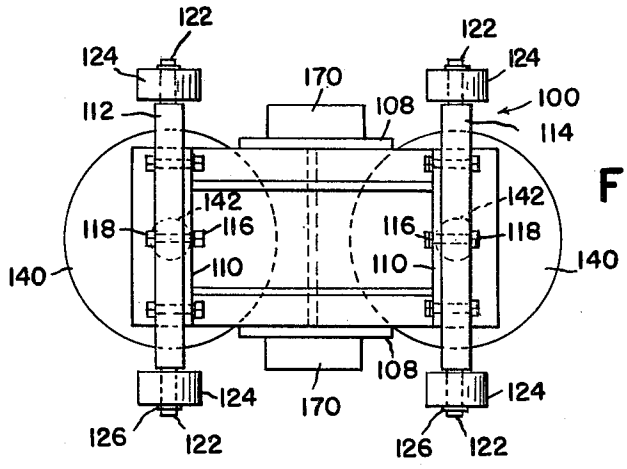


FIG.5.

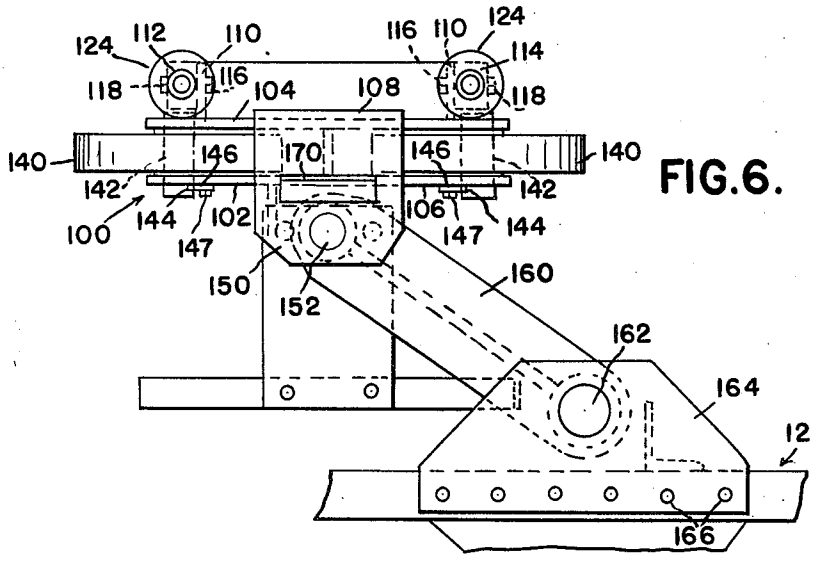


FIG.6.

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United States Patent Office 3,151,349 Patented Oct. 6, 1964

3,151,349

TOP ROLLER ASSEMBLY

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Filed Nov. 2, 1961, Ser. No. 149,547
14 Claims. (Cl. 16—106)

This invention relates generally to a top roller assembly for guiding the movement of a door between open and closed positions.

One object of the invention is to provide a top roller assembly for guiding the upper edge of a sliding type door, which is adapted to follow a track extending in the direction of door movement along the top of the door opening, and which has provision for automatically accommodating itself to differences in the distance between the top edge of the door and the track. The track may be carried by overhead structure of the cantilever type, for example, and hence its elevation may vary.

Another object is to provide a top roller assembly which can be readily removed from its track for repair or replacement.

Another object is to provide a top roller assembly comprising a roller housing, track engaging rollers, axles for the rollers, and fasteners for releasably mounting the axles on the housing, the fasteners being readily accessible to facilitate removal of the axles from the housing so that the roller assembly can be removed from the track.

Another object is to provide a top roller assembly having guide rollers for laterally guiding the same, with fasteners readily accessible from the underside of the assembly for releasably locking the roller shafts in position, whereby the shafts and rollers may be readily disassembled in order to facilitate repair or replacement.

Another object is to provide a top roller assembly having an arm beneath the housing to one end of which the door may be connected, and also having a releasable pivotal connection with the underside of the housing.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a semi-diagrammatic view illustrating a plurality of the top roller assemblies of my invention shown in use with sliding doors.

FIGURE 2 is a top plan view of the roller assembly.

FIGURE 3 is a side elevational view thereof.

FIGURE 4 is a view partly in section taken on the line 4—4 of FIGURE 2.

FIGURE 5 is a top plan view of a top roller assembly of modified construction.

FIGURE 6 is a side elevational view of the top roller assembly shown in FIGURE 5.

FIGURE 7 is an end view of the roller assembly shown in FIGURES 5 and 6.

Referring now more particularly to the drawings and especially to FIGURES 1–4 thereof, the top roller assembly is generally indicated by the reference character **10**. In FIGURE 1, a plurality of doors or leaves **12** are shown supported on tracks **14** by rollers **16**. The doors or leaves are flat and move back and forth in their own planes. The upper edges of the leaves **12** are supported and guided by a plurality of the top roller assemblies **10**. Ordinarily two or more of the top roller assemblies are provided for guiding the upper edge of each door or leaf.

Above the top of the door opening there is provided a horizontal plate **18** carrying a pair of depending laterally spaced angles **20**. The angles have horizontal flanges **22** projecting toward each other and upright flanges **24** connected to the horizontal plate **18** by angles **26**. The

flanges **22** of the angles **24** lie in the same plane and provide tracks for the rollers of the top roller assemblies. The flanges or tracks **22** extend parallel to each other in the direction of movement of the leaves along the top of the opening controlled by the leaves. As seen in FIGURE 4, the adjacent edges of the tracks **22** are separated by a sufficient distance to provide a space for the portions of the top roller assemblies which extend beneath the tracks.

Each top roller assembly is of the same construction and includes a roller housing **30** composed of the vertically spaced, parallel, upper and lower flat plates **32** and **34**. The plates **32** and **34** are of the same outline and are held together in permanent fixed relation by the ribs **36**.

Removable axles **38** and **40** are provided at each end of the roller housing. The axles are parallel to one another and extend at right angles to the longitudinal center line of the roller housing. As shown, the axles **38** and **40** are rectangular in cross-section throughout the length of their mid-section and are disposed between and in surface-to-surface relation with the end portions **42** and **44** of the housing plates. As shown in FIGURE 2, the end portions **42** and **44** of the plates are of reduced width with respect to the intermediate portions of the plates.

Nut and bolt assemblies are provided for releasably connecting the axles to the top and bottom plates of the housing. Bolts **46** extend vertically through the top and bottom plates and through the axles. Nuts **48** threaded on the lower ends of the bolt shanks which project beneath the bottom plate serve to releasably secure the axles in the illustrated position. The nut and bolt assemblies **46**, **48** are readily accessible both from beneath and from the ends of the roller housing so that the axles may be readily assembled or disassembled with respect to the housing.

The axles **38** and **40** are provided with reduced spindle end portions **50**, and rollers **52** are secured on the spindles **50** by retainers **54**. The spindles **50** of each axle of course have a common axis and are at right angles to the longitudinal center line of the housing. The rollers are spaced from each other a distance such that the rollers on one side of the assembly engage the track **22** of one angle **20** and the rollers on the other side thereof engage the track **22** of the other angle **20**. The plate **18** lies close above rollers **52** to retain them on the tracks.

Provision is made for laterally guiding the top roller assemblies. The means for accomplishing this includes the horizontal rollers **56** supported between the top and bottom plates **32** and **34** by shafts **58** which are parallel to each other and at right angles to the axles **38** and **40**. The shafts **58** are arranged in pairs, two adjacent either end of the housing. The shafts are located between the axles **38** and **40**, and the shafts of each pair are spaced equal distances on opposite sides of the longitudinal center line of the housing. The rollers **56** are freely rotatable on the shafts and their peripheries project beyond the side edges **60** of the housing plates for engagement with the upright flanges **24** of the angles **20**.

The shafts **58** are freely vertically slidable in aligned apertures in the top and bottom plates **32** and **34** and are locked in position by the keeper bars **62**. The keeper bars extend into notches **63** in the sides of the shafts to prevent them from moving longitudinally with respect to the housing and hence to lock them in position. The keeper bars are releasably secured to the underside of the bottom plate **34** by bolts **66**. The bolts **66**, being on the underside of the housing, are readily accessible and can be removed to similarly remove the keeper bar

and release the shaft so that it can be removed from the housing by sliding in either direction of its length.

Beneath the housing and permanently secured to the underside of the bottom plate **34** is a pair of brackets **70** which have spaced depending flanges **72**. A bracket **74** is positioned between the flanges **72** and secured thereto by the bolts **76** and nuts **78** threaded on the ends of the bolts. Hence the bracket **74** may be readily assembled and disassembled by means of the nut and bolt assemblies **76, 78** which are beneath the top roller assemblies for ready access.

The bracket **74** has a pair of depending legs **79**, and a pin **80** parallel to axles **38, 40** connects the legs. An arm **82** is pivoted at one end to the pin **80**, and the other end of the arm is carried by a pin **84** on the bracket **86**. The bracket **86** is secured to the top edge **88** of a door or leaf **12** by the releasable nuts **89** and bolts **90**.

Difficulty in the past has been experienced with top roller assemblies due to the fact that they are difficult to repair or replace. For example, if a roller bearing should wear out, it is very difficult to remove the top roller assembly from its tracks, or to remove the roller axle, for repair purposes. However, the top roller assembly of this invention can be readily taken from the track by first removing the axles **38** and **40**. This can be done by manipulation of the nut and bolt assemblies **46, 48** which are accessible from the ends of the roller housing and also from underneath. The rollers and axles can then be removed from the housing and lowered through the space between the tracks **22**. The rollers **56** can also easily be removed by releasing the keeper bars **62**, removing the shafts and then withdrawing the rollers from the space between the upper and lower plates of the housing. First of course one axle or the other will be removed. After removal of the axles **38** and **40**, and rollers **52** and **56**, the housing itself can be cocked and lowered through the space between the tracks.

The arm **82** may also be removed from the top roller assembly by manipulation of the nut and bolt assemblies **76, 78** to release the bracket **74**.

The horizontal plate **18** carrying the tracks **22** may be supported from structure of the building which is out of level or which varies in elevation due to changing weather conditions. Such structure may be of the cantilever type, for example. However, changes in the elevation of the tracks **22**, and hence of the roller assemblies **10**, are compensated for by the pivoted arm **82**.

FIGURES 5–7 illustrate a modification of the invention. The top roller assembly there shown is generally indicated at **100** and includes a roller housing **102** which is made up of the identical top and bottom plates **104** and **106**. The plates are rigidly secured together by the side flanges **108**. Along the top surface of each plate **104** are the parallel upright flanges **110** which extend at right angles to the longitudinal center line of the housing. Removably secured to the remote surfaces of the flanges **110** are the axles **112** and **114** which are parallel to each other, of rectangular cross-section throughout the main portion of their length and at right angles to the longitudinal center line of the housing. The axles are secured to the flanges **110** by the nuts **116** and bolts **118**. Hence the axles can be very easily removed because the nut and bolt assemblies **116, 118** are readily accessible from the ends of the roller assembly.

The axles **112** and **114** are provided on either end with reduced spindle portions **122**, and the axes of the spindle portions of each axle are parallel and extend at right angles to the longitudinal center line of the assembly. Rollers **124** are rotatably mounted on the spindle portions and secured thereon by keepers **126**. The rollers **124** are spaced apart appropriate distances such that they will engage the tracks **130** which, as in the first embodiment, extend along the top of the door opening parallel to the direction of movement of the door. The tracks are in the same horizontal plane and spaced from each other to clear the portions of the roller assembly which depend beneath the tracks. The tracks **130** are supported from the structure of the building along the top of the door opening, as by a plate, not shown, similar to the plate **18** in the first embodiment.

Members **132**, secured to tracks **130**, have flanges **134** which extend throughout the length of the tracks to provide a lateral guide for the assembly. Coacting with the guide provided by flanges **134** are the horizontal rollers **140**. These rollers, two in number, are disposed between the plates **104** and **106** of the housing and are rotatable on shafts **142** which are located near the ends of the housing and disposed in parallel relation to each other at right angles to the axles. The shafts **142** are on the longitudinal center line of the housing and are freely slidable in aligned apertures in the top and bottom housing plates. The shafts have notches **144** beneath the bottom plate, and keeper bars **146** extend into the notches to lock the shafts against movement. The keeper bars **146** are secured to the underside of the plate **106** by bolts **147**. Bolts **147** are readily accessible from the underside of the roller housing and may be removed to remove the keeper bar and thereby permit the shafts to be taken from the housing apertures in either direction.

The side flanges **108** have downward extensions **150** and a transverse pin **152** is welded to the extensions. The pin is parallel to the axles **112** and **114**. The upper end of the arm **160** is pivoted on the pin, and the lower end is pivoted on pin **162** carried by the bracket **164** removably secured to the upper edge **188'** of the door **12'** by bolts **166** and nuts **168**.

Hold-down plates **170** in the form of angles are secured to the outer sides of the side flanges **108** in position to underlie the lower edges of flanges **134** and thereby retain the rollers **124** on the tracks **130**.

The axles **112** and **114** can be readily removed by manipulation of the nuts and bolts **116, 118** which are readily accessible from the ends of the roller assembly. The rollers **140** and their shafts can also be readily removed by first removing the keeper bars **146**, through manipulation of bolts **147**. This is accomplished readily from underneath the roller assembly. Removal of the axles **112** and **114** permits the roller housing to be lowered through the space between the tracks.

What I claim as my invention is:

1. A top roller assembly for guiding the movement of a door comprising a roller housing, rollers mounted on said housing for rotation about parallel axes to support said roller assembly for movement on a track extending in the direction of door movement, means on said housing cooperable with a guide to laterally guide said roller assembly, said means including guide rollers, shafts supporting said guide rollers for rotation about axes at right angles to the axes of said first-mentioned rollers, said shafts being freely slidable in apertures in said housing for ready assembly and disassembly, and keeper bars on the underside of said housing to releasably lock said shafts in assembled relation with said housing, an arm beneath said housing for attachment of one end thereof to the door, and means pivotally attaching the other end of said arm to said housing.

2. The top roller assembly defined in claim 1, wherein said housing includes top and bottom plates, said guide rollers are disposed between said plates in positions such that their peripheries project laterally beyond the edges of said plates for engagement with the guide aforesaid, and fasteners accessible from beneath said housing to releasably secure said keeper bars to the underside of said bottom plate.

3. The top roller assembly defined in claim 2, wherein flanges rigid with said top plate project upwardly therefrom, parallel axles are releasably secured to said

flanges, and said first-mentioned rollers are supported on the ends of said axles.

4. The top roller assembly defined in claim 2, wherein parallel axles are disposed between and releasably secured to said plates, and said first-mentioned rollers are supported on the ends of said axles.

5. A top roller assembly for guiding the movement of a door comprising a roller housing having top and bottom plates, parallel axles extending transversely of said housing at the ends thereof and disposed between said plates, fasteners extending through said axles and plates for releasably securing said axles to said plates, said fasteners projecting beneath said bottom plate for ready access thereto, rollers on the ends of said axles engageable with a track extending in the direction of door movement to support said roller assembly for movement along the track, guide rollers between said plates, shafts extending between said plates at right angles to said axles and rotatably supporting said guide rollers between said axles in positions such that their peripheries project beyond the side edges of said plates for engagement with a guide to laterally guide said roller assembly, said shafts being freely slidable in apertures in said plates for ready assembly and disassembly, keeper bars on the underside of said bottom plate releasably locking said shafts in assembled relation, fasteners releasably securing said keeper bars to said bottom plate, said second-mentioned fasteners being readily accessible from the underside of said roller assembly, an arm beneath said housing for attachment of one end thereof to the door, a bracket on the underside of said bottom plate, fasteners readily accessible from the underside of said housing releasably securing said bracket to said bottom plate, and means pivotally connecting the other end of said arm to said bracket.

6. A top roller assembly for guiding the movement of a door comprising a roller housing having top and bottom plates, parallel flanges rigid with said top plate extending transversely of said housing and projecting upwardly from said top plate in spaced relation longitudinally of said housing, parallel axles above said top plate extending along said flanges at the remote sides thereof, fasteners accessible from the ends of said housing releasably securing said axles to said flanges, rollers on the ends of said axles engageable with a track extending in the direction of door movement to support said roller assembly for movement along the track, guide rollers between said plates, shafts extending between said plates at right angles to said axles and supporting said guide rollers in positions such that their peripheries project beyond the side edges of said plates for engagement with a guide to laterally guide said roller assembly, said shafts being freely slidable in apertures in said plates for ready assembly and disassembly, keeper bars on the underside of said bottom plate releasably locking said shafts in assembled relation, fasteners releasably securing said keeper bars to said bottom plate, said second-mentioned fasteners being readily accessible from the underside of said roller assembly, an arm beneath said housing for attachment of one end thereof to the door, and means pivotally connecting the other end of said arm to said housing.

7. A top roller assembly for guiding the movement of a door comprising a roller housing, longitudinally spaced parallel axles extending transversely of said housing, fasteners engaging said axles and said housing for releasably mounting said axles on said housing, said axles being mounted adjacent the ends of said housing and when released being capable of separation therefrom in a longitudinal direction with respect thereto, said fasteners extending beneath said housing for ready access thereto, rollers on the ends of said axles engageable with a track extending in the direction of door movement to support said roller assembly for movement along the track, means on said roller assembly cooperable with a guide for laterally guiding the same, an arm beneath said housing for attachment of one end thereof to the door, and means pivotally attaching the other end of said arm to said housing.

8. A top roller assembly for guiding the movement of a door comprising a roller housing, longitudinally spaced parallel axles extending transversely of said housing, fasteners engaging said axles and said housing for releasably mounting said axles on said housing, said axles being mounted on top of said housing adjacent the ends thereof and when released being capable of separation therefrom in a longitudinal direction with respect thereto, said fasteners being readily accessible from the ends of said housing, rollers on the ends of said axles engageable with a track extending in the direction of door movement to support said roller assembly for movement along the track, means on said roller assembly cooperable with a guide for laterally guiding the same, an arm beneath said housing for attachment of one end thereof to the door, and means pivotally attaching the other end of said arm to said housing.

9. A top roller assembly for guiding the movement of a door comprising a roller housing, longitudinally spaced parallel axles extending transversely of said housing, fasteners engaging said axles and said housing for releasably mounting said axles on said housing, rollers on the ends of said axles engageable with a track extending in the direction of door movement to support said roller assembly for movement along the track, means on said roller assembly cooperable with a guide for laterally guiding the same, said axles being mounted adjacent the ends of said housing and when released being capable of separation therefrom in a longitudinal direction, said fasteners being in positions enabling ready access thereto, and means on said housing adapted to be attached to the door.

10. A top roller assembly for guiding the movement of a door comprising a roller housing, longitudinally spaced parallel axles extending transversely of said housing, said axles being releasably mounted on said housing adjacent the ends thereof and when released being capable of separation from the housing in a longitudinal direction, rollers on the ends of said axles engageable with a track extending in the direction of door movement to support said roller assembly for movement along the track, means on said roller assembly cooperable with a guide for laterally guiding the same, and means on said housing adapted to be attached to the door.

11. A top roller assembly for guiding the movement of a door comprising a roller housing having top and bottom plates, parallel axles extending transversely of said housing adjacent the ends thereof and disposed between said plates, means for releasably securing said axles to said plates, said releasable securing means comprising vertical fasteners extending through said axles and said plates and projecting beneath said bottom plate for ready access thereto, rollers on the ends of said axles engageable with a track extending in the direction of door movement to support said roller assembly for movement along the track, means on said roller assembly cooperable with a guide for laterally guiding the same, an arm beneath said housing for attachment of one end thereof to the door, and means pivotally attaching the other end of said arm to said housing.

12. The roller assembly defined in claim 11, wherein said guiding means on said roller assembly includes guide rollers between said plates the peripheries of which project laterally beyond the sides of said plates for engagement with the aforesaid guide, and shafts rotatably supporting said guide rollers and extending between the housing plates at right angles to said axles.

13. The roller assembly defined in claim 12, wherein said shafts are freely slidable in apertures in said plates for ready assembly and disassembly, keeper bars on the underside of said bottom plate are provided to lock said shafts in assembled relation with said plates, and re-

leasable means accessible from the underside of said housing secure said keeper bars in place.

14. The roller assembly defined in claim 13, wherein the means for pivotally attaching the said other end of said arm to said housing includes a bracket, and releasable means for securing said bracket to said bottom plate.

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