Dec. 27, 1966 L. M. HENNING 3,293,801

APPARATUS FOR MOUNTING SLIDING DOORS

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FIG. 1.

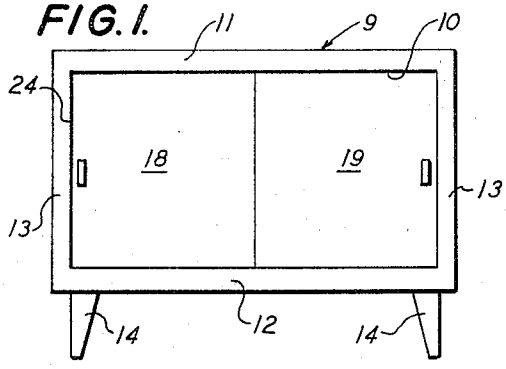



FIG. 2.

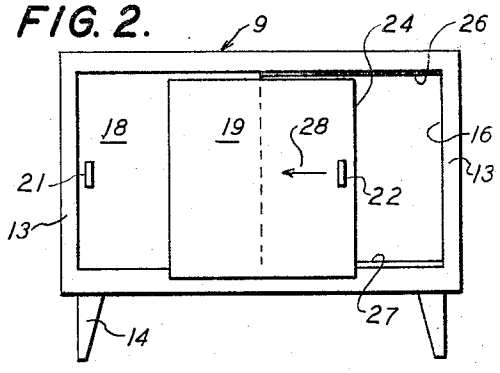



FIG. 3.

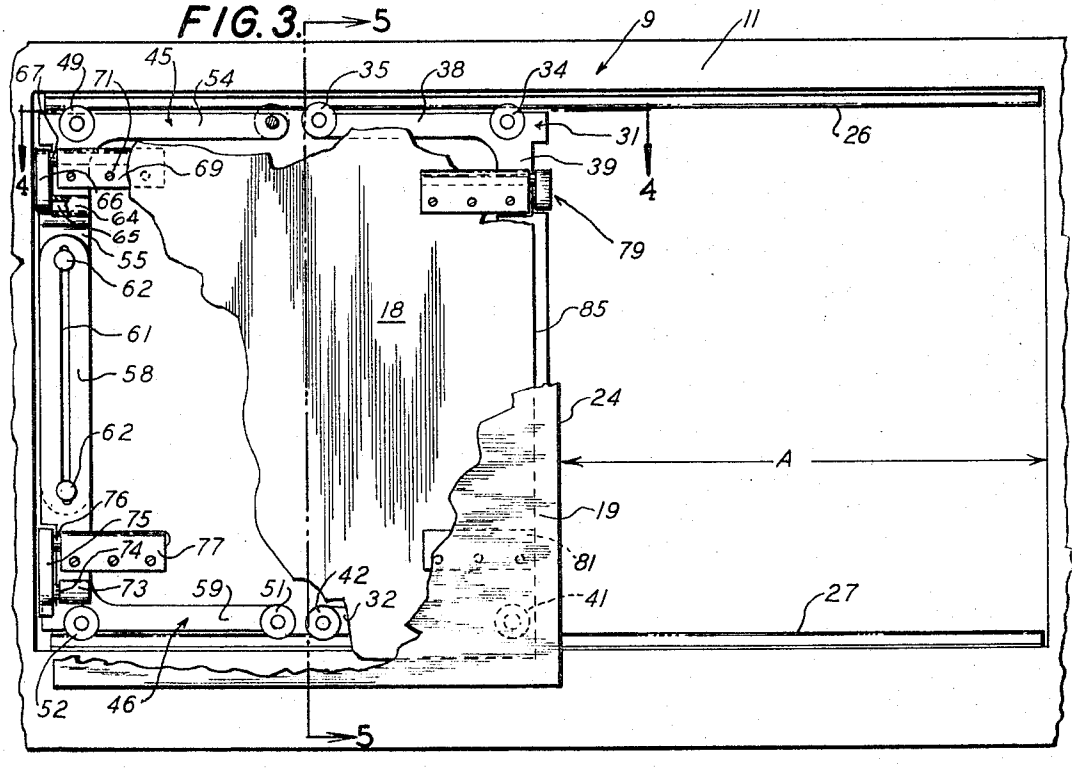
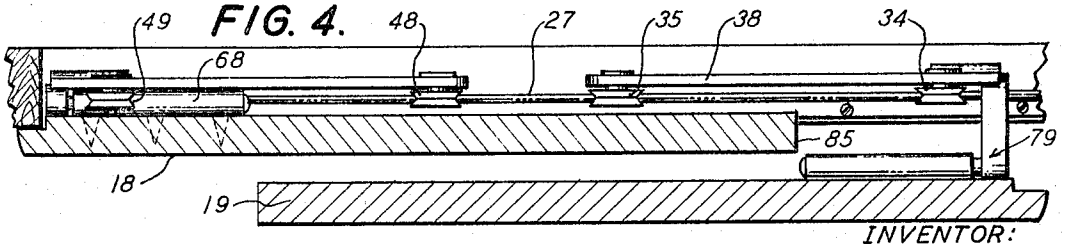



FIG. 4.




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FIG. 5.

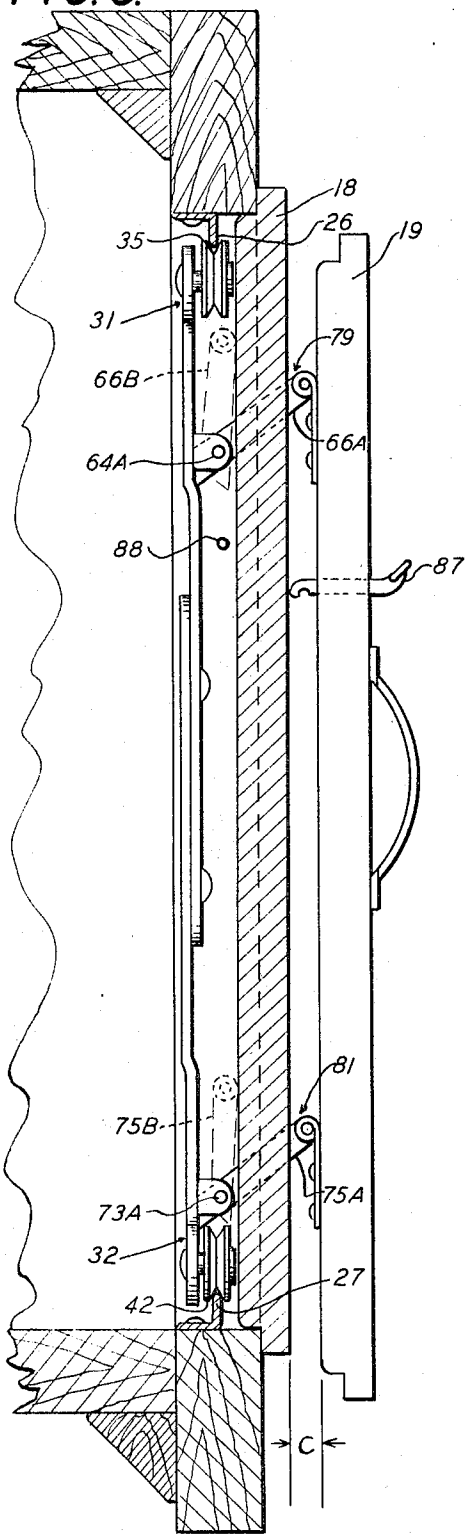
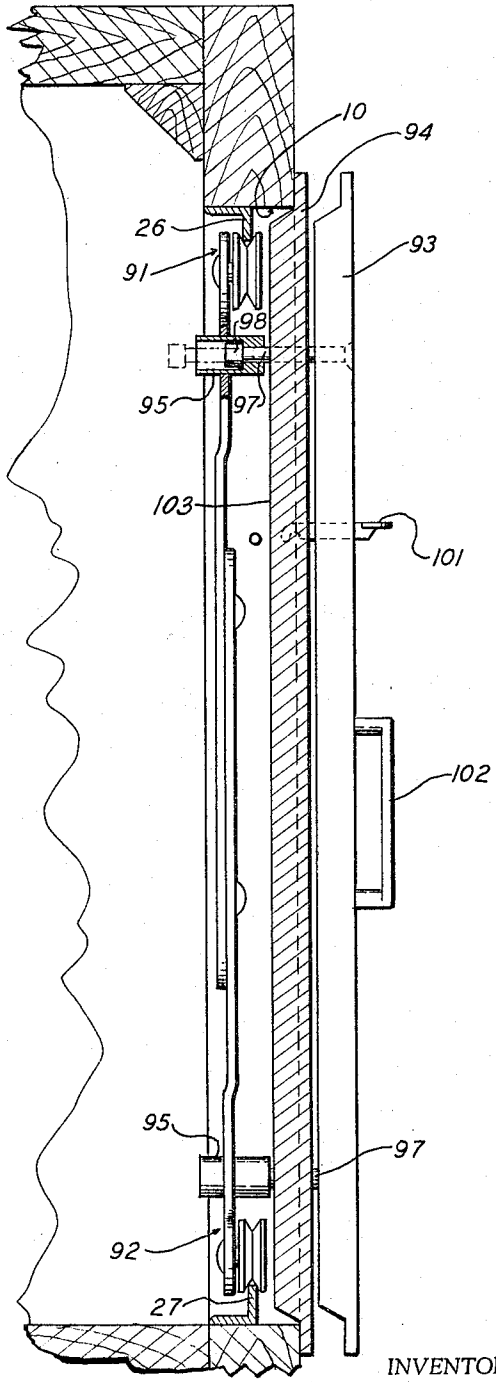



FIG. 6.




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# APPARATUS FOR MOUNTING SLIDING DOORS

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1 Claim. (Cl. 49—130)

The invention relates to apparatus for mounting sliding doors, and more particularly to such apparatus for doors that bypass one another to open.

Sliding doors in cabinets and entryways are old in the art. Many suspension and guiding systems have been devised in the past to promote easy movement and precise closure of movable doors. However, most of the devices conventionally in use require a separate track for each door of the closure. I have invented mounting means for sliding doors that requires a single rail for two sliding doors and by means of which either of the doors may be moved to open one-half of the access way and bypass the stationary door.

The invention contemplates mounting apparatus for sliding doors that comprises an upper track and a lower track, and a door carriage for each of the sliding doors that is movable along the tracks. Preferably, the upper and lower tracks are parallel, and each may be fixed to the frame of the doorway opening. Each door carriage extends along the tracks approximately one-half the width of the door. First connecting means link the top of the door to the carriage and second connecting means link the bottom of the door to the carriage. The top and bottom connecting means are so articulated that the connected door is suspended or supported from the carriage at either a closed position near the tracks or at an opening position horizontally displaced from the tracks.

Preferably, the connecting means on each door comprises a link hingedly fastened to the carriage at one end and to the inner face of the door at the other. The hinge points are such that when the door is displaced toward the tracks in closed position the downward thrust of the door weight tends to keep the door closed.

In operation, a pull knob on the exterior of the door is pulled outwardly from the tracks, displacing the door from the carriage sufficiently to enable the door to move horizontally exteriorly of the static second door which closes the access way. Obviously, the position of the connecting means with respect to the carriage and the vertical door edge is important, since this positioning determines the extent to which one door may overlap the other. The connecting means therefore are preferably narrow in the direction the tracks extend.

The mounting apparatus of the invention is, therefore, not limited as to doorway sizes. One-half of a door opening is completely unobstructed when one of a pair of doors mounted in accordance with the invention is moved to its limit. While the mounting apparatus of the invention is best utilized for the doors of doorways wherein two passing doors are used, the invention has limited use for doorways closed by a single door. Where the door is extremely light, this latter use prvides an unobstructed passageway in the doorway equal to about three-quarters or more of the doorway opening.

These and other advantages of the invention are apparent from the following detailed description and drawing in which:

FIG. 1 is a front elevation of a storage cabinet having doors mounted in accordance with the invention;

FIG. 2 illustrates in a front elevation the cabinet of FIG. 1 with one of the doors partly opened;

FIG. 3 is a fragmentary front elevation, partly broken away, and showing the full open position of the doors;

FIG. 4 is a plan section taken along line 4—4 of FIG. 3;



FIG. 5 is a fragmentary sectional elevation taken along line 5—5 of FIG. 3; and

FIG. 6 is a fragmentary sectional elevation similar to FIG. 5 and showing an alternate embodiment of the invention.

In the embodiment shown in FIGS. 1–5, a storage cabinet **9** has a doorway **10** defined by a front framing member **11**, a lower framing member **12**, and side framing members **13**. The cabinet is supported upon legs **14**. The doorway is closed by two similar doors **18, 19**. When in the closed position of FIG. 1, doors **18** and **19** are coplanar.

Each door has an exterior handle **21, 22**. The handles are preferably near a vertical door edge **24** adjacent the side framing members **13**. As shown in FIG. 2, when exterior handle **22** of door **19** is pulled outwardly, door **19** is displaced and supported away from the upper and lower tracks **26, 27**, respectively, and may be moved past door **18** leftwardly, as shown by an arrow **28** in FIG. 2.

In FIG. 3 door **19** is shown fragmentarily. The door is positioned at its extreme leftward displacement. The leftward displacement leaves open the interval A between edge **24** of the door and the inner surface of framing member **13**. Interval A approximates one-half of the doorway horizontal width.

Door **19** is supported by an upper carriage **31** and a lower carriage **32**. Upper carriage **31** has a pair of grooved rollers **34, 35** that roll along track **26**. The rollers are rotatably mounted to a horizontal carriage arm **38** that extends horizontally from a vertical connector **39**. Lower carriage **32** has a similar grooved roller pair **41, 42** that ride on track **27**.

Door **18** is shown fragmentarily in FIG. 3. It is supported by an upper carriage **45** and a lower carriage **46**. Upper carriage **45** has two grooved rollers **48, 49** that roll along track **26**. Similar grooved rollers **51, 52** of carriage **46** ride on track **27**.

Upper carriage **45** has a horizontal carriage arm **54**. The mount extends inboard of the track **26**. A vertical connector **55** extends downwardly from arm **54**. The vertical connector overlaps a similar vertical lower connector **58** extending upwardly from a lower carriage arm **59** of lower carriage **46**. Each vertical connector has an elongate slot such as the slot **61** in connector **58**. Binding means, such as fasteners **62**, extend through the slots and lock the two vertical members of the carriages together in adjustable fashion. By loosening the fasteners the relative vertical space between upper and lower carriages can be adjusted. Thus the same carriage pair can be used with doors of different heights.

Upper carriage **45** has a pin boss **64** fixed to its outboard surface below roller **49**. A pivot pin **65** extends from the boss toward frame member **13** of the doorway frame. A link **66** is fixed to the pivot pin at its lower end. A second pin **67**, parallel to pivot pin **65**, extends from the link through a loop **68** of a hingle leaf **69**. The hinge leaf is fixed by suitable means such as screws **71** to the inside of door **18**.

A boss **73** extending outboard from vertical connector **58** of carriage **46** supports a pivot pin **74**, a link **75**, a second pin **76**, and a hinge leaf **77**, all of which elements are like those described with respect to carriage **45**. Hinge leaf **77** is secured to the inside face of door **18**. Similar linkage assemblies **79, 81** support door **19** from its upper and lower carriages **31, 32**.

Turning now to FIG. 5, static door **18** is shown in the same position it occupies in FIG. 3. Door **19** is again in open position cantilevered by linkage assemblies **79** and **81** from the vertical connectors of carriages **31, 32**. The respective links **66A, 75A** of carriages **31** and **32** extend almost horizontally from their respective pivot bosses **64A, 73A**. Such extension displaces door **19** outwardly

away from tracks **26**, **27** such that an interval indicated by the dimension C exists between the inner face of door **19** and the outer face of door **18**. When door **19** is thrust leftwardly in FIG. 3, door **19** passes outside of door **18** limited in its leftward movement only by eventual contact between the links **66A**, **75A** and an edge **85** of door **18**.

When a door is in static, or closed, position, the links of the linkage assemblies occupy the position shown in FIG. 3 by links **66** and **75** and the dotted lines **66B**, **75B** of FIG. 5. The substantially vertical orientation of the links extending directly above their respective pivot pins tends to keep the door in closed position, since there is no outward resultant from the weight of the door. The door may be additionally secured by a latch **87** engaging a pin **88** in framing member **13**.

Obviously, in most situations, there will be one static and one moving door. With the apparatus of the invention either door may have either status. When door **19** is closed, door **18** may be pulled outwardly and the carriages **45**, **46** rolled along the tracks to displace door **18** rightwardly, as shown in FIGS. 1–3, to create an opening at the left portion of doorway **10**.

The grooved rollers guide along the track, and are engaged thereon sufficiently to prevent inward or outward displacement of the rollers and the carriage with respect to the tracks. Therefore, the only transverse motion of the door with respect to the opening is that made possible by the support linkage.

The span between rollers on a carriage arm should be as close as possible to one-half the width of the door. With doors of conventional weight this span is sufficient for stability. The carriage arm thus need only equal one-half the door width in horizontal extent, and the two carriages of the two doors on a track occupy only one-half of the track length.

FIG. 6 shows in vertical section an alternate embodiment of the invention wherein upper and lower carriages **91**, **92**, respectively, support a door **93**. The door is displaced outwardly from tracks **26**, **27** of a doorway **10** sufficiently to pass a temporarily static door **94**. The carriages are substantially identical to those described with respect to the previous embodiment. However, in place of the pivot boss, link and hinge leaf of the previously described embodiment, the embodiment of FIG. 6 employs a support collar **95** on each vertical connector of a carriage. Each support collar extends through the connector transversely to the run of the track. A pin **97** is slidably engaged within the support collar. An enlarged end **98** on the inboard end of each pin limits outward extent of the pin. The outer end of the pin is secured to the door. The door may have a latch **101** and an exterior handle **102**.

The embodiment of FIG. 6 is operated by pulling the first door **93** to be moved outwardly from the tracks. The pins slide within the support collars and the door is supported away from the framed opening a sufficient distance to clear the outer face of the static door. The moving door is then thrust longitudinally along the tracks. Longitudinal motion is limited by contact between the pins **97** and the inner edge **103** of the static door.



The second door **94** is similarly mounted and may be moved in the fashion described when first door **93** is returned to static position.

The invention permits sliding doors in a single frame to be flush or coplanar when closed and yet be displaced so that one-half of the doorway may be open at either side of the doorway, as desired. The apparatus of the invention is easily adapted to various doors and doorways and may be combined with conventionally framed doorways. Many variations will occur to those skilled in the art, within the scope of invention. Therefore, the scope of the invention is not limited to the illustrative embodiments but is rather defined by the appended claim.

I claim:

Mounting apparatus for a first and a second sliding door movable within a framed opening and comprising a first track fixed at the bottom of the framed opening, a second track fixed at the top of the framed opening and extending parallel to the first track, a first upper wheeled carriage adapted to move longitudinally on the upper track, a first lower wheeled carriage adapted to move longitudinally on the lower track, each of said second carriages extending along the tracks approximately one-half the width of a door, vertical means connecting the first upper and the first lower carriages, first support means extending between the first sliding door and the first wheeled carriages, said support means being adapted selectively to displace the first sliding door outwardly from the wheeled carriages and the framed opening so as to pass the second sliding door when the second door is in static position within the framed opening, a second upper wheeled carriage adapted to move longitudinally on the upper track, a second lower wheeled carriage adapted to move longitudinally on the lower track, each of said second carriages extending along the tracks approximately one-half the width of a door, vertical means connecting the second upper and lower carriages, and second support means extending between the second sliding door and the second upper and lower carriages, said second support means being adapted selectively to displace the second sliding door outwardly beyond the first sliding door when the first sliding door is in static position within the framed opening the first and second carriage pairs being linked by the support means to their respective doors so as to be positioned at the remote ends of the doors whereby the carriages of the one door do not meet the carriages of the other door when one door passes another.


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