May 3, 1932. L. A. BITTORF 1,856,235

SLIDING DOOR STRUCTURE

Filed July 17, 1930

Fig. 1.

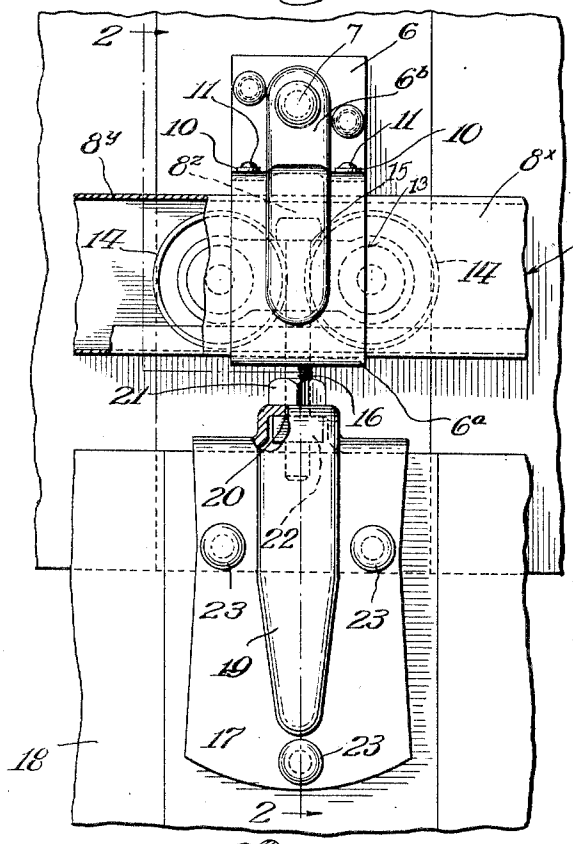



Fig. 2.

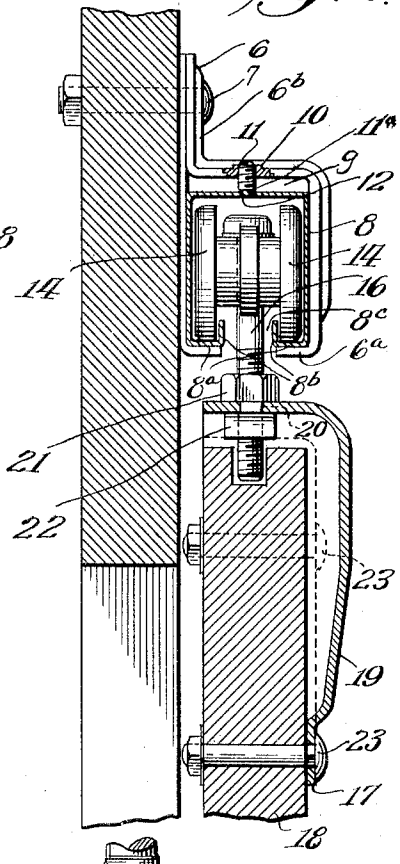



Fig. 3.

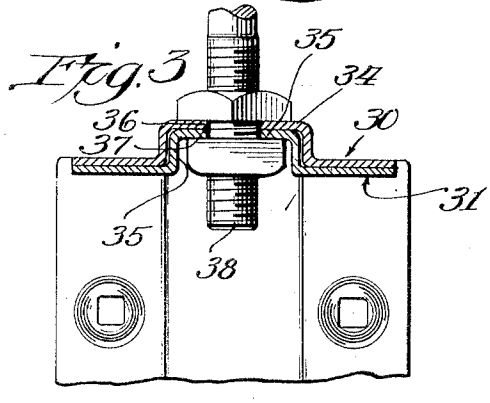
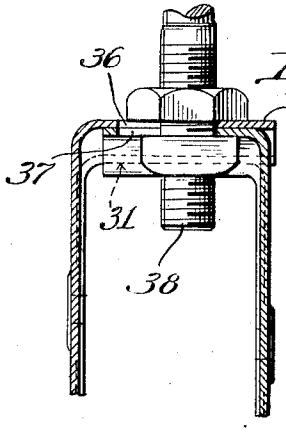



Fig. 4.




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# UNITED STATES PATENT OFFICE

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## SLIDING DOOR STRUCTURE

Application filed July 17, 1930. Serial No. 468,477.

My invention relates generally to sliding door structure and has to do particularly with means for supporting the door and moving it along a track. This application is a continuation in part of my copending application, Serial No. 196,670, filed June 6, 1927, for sliding door structure.

One of the objects of my invention is to provide for so adjustably connecting the door to the carriage supporting structure that in the event of sagging or warping, or the like, the door may be readily and quickly adjusted without disturbing the already-assembled parts. To this end, I employ a strong and durable bracket for direct connection to the door and an adjustable connection between this bracket and the carriage structure, the bracket being of such form and construction as to aid in and permit of adjustment of the parts without removal of the bracket, which construction also adds to the strength and efficiency and durability of the bracket itself.

Other objects and advantages will become apparent as this description progresses and by reference to the drawings, wherein,—

Figure 1 is a front elevational view, partially in section, of one form of structure embodying my invention;

Fig. 2 is a transverse sectional view taken substantially on line 2—2 of Fig. 1;

Fig. 3 is a sectional view of a modified form of door hanger embodying my invetnion; and

Fig. 4 is a transverse sectional view of the structure shown in Fig. 3.

Referring to the drawings, and particularly to Fig. 1, I may employ a bracket 6 formed, preferably, but not necessarily, of two pieces secured together as by the rivets 7, the bracket being substantially of the shape as shown in Fig. 2 and having the inwardly projecting flanges $6^a$ upon which the track 8 is carried. This bracket 6 is also provided with a centrally disposed rib $6^b$ which adds greatly to its strength and durability.

The rectangularly shaped track 8 has internal trackways $8^a$ with the upturned confining flanges $8^b$. The space $8^c$ between the flanges $8^b$ is for a purpose which will become obvious later. The track is, preferably, formed by a plurality of sections $8^x$ and $8^y$ joined end to end as at $8^z$ to form a complete track. In the assembly of the track sections, the ends thereof are brought together within and are supported by the bracket 6. For obvious reasons, there is clearance between the track 8 and the bracket 6 as indicated at 9 in Fig. 2. To anchor these meeting track ends in such a way that they will be positively fixed and maintained in a definite joined position so that they will always present a smooth track surface, I provide the top portion of the bracket 6 with external bosses 10 having threaded openings passing therethrough and adapted to receive the set screws 11. The screws 11 pass through the top of the bracket 6 at substantially its central portion and have their inwardly projecting ends tapered to a sharp point as at $11^a$. Openings 12 are provided in the top of the track adjacent each meeting end and in alignment with the openings in the bosses 10. These openings, which are smaller in diameter than the screws 11, receive the tapered ends $11^a$ of such screws.

To adjust and fix the adjoining track ends in the desired position, they are moved to the abutting position shown in Fig. 1, whereupon the screws 11 are screwed inwardly with their tapered ends passing through the openings 12, such screws being drawn down tightly to clamp the track against the inwardly extending bottom flanges $6^a$ on the support 6. The screws 11 may be drawn down separately or at the same time and to variable extents so as to insure that each track section is properly anchored and that the joint presents a smooth track surface. If desired, the openings 12 may be omitted so that the sharp ends of the screws 11 will engage and indent the top surface of the track when such screws are adjusted as above set forth.

The carriage structure has a body 13 with wheels 14 adapted to be carried by the track 8 in the usual manner, as shown in Fig. 2. The central portion of the body 13 is provided with a vertical hub 15 adapted to rotatably receive a headed depending support pin 16 which has a threaded portion extending downwardly through the opening $8^c$ of

the track for attachment to the door bracket 17. The bracket 17 is L-shaped and is attached to the door 18 by bolts 23. It is highly desirable to provide for adjustment of the bracket and door because the door may warp or sag making operation of the same difficult or of a highly undesirable nature. It is also desirable to provide means for effecting adjustment to compensate for such warping or sagging without disassembly of the parts in view of the great inconvenience that would be experienced after the structure had been completely assembled and in use. To accomplish this adjustment in accordance with my invention, the bracket 17 is provided with a centrally disposed and hollow longitudinal rib 19. An opening 20 is provided in the horizontal leg of the rib which is adapted to receive the threaded end of the pin 16. The pin 16 may have an exceptionally long threaded portion to take care of adjustments over a wide range so that it projects through the bracket 17 a considerable distance as shown in Fig. 2. In that case, an opening is provided in the adjacent part of the door to receive the inwardly extending end of the pin. In securing the bracket 17 upon the threaded portion of the pin, a lock nut 21 (Fig. 2) is first screwed onto the depending end of said pin. The pin is then passed through the opening 20 and the adjusting nut 22 is applied and drawn up to the desired position. The lock nut 21 is drawn down tightly to lock these parts in position. Adjustment may be readily and quickly accomplished without removal of any of the parts merely by loosening the lock nut 21 to the desired extent and turning the pin 16 in one direction or the other as the adjustment requires. After this adjustment, the lock nut 21 is again tightened up. The rectangularly shaped rib 19 makes possible the adjustment as explained by holding the nut 22 stationary while the pin is turned. This rib is of such a character as to conceal the adjusting nut 22 and pin end to protect such parts from the weather and its deteriorating effects. It further serves to strengthen the bracket 17 and render the same capable of withstanding greater load and adds efficiency over a greater period of time.

In the modified form of structure shown in Figs. 3 and 4, I provide a plurality of L-shaped brackets 30 and 31 which are similar to the bracket 6 of the form of Fig. 1. These brackets have centrally-disposed, hollow ribs 34 and 35 which are of such relative size that the outwardly projecting ribs nest one within the other when the brackets are mounted on the door in the manner illustrated in the drawings. These ribs are provided with longitudinal slots 36, 37 which align with each other in the nested position of the brackets for the reception of the threaded end of the stem 38 depending from the door carriage structure. The brackets are provided with suitable openings for the reception of fastening devices for securing the same to the door on opposite sides of the latter and the door is attached to its carrying-trolley in the same manner as illustrated and described in connection with the form of Figs. 1 and 2. The manner of adjustment, and further operation, of this modified form of structure is the same as that already described in connection with the form of the previous figures.

Although I have shown and described only two embodiments of my invention, it is obvious that various changes in details and arrangements of parts may be made without departing from the spirit and scope of my invention as defined by the claim which follows. It will be further understood that my invention is not limited to use with a sliding door structure as described, but may also be used in conjunction with any sliding panel, or the like, where similar conditions are to be met.

I claim:

An apparatus of the character described, comprising a track, a carriage supported by and movable along said track, a depending connector freely rotatably connected to the carriage, said connector having a threaded end portion and an exposed unthreaded intermediate portion adapted to be engaged for adjusting the connector, a bracket member adapted to be attached to the door, said bracket having a horizontally disposed inwardly projecting portion substantially overhanging the upper edge of the door and a hollow rectangular rib open at one end formed in the horizontally disposed portion of the bracket and adapted to receive the threaded portion of the connector, an adjusting nut positioned within the rib through its open end and engaging a wall of the rib so as to be held against rotation for cooperating with the threads of the connector to adjust said door vertically as the connector is rotated relative to the nut, without disturbing the assembly relation between the carriage and the connector, and a lock nut carried by the connector and engaging the adjacent side of the rib for maintaining the connector and door in their adjusted positions.

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