

July 13, 1948.

A. WARTIAN
DOOR MOUNTING

2,445,131

Filed Aug. 10, 1944

4 Sheets-Sheet 1

Fig. 1.

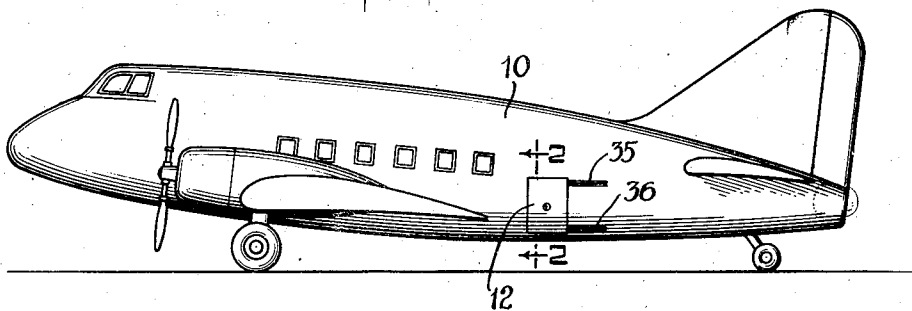
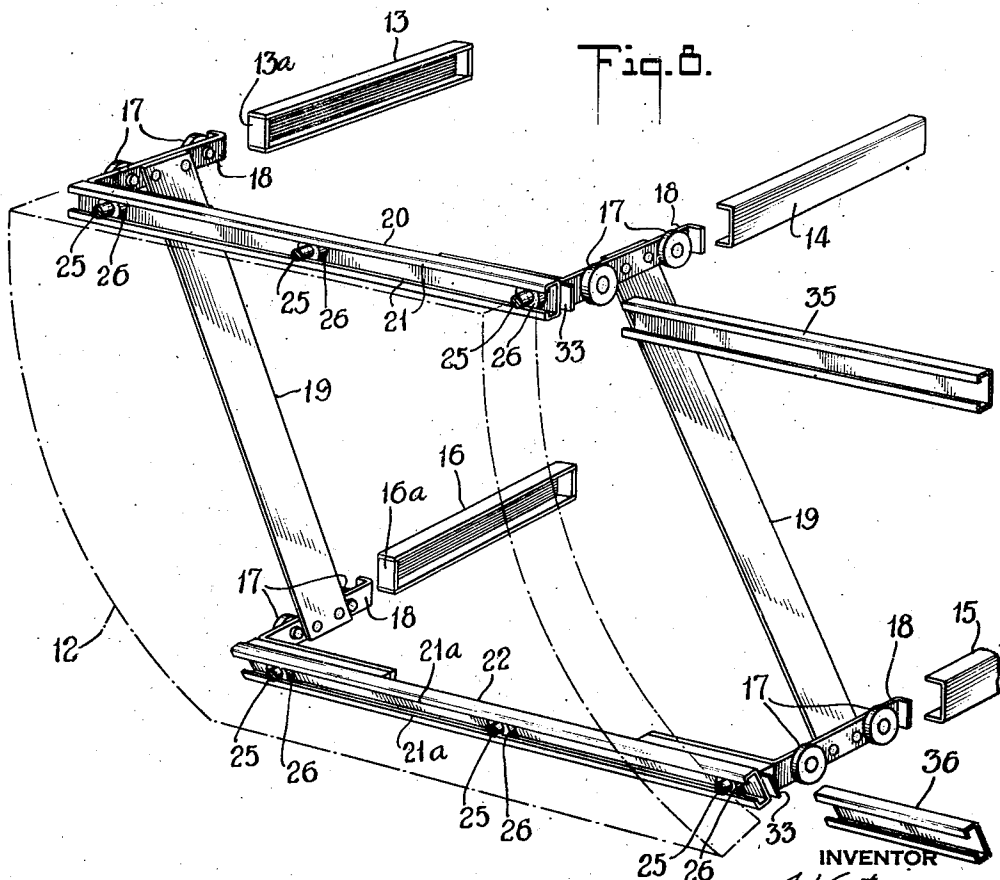


Fig. 8.



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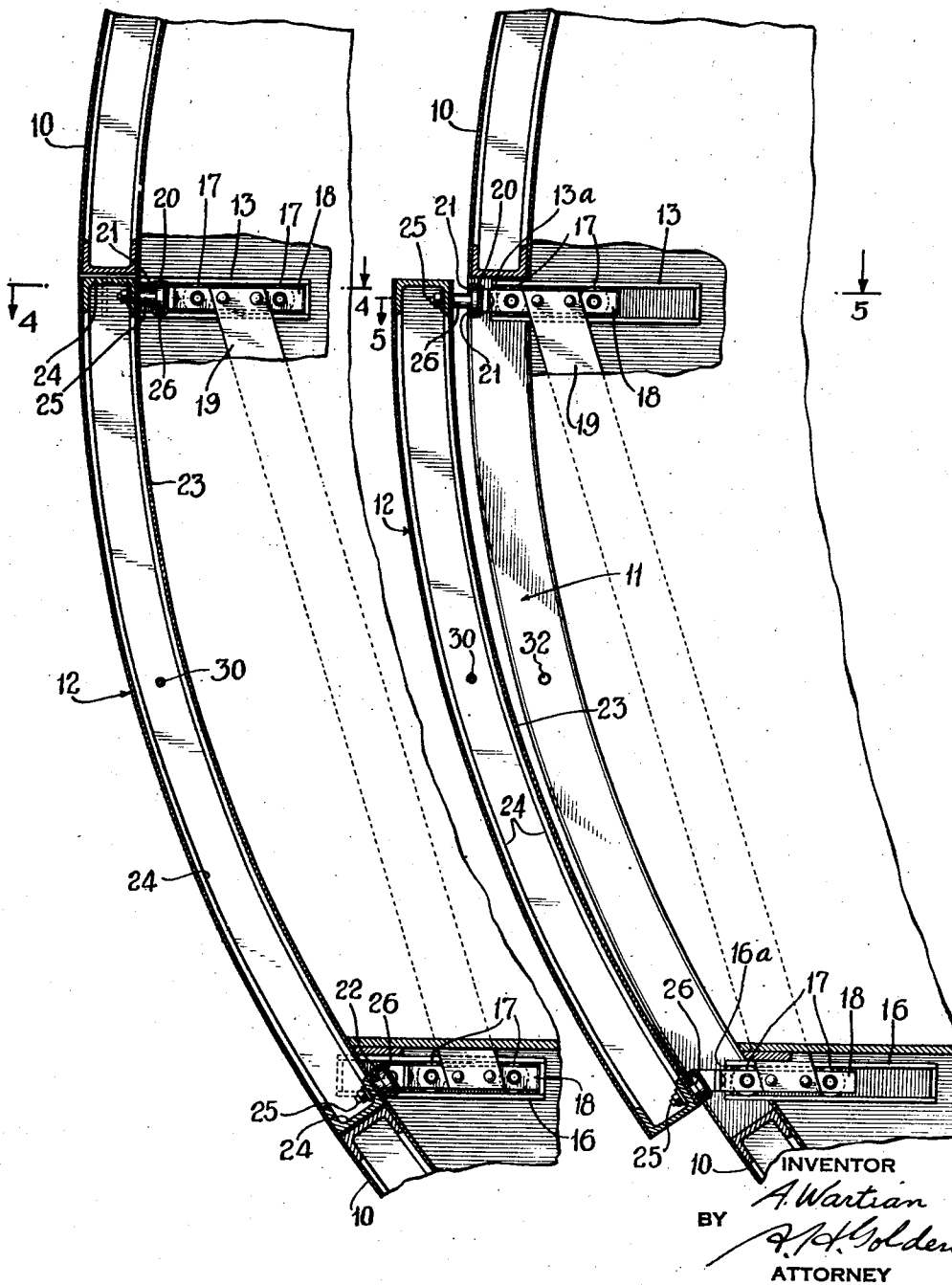
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Fig.2.

Fig. 3.



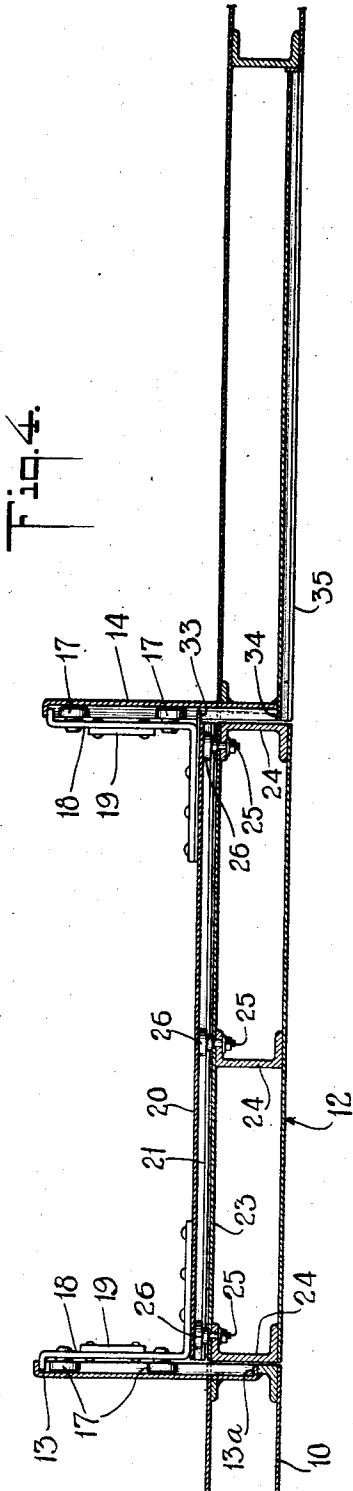
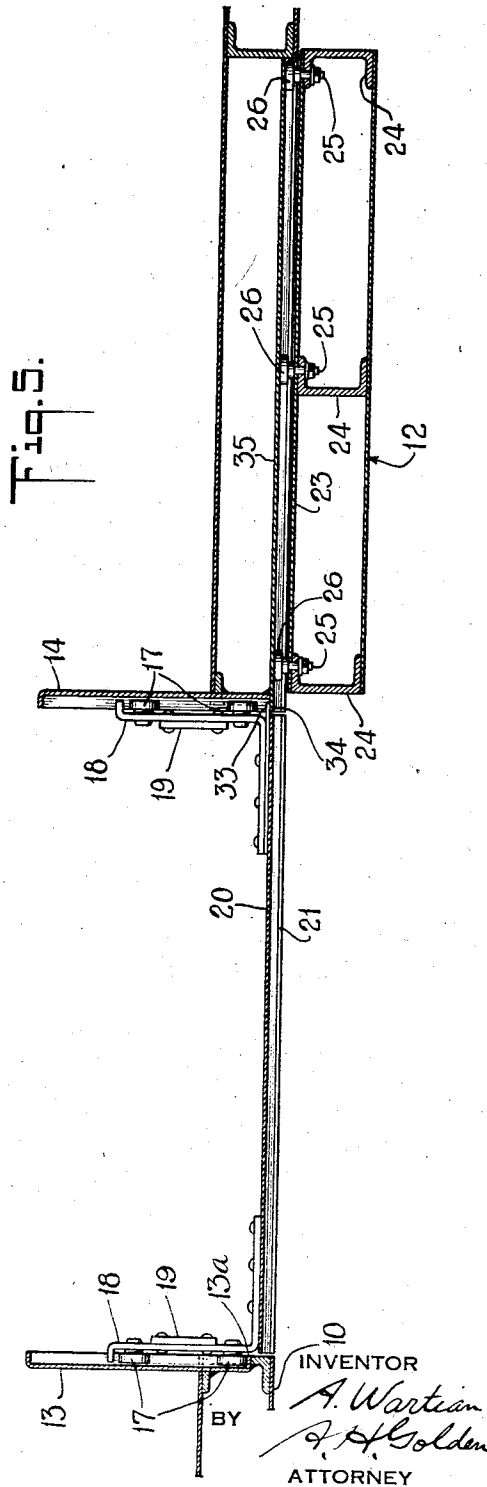
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Fig. 6.

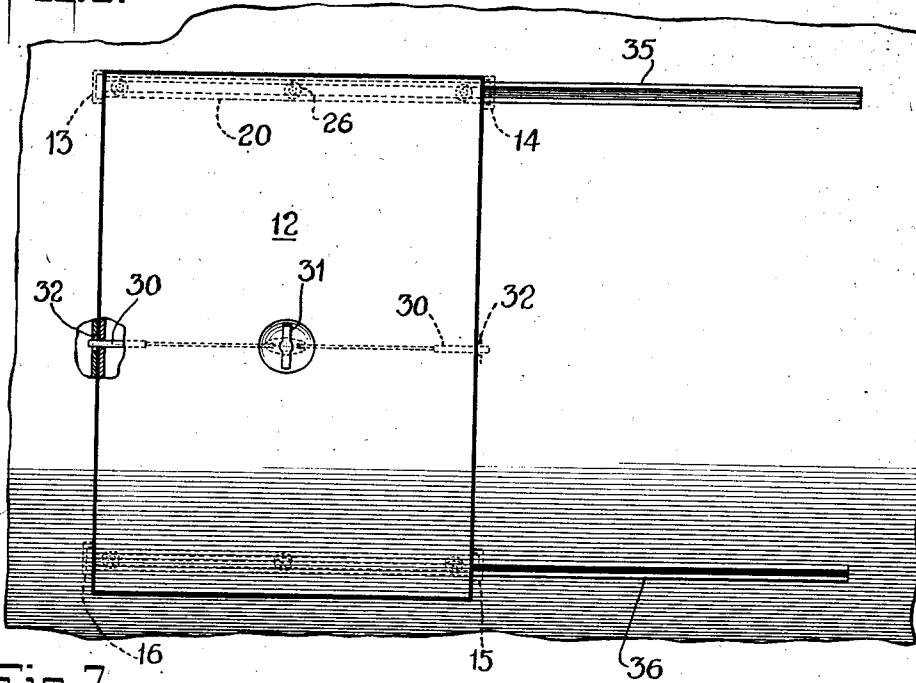
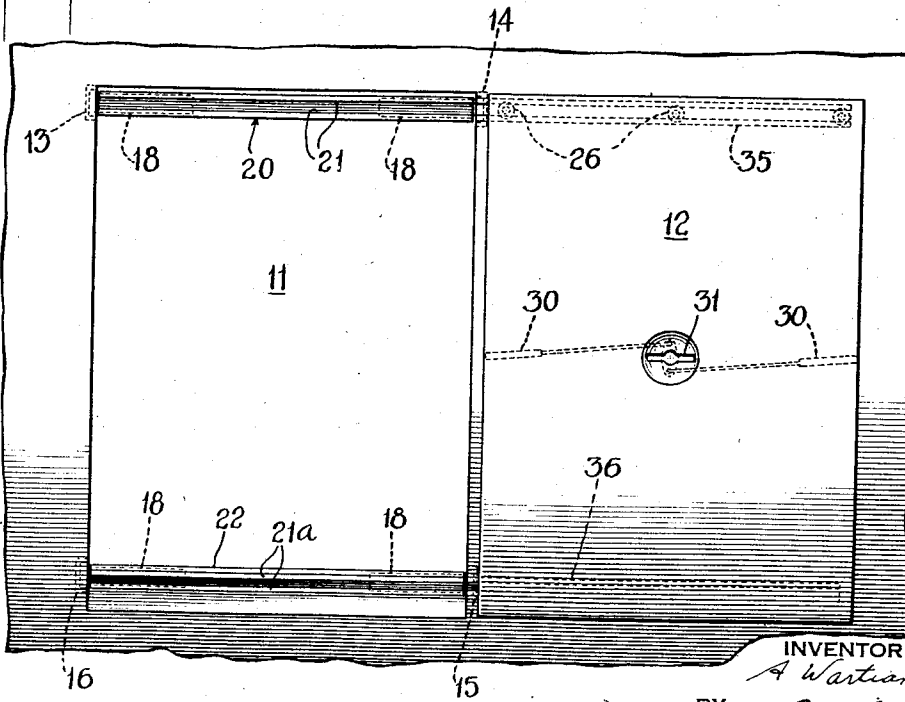


Fig. 7.



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DOOR MOUNTING

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Application August 10, 1944, Serial No. 548,813

4 Claims. (Cl. 244—129)

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This invention relates to mechanism utilized for the mounting of a door on an airplane.

Those skilled in the art appreciate that an airplane door preferably has its exterior surface in streamlined alignment with the outer surface of the fuselage wall when the door is in closed or nested relation to the doorway it is adapted to close. Such mounting of a door may be obtained through the utilization of hinges of the concealed type adapted to mount the door for swinging movement into and out of closed or nested position relatively to the doorway. However, in the modern airplanes now being developed by designers, the fuselage in which the doorway is located is so close to the ground when the airplane has landed, that it is impossible to utilize a swinging door. This is true because of the substantially circular cross-section of the fuselage and the fact that the doorway will be formed in the lower part of the fuselage and with the upper and lower hinges offset vertically so that the door must swing downwardly as well as outwardly to open position. Those skilled in the art will fully appreciate the problem.

It is the object of my invention to contribute a door mounting mechanism that will mount a door for movement into and out of closed or nested relation to a doorway whereby to admit full use of the doorway. It is the further object of my invention to contribute such a door mounting mechanism adapted for use on an airplane fuselage in the manner I have outlined. As a feature of my invention whereby the objects thereof are made possible, I utilize mounting means that maintain the door for inward and outward movement relatively to the doorway of the fuselage, with the door being slidable on the said mounting means to one side of the doorway once the door has been moved outwardly and out of nesting relation relatively to the doorway.

As a more detailed feature of my invention, I utilize means that mount the door for sliding movement, preferably on rollers and trackways, both inwardly and outwardly of the doorway, and to one side of the doorway. As a more detailed feature of this part of my invention, a trackway for the door is mounted on the exterior wall of the fuselage, the door being adapted to slide on the said trackway and also on a trackway that is slidable inwardly and outwardly of the doorway. Obviously, when the two trackways are brought into longitudinal alignment through the movement of the door and one trackway outwardly of the doorway, the door may slide on the other trackway to one side of the doorway.

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I have thus described generally the objects and the more important feature of my invention in order that those skilled in the art may better understand the nature of my invention and its relation to the prior art. It will, of course, be understood that my contribution may be embodied in mechanical means other than those that I shall herein describe and illustrate and that the claims to be granted me should not be limited therefore to the specific embodiment of my invention hereinafter set forth.

Referring now to the drawings, Figure 1 is an elevation of an airplane in which my invention is embodied. Figures 2 and 3 are sections taken along lines 2—2 of Figure 1 showing the door in closed position in Figure 2 and in open position in Figure 3. Figure 4 is a horizontal section taken along lines 4—4 of Figure 2 while Figure 5 is a similar section taken along lines 5—5 of Figure 3, but illustrating the door moved to one side of the doorway.

Figure 6 is an enlarged view of the door shown in Figure 1 with a part of the door cut out to illustrate the lock carried thereby. Figure 7 illustrates the door moved to one side from its position of Figure 6 and into the open position of Figure 5. Figure 8 is an exploded view of parts of my door mounting means.

Referring now more particularly to the drawings, reference numeral 10 indicates the exterior structural wall of the fuselage of an airplane, while reference numeral 11 indicates the doorway formed in the fuselage, as best shown in Fig. 7. Exterior wall 10 may be of any desired thickness and will naturally have inner and outer surfaces suitably held in assembled relation. The door for the fuselage doorway 11 is designated by reference numeral 12 and is adapted to move from a nested or closing relation to the doorway 11 as shown in Figs. 1 and 6, to its open position at one side of the doorway illustrated best in Figs. 5 and 7.

Referring now more particularly to Figs. 2 to 5 inclusive and Fig. 8, the doorway 11 has mounted near each of its four corners a channel formed of sheet metal. The four channels are maintained parallel as best illustrated in Fig. 8 where they bear reference numerals 13, 14, 15 and 16, and are intended preferably to lie substantially horizontally when the plane is on the ground. A pair of rollers 17 is adapted for rolling movement in each of said channels, each pair of rollers 17 being carried by a sheet metal strip 18 formed as illustrated in the drawings.

The upper and lower strips 18 at each side of

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the doorway 11 are connected by vertical and angularly extending connecting bars 19 that may be riveted to the metal strips 18 or otherwise secured as may be desirable. It is important at this point to indicate that the mode of fabrication of the means utilized in my invention is not the essence of the invention; thus, I shall herein describe a preferred method of manufacture of my invention, but that method will change as materials and technological processes progress. The two upper strips 18 are welded or otherwise secured to an upper channel 20 that varies from the channels 13—16 in that it has inwardly projecting retaining flanges 21 whose function will presently be indicated. The lower strips 18 are similarly secured to a second channel 22, the same in construction as upper channel 20.

The door 12 is formed of any suitable construction and its exterior surface is curved as best illustrated in Figs. 2 and 3 so that when the door is in closed position the said exterior surface will form a streamlined extension of the outer surface of the exterior wall 10 of the fuselage. The inner surface of the door 12 is formed of sheet metal designated by reference numeral 23 and is secured in reinforced relation to the outer surface by a series of structural channel members 24. A series of studs 25 are bolted to the channel members 24 and on these studs are mounted three upper rollers and three lower rollers 26.

The rollers 26 are adapted for rolling action in the upper channel 20 and in the lower channel 22 as is, of course, apparent. In addition, the rollers cooperate with the flanges 21 of the upper channel 20 and flanges 21a of the lower channel 22, so as to maintain the door secured to the said channels for inward and outward movement relatively to the doorway 11. Thus, with the door in its closed position of Fig. 2, the channels 20, 22 are maintained in an inward position relatively to the several channels 13—16 through the several rollers 17, but adapted for outward sliding movement on said rollers.

Through a pair of bolts 30 controlled by a handle 31, as best illustrated in Fig. 6, the door may be locked in closed position, the bolts entering holes 32 formed in the metal outlining the doorway 11 of the plane. By rotating the handle 31 and releasing the bolts 30, the door 12 is conditioned for movement from its position of Fig. 2 to its position of Fig. 3. This movement is, of course, obtained through the integral sliding of the door 12, the six rollers 26, the channels 20, 22 and the four strips 18 on the rollers 17 relatively to the channels 13—16. This outward sliding movement may be limited by plates 33 extending from between the strips 18 and the upper and lower channels 20, 22 as is readily seen in Figs. 4 and 5, the said plates impinging on limit surfaces 34. The outward movement of the door may also be limited by the rollers 17 cooperating with the end surfaces 13a and 16a of channels 13 and 16, respectively.

When the door 12 has been moved to the position of Fig. 3, its several rollers 26 become aligned with an upper channel 35 and a lower channel 36. These channels are secured to the exterior wall 10 of the fuselage at one side of the doorway as is best apparent in Figs. 1, 6 and 7, and are of substantially the same construction as the channels 20, 22. It is obvious that the rollers 35 will slide from within the channels 20, 22 into channels 35, 36 so as to carry the door into its open position of Figs. 5 and 7. If it be now desired to

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close the door it is only necessary to slide the door to the left from its position of Fig. 5, whereupon the rollers 26 will leave the channels 35—36 and enter the channels 20, 22 so as to bring the parts to the position of Fig. 3. With the door 12 then in alignment with the doorway 11, the application of pressure to the door will move it and the channels 20, 22 on the rollers 17 of strips 18 to the position of Fig. 2. The bolts 30 may then be utilized to lock the door as best illustrated in Fig. 6.

It will now be perceived that through my invention the door 12 is readily and easily brought into nested relation to the door way, or is moved out of nested relation and completely to one side of the doorway so as not to obstruct its full and complete use. It is also readily seen that despite the fact that the door is mounted at the lower part of the fuselage so as to curve downwardly and inwardly relatively to the center of the fuselage, the movement of the door inwardly and outwardly is on substantially horizontal tracks so that the weight of the door need not be overcome in moving the door from the open position of Fig. 3 to the closed or nested position of Fig. 2. The lengthwise movement of the door relatively to the doorway is also quite simple as is now clear. It is thought that the many advantages inherent in my contribution to the art will now be quite apparent and that no further description of my invention or its operation is now necessary.

I now claim:

1. An airplane fuselage having an exterior wall with a doorway formed therein providing access to the interior of the plane, a door for said doorway, a trackway extending longitudinally of said plane across said doorway, a second trackway extending longitudinally of said plane on said fuselage exterior wall, means mounting said door on said trackways for sliding movement thereon and for movement from one trackway to the other when said trackways are in operating alignment, said means holding said door against endwise movement off said trackways, additional trackways mounted at each side of said doorway extending between the inner and outer surfaces of said exterior wall, and rollers mounting said first trackway on said additional trackways for movement with said door into and out of nesting relation to said door.

2. An airplane fuselage having an exterior wall with a doorway formed therein providing access to the interior of the plane, a door for said doorway, a trackway extending longitudinally of said plane across said doorway, a second trackway extending longitudinally of said plane on said fuselage exterior wall, additional trackways mounted at each side of said doorway extending between the inner and outer surfaces of said exterior wall, rollers mounting said first trackway on said additional trackways for sliding movement inwardly and outwardly relatively to said doorway and positioning said trackway in alignment with said second trackway when said first trackway is moved to a predetermined position relatively to said doorway, and rollers mounting said door for sliding movement on said first and second trackways for movement from one trackway to the other, and for sliding movement with said first trackway inwardly and outwardly of said doorway on said additional trackways.

3. An airplane fuselage having an exterior wall with a doorway formed therein providing access to the interior of the plane, a door for said doorway, and rollers and trackways mounting said

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door for movement inwardly into nested relation to said doorway and outwardly relatively to said doorway and for movement from a position outwardly of said doorway to one side of said doorway.

4. An airplane fuselage having an exterior wall with a doorway formed therein providing access to the interior of the plane, a door for said doorway, a trackway mounted on said exterior wall of said fuselage to one side of said doorway and with its outer surface flush with the outer surface of the fuselage, support means secured to said door whereby it slides on said trackway from a position in alignment with said doorway to a position to one side of said doorway, a second trackway, means mounting said second trackway for movement transversely of said doorway from a position within said doorway to a second position outwardly thereof and into longitudinal alignment with said first trackway, said support

5 means mounting said door also on said second trackway for sliding movement therewith inwardly into nested relation to said doorway and outwardly of said doorway to bring said first and second trackways into longitudinal alignment, said door sliding on said support means relatively to said second trackway and on to said first trackway for movement to one side of said doorway when said trackways are placed in longitudinal alignment.

6

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15 The following references are of record in the file of this patent:

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