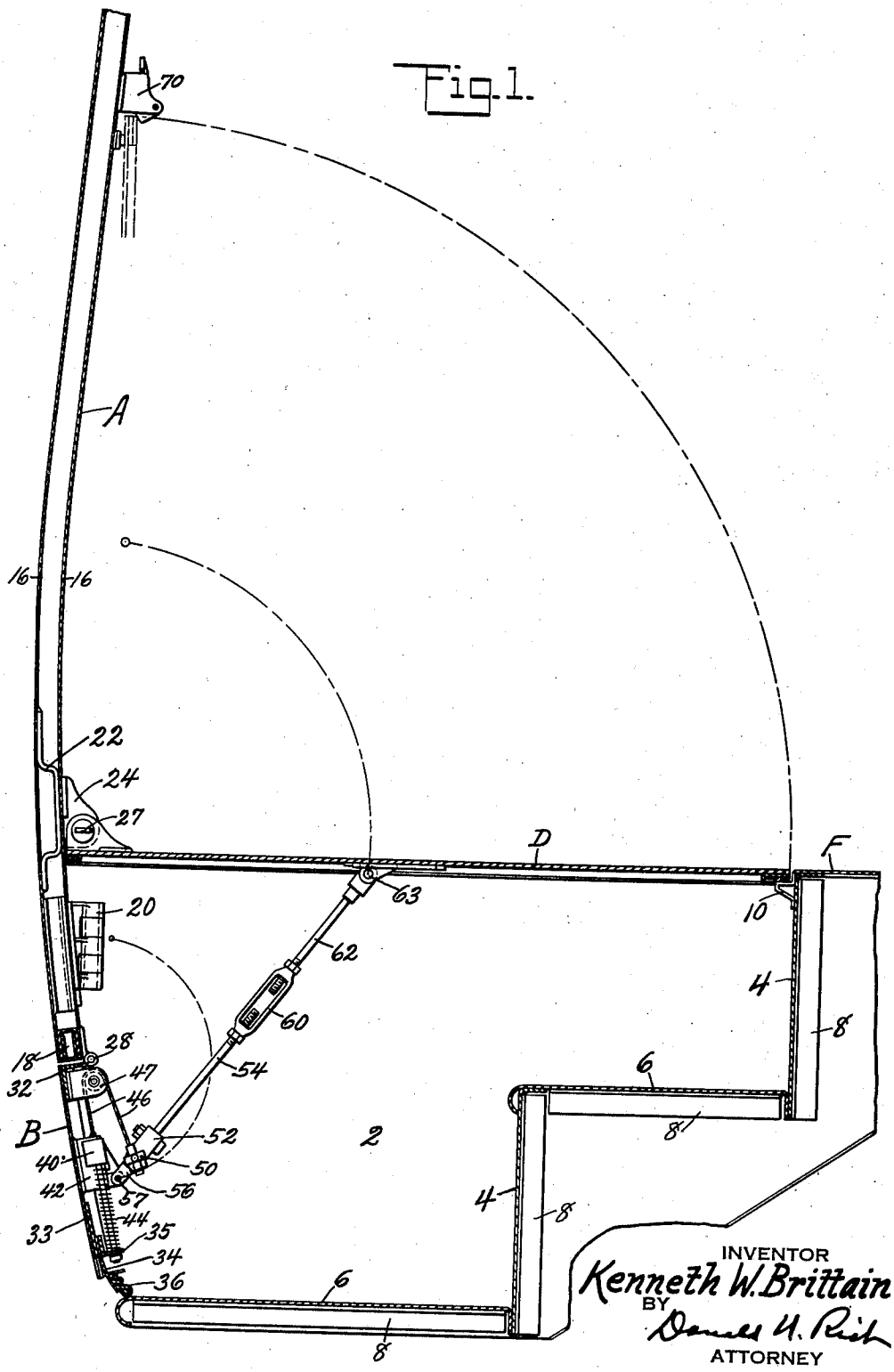
Feb. 20, 1940. K. W. BRITTAIN 2,190,694

CAR SIDE DOOR AND FOLDING SKIRT ARRANGEMENT

Filed Jan. 7, 1939 4 Sheets-Sheet 1

Fig. 1.



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CAR SIDE DOOR AND FOLDING SKIRT ARRANGEMENT

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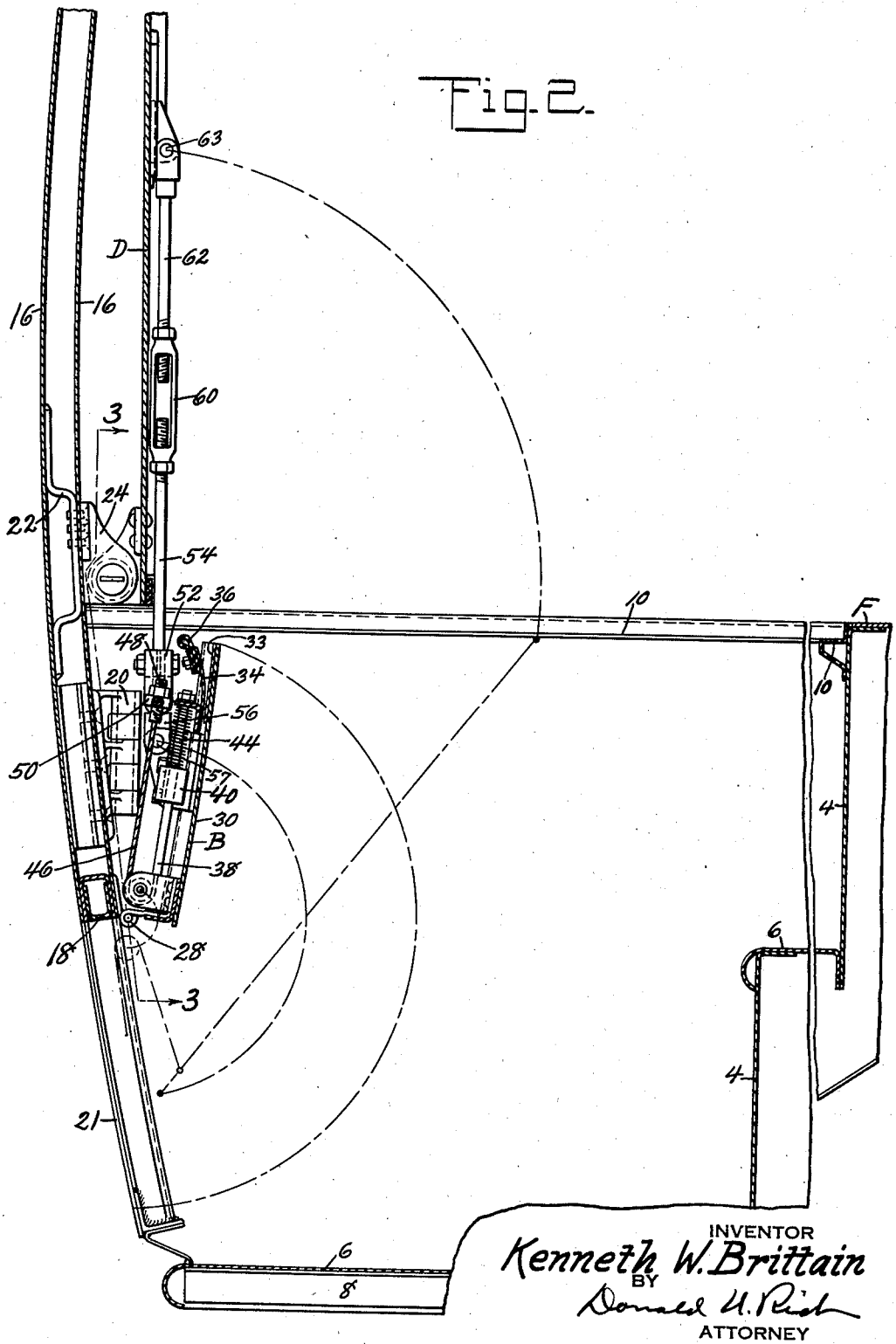
Fig. 2.



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CAR SIDE DOOR AND FOLDING SKIRT ARRANGEMENT

Filed Jan. 7, 1939 4 Sheets-Sheet 3

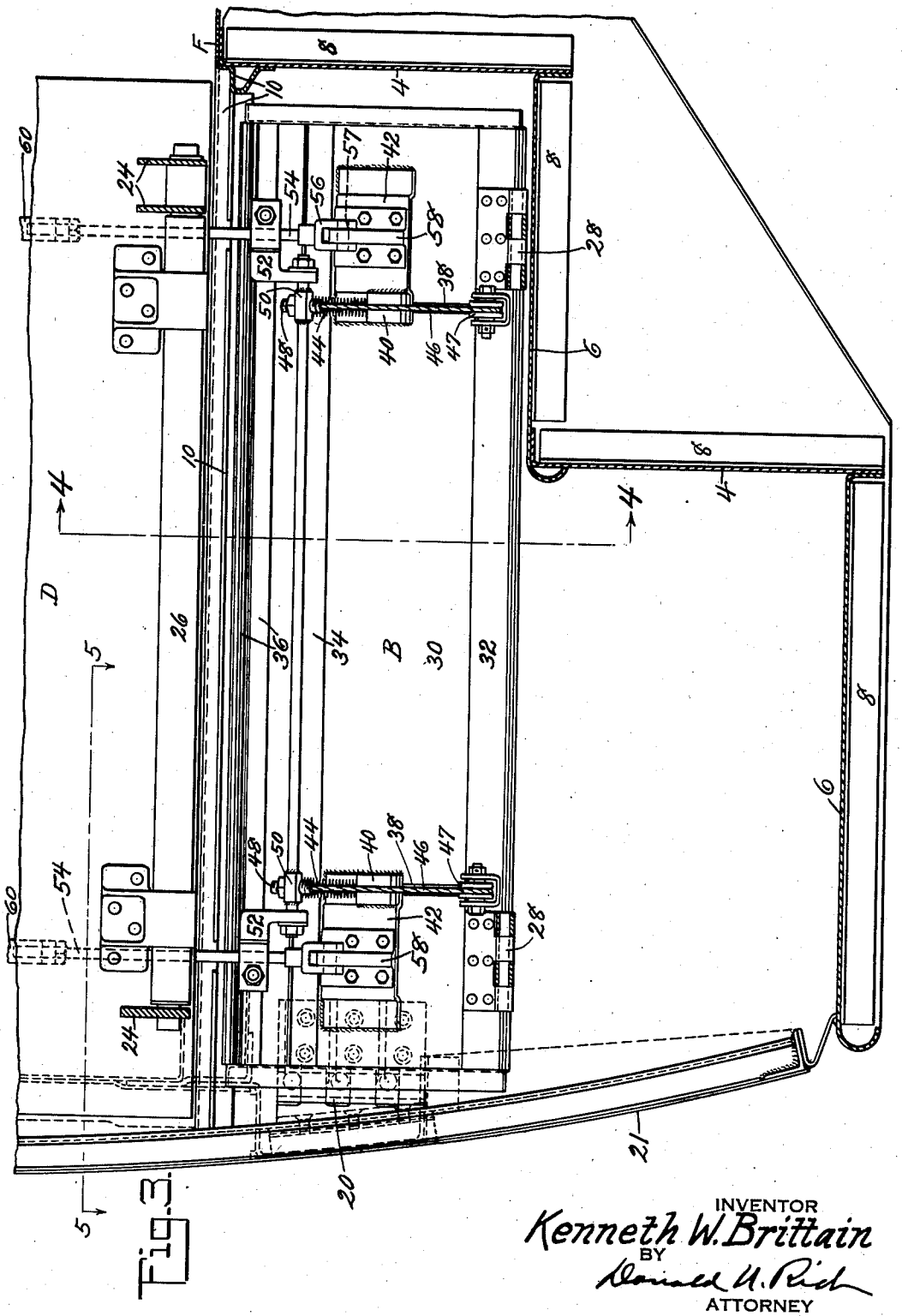

Fig. 3.

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CAR SIDE DOOR AND FOLDING SKIRT ARRANGEMENT

Filed Jan. 7, 1939 4 Sheets-Sheet 4

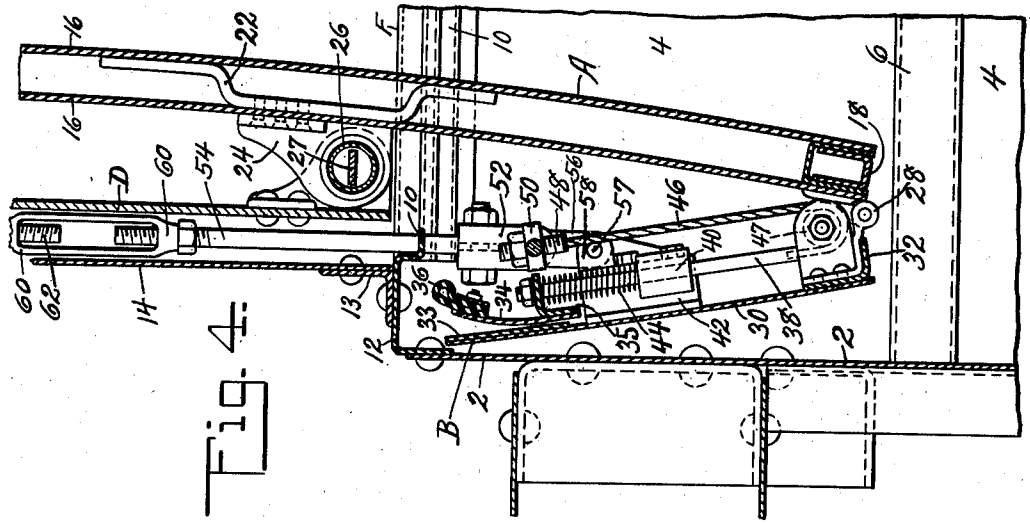

Fig. 4.

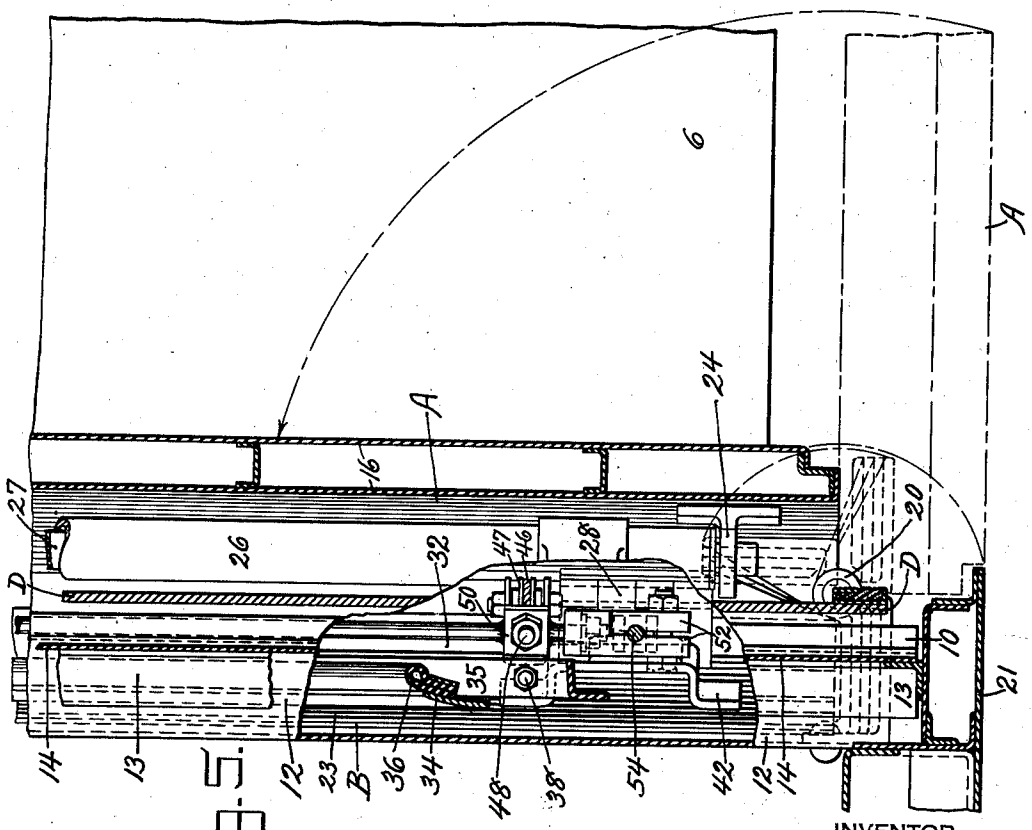

Fig. 5.

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UNITED STATES PATENT OFFICE

2,190,694

CAR SIDE DOOR AND FOLDING SKIRT ARRANGEMENT

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Application January 7, 1939, Serial No. 249,735

15 Claims. (Cl. 105—429)

This invention relates to side doors in general and in particular to side doors for railway cars carrying trap doors and adapted to swing inward into the step well.

In the past the major proportion of cars have been built without any protection between the lower edge of the side door and the lower step tread; in other words, the step well was open leaving an unsightly recess for collection of snow, ice and dirt. Attempts have been made recently to close the step wells by continuations of the skirting being either directly or hingedly connected to the door. In cases where the door was swung inwardly into the step well, together with the hinged skirting, it was necessary that the step risers be made of unequal height. Such unequal height risers have been the cause of frequent accidents to passengers entering or leaving the car. It is an object, therefore, of the present invention to provide a side door with folding skirt and trap door attached in such a manner that the step risers may be of equal height.

A further object of the invention is the provision of a side door swingable into a step well and having the lower part thereof swingable and slidable relative to the door in order to clear the steps.

A still further object of the invention is the provision of a combined side door and trap door swingable as a unit into the passageway and in which the lower part of the side door may swing and slide relative to the door in unison with the movement of the trap door.

These and other objects of the invention will be apparent to persons skilled in the art from a study of the following description and accompanying drawings, in which

Figure 1 is a transverse sectional view through the car at the step well and showing the parts in closed or train running position;

Fig. 2 is a sectional view similar to Figure 1 and showing the trap door and folding skirt raised preliminary to opening of the main side door;

Fig. 3 is a sectional view taken substantially on line 3—3 of Fig. 2;

Fig. 4 is a sectional view taken substantially on line 4—4 of Fig. 3, and

Fig. 5 is a sectional view taken substantially on line 5—5 of Fig. 3 but with parts of the step well broken away in order to more clearly disclose the connection and arrangement of the parts.

Referring now to the drawings in detail, it will be seen that the side door A and hinged skirt B are adapted to close the passageway and step well. The step well is formed by side plates 2 connected to the underframe elements and in turn connected by equal height step risers 4 and step treads 6 through the medium of angle clips or other means 8. The upper edges of the side plates 2 and upper riser edge have attached thereto angular means 10 providing a shoulder for support of trap door D, later to be referred to. The angular member at one side of the step well projects inwardly into the step well as at 12 (Fig. 4) and has attached thereto an angle or similar means 13 to which the passageway side wall 14 may be attached. It will thus be seen that by projecting the angular means inwardly a recess will be formed in the step well beneath the passageway wall. The side door A is preferably formed of two spaced sheets 16 joined at suitable intervals and strengthened at the edges by channel or other form stiffeners 18 and is hinged to the passageway plate and step well plate by means of hinges 20 so arranged as to bring the outer door plate substantially flush with the side wall 21 (Fig. 5) when the door is closed.

The side door is stiffened as at 22 in order to receive one element of hinge 24, the other element being secured to the trap door D adapted to normally rest on the shoulders of angle members 10 substantially in alignment with the floor surface F of the car. The trap door hinge 24 is preferably of a conventional type having a tube 26 enclosing a flat spring 27 which will act as a torsion spring counterbalancing a part of the trap door weight and causing the door to lift slightly when the catch (not shown) holding the door down is released.

The side or main door is of such a length that the lower edge thereof may readily clear the second step tread when the door is swung inwardly on hinges 20 and the lower edge of the side door carries hinges 28 by means of which the folding skirt member or auxiliary door B is carried by the main door. The folding skirt member or auxiliary door is constructed with an outer plate 30 conforming to the car contour and reinforced adjacent its upper and side edges by angles 32 with the lower edge being reinforced by a plate 33 secured directly to plate 30. Since the lower edge of the main side door must clear the second step tread and since the plate 30 must, when folded upwardly, fit in the recess formed by the extension 12, the plate 30 must of necessity be of such a length as to prevent its contacting the lower tread surface, thus leaving a space between the tread and plate. In order to close the space between plate 30 and the lower tread surface, an auxiliary sliding skirt or auxiliary door extension is pro-

vided formed of plate 34 reinforced at its upper edge by angle 35 and carrying at its lower edge a rubber or other resilient sealing gasket 36 adapted to contact the upper surface of the lower step tread. The plate 34, angle 35 and gasket 36 may slide relative to the plate 30 and in order that the sliding movements of this extension may be controlled, rods 38 are connected to angle 35 and extend through guides 40 carried by brackets 42 secured to the inner face of the plate 30. Springs 44 are interposed between the angle 35 and guides 40, thus constantly urging the sliding extension outward substantially parallel to the plates 30. Rods 38 have connected thereto short cables 46 passing over pulleys 47 carried by the angles 32 and having the free ends thereof connected by means of adjusting bolts 48 to pivot blocks 50 extending outwardly from brackets 52, which brackets are clamped or otherwise secured to rods 54 at a predetermined point intermediate their ends. Rods 54 are provided at one end with clevis 56 adapted to be pivoted as at 57 to lugs 58 carried on brackets 42, while the other ends engage turnbuckles 60 connected through rods 62 and hinge pins 63 to the under surface of the trap door. By adjustment of turnbuckle 60 the folding skirt section B, together with its slide extension, may be forced into and held in proper position in alignment with the door and skirt section of the car, while by adjusting bolt 48 and clamp 52 the extent of sliding movement of the slide extension may be controlled as desired and in order that the gasket will clear the trap door supporting shoulder 10 when the folding skirt enters the recess provided therefor in the step well.

The operation of the combined side door, trap door and folding skirt arrangement is as follows and assuming the parts to be in the positions as indicated in Figure 1: Release of the trap door catch (not shown) will cause torsion springs 27 to raise the door slightly, allowing the operator to grasp the same and lift it upwardly to a position substantially paralleling the door for retention by catch 70. During the upward swinging of the trap door connection, rods 62 and 54 have caused the folding skirt member B to rotate upwardly about pivots 28 into a position as nearly parallel to the door as is possible. During the upward swinging of the folding skirt member under control of rods 62 and 54 the pivot blocks 50 swing through an arc and since they are offset from the pivot pins 57, they increase their distance from the hinges 28. Increasing the distance between the pivot blocks and hinges 28 will cause tension to be placed in the cables 46, thus pulling rods 38 toward the hinge axis of the folding skirt section and causing the slide extension to be retracted to a position in which gasket 36 is substantially even with the edge of plate 30 and reinforcement 33. With the trap door in the raised position, the side door may be unlocked and swung inwardly against passageway wall 14 with the folding skirt arrangement entering the recess provided therefor and with the door outer surface covering all working parts of the mechanism, thus preventing any injury to passengers or equipment. It is obvious that by changing the position of the brackets 52 and by adjusting the bolts 48, the relative throw of the pivot block 50 and consequently the sliding movement of the extension may be controlled.

While the present improvement has been described more or less in detail by reference to a specific form, it is obvious that various rearrangements of parts and changes in form may be made by persons skilled in the art and all such rearrangements of parts and changes in form are contemplated as will fall within the scope of the following claims.

What is claimed is:

1. A side door assembly for railway car passageways having a step well and comprising, a main side door hinged to the car structure, an auxiliary door hinged to the lower portion of the main door for upward swinging movement relative thereto, an extension on said auxiliary door and movable relative thereto, a trap door mounted for upward swinging movement and normally covering said step well, and means connecting said trap door, auxiliary door and extension for operation substantially in unison.

2. A side door assembly for railway car passageways having a step well and comprising, a main side door hinged to the car structure, an auxiliary door hinged to the lower portion of the main door for upward swinging movement relative thereto, an extension on said auxiliary door and movable relative thereto, a trap door mounted for upward swinging movement and normally covering said step well, and means connecting said trap door, auxiliary door and extension for operation substantially in unison, said extension being slidably carried by said auxiliary door and moving toward the lower portion of said main door during upward swinging of said trap door and auxiliary door.

3. A side door assembly for railway car passageways having a step well and comprising, a main side door hinged to the car structure, an auxiliary door hinged to the lower portion of the main door for upward swinging movement relative thereto, an extension on said auxiliary door and movable relative thereto, a trap door mounted for upward swinging movement and normally covering said step well, means pivotally connected to said trap door and to said auxiliary door and operative to move said doors substantially in unison, and additional means connected to said extension and to said first named means intermediate the pivotal connections and operative upon movement of the trap door to and from closed position to shift said extension relative to said auxiliary door.

4. A side door assembly for railway car passageways having a step well and comprising, a main side door hinged to the car structure, an auxiliary door hinged to the lower portion of the main door for upward swinging movement relative thereto, an extension on said auxiliary door and movable relative thereto, a trap door mounted for upward swinging movement and normally covering said step well, rods pivotally connected at their ends to said trap door and to said auxiliary door and operative to move said doors substantially in unison, and means connected to said extension and to said rods intermediate said pivotal connections and operative upon movement of the trap door to and from closed position to shift said extension relative to said auxiliary door.

5. A side door assembly for railway car passageways having a step well and comprising, a main door hinged to the car structure adjacent the passageway wall, an auxiliary door hinged to the lower portion of the main door for upward swinging movement, an extension carried by said auxiliary door and movable relative thereto, a trap door normally covering said step well and hinged to said main door for upward swinging movement toward the main door, means connecting said trap door and auxiliary door for swinging movements substantially in unison, and additional means connected to the extension and to said first named

means intermediate the connections to said trap door and auxiliary door, said additional means operating to move said extension toward the lower portion of said main door during upward swinging of said trap door and auxiliary door.

6. A side door assembly for railway car passageways having a step well and comprising, a main door hinged to the car structure adjacent the passageway wall, an auxiliary door hinged to the lower portion of the main door for upward swinging movement, an extension carried by said auxiliary door and movable relative thereto, a trap door normally covering said step well and hinged to said main door for upward swinging movement toward the main door, means connecting said trap door and auxiliary door for swinging movements substantially in unison, additional means connected to said extension and to said first named means intermediate the connections to said trap door and auxiliary door, said additional means operating to move said extension toward the lower portion of said main door during upward swinging of said trap door and auxiliary door, and means retaining said trap door in raised position permitting swinging of said assembly inward against the passageway wall.

7. A side door assembly for railway car passageways having a step well and comprising, a main side door hinged to the car structure and swingable into the step well, an auxiliary door hinged at one edge to the lower portion of the main door for upward swinging movement, an extension carried by the other edge of said auxiliary door and slidable relative thereto, and means connected to said auxiliary door and to said extension and operable to swing said auxiliary door and to slide said extension relative thereto substantially in unison.

8. A side door assembly for railway car passageways having a step well and comprising, a main side door hinged to the car structure and swingable into the step well, an auxiliary door hinged at one edge to the lower portion of the main door for upward swinging movement, an extension carried by the opposite edge of said auxiliary door and movable relative thereto, and means connected to said auxiliary door and to said extension and operable to swing said auxiliary door and to move said extension relative thereto substantially in unison, said extension being slidable along said auxiliary door toward the hinged edge thereof during upward swinging of said auxiliary door.

9. A side door assembly for railway car passageways having a step well and comprising, a main side door hinged to the car structure and swingable into the step well, an auxiliary door hinged at one edge to the lower portion of the main door for upward swinging movement, an extension slidably carried by the opposite edge of said auxiliary door and movable relative thereto, said extension being slidable along said auxiliary door toward the hinged edge thereof during upward swinging of the auxiliary door whereby the overall height of said door and extension is decreased.

10. As an article of manufacture, a car side door assembly comprising in part, a main door portion, an auxiliary door portion hinged at one edge to the main door portion for upward swinging movement, and an extension slidably carried by the opposite edge of said auxiliary door, said extension being slidable along said auxiliary door toward the hinged edge thereof during upward swinging of the auxiliary door.

11. As an article of manufacture, a car side door assembly comprising, a main door portion, an auxiliary door portion hinged at one edge to the main door portion for upward swinging movement, an extension carried at the opposite edge of said auxiliary door and slidable along the door toward the hinged edge thereof during upward swinging of the auxiliary door, a trap door hinged to the main door and movable relative thereto, and means connecting said trap door, auxiliary door and extension for swinging movement substantially in unison.

12. As an article of manufacture, a car side door assembly comprising, a main door portion, an auxiliary door portion hinged at one edge to the main door portion for upward swinging movement, an extension carried at the opposite edge of said auxiliary door and slidable relative thereto toward the hinged edge thereof during upward swinging of said auxiliary door, a trap door hinged to the main door and movable relative thereto, and means connecting said trap door, auxiliary door and extension for swinging movement substantially in unison, said means including main connections between the trap door and auxiliary door and branch connections to said extension operable by said main connections.

13. A side door assembly for railway car passageways having a step well and comprising, a main side door hinged to the car structure, an auxiliary door hinged to the lower portion of the main door for upward swinging movement relative thereto, a retractable extension slidably carried by said auxiliary door, a trap door mounted for upward swinging movement and normally covering said step well, means connecting said trap door and auxiliary door for operation thereof substantially in unison, and additional means connecting said first-named means with said extension and so formed and arranged as to retract the latter during upward swinging movement of the auxiliary door.

14. A side door assembly for railway car passageways having a step well and comprising, a main side door hinged to the car structure, an auxiliary door hinged to the lower portion of the main door for upward swinging movement relative thereto, a retractable extension slidably carried by said auxiliary door, a trap door mounted for upward swinging movement and normally covering said step well, means connecting said trap door and auxiliary door for operation thereof substantially in unison, and resilient means connecting said first-named means and said extension and operable during upward swinging movement of the auxiliary door to retract said extension.

15. A side door assembly for railway car passageways having a step well and comprising, a main side door hinged to the car structure, an auxiliary door hinged to the lower portion of the main door for upward swinging movement relative thereto, a retractable extension slidably carried by said auxiliary door, a trap door mounted for upward swinging movement and normally covering said step well, rods pivotally connected to said trap door and auxiliary door for operation of said doors substantially in unison, and means resiliently connecting said rods and extension in such a manner as to retract the latter during upward swinging movement of the auxiliary door.

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