

April 7, 1959

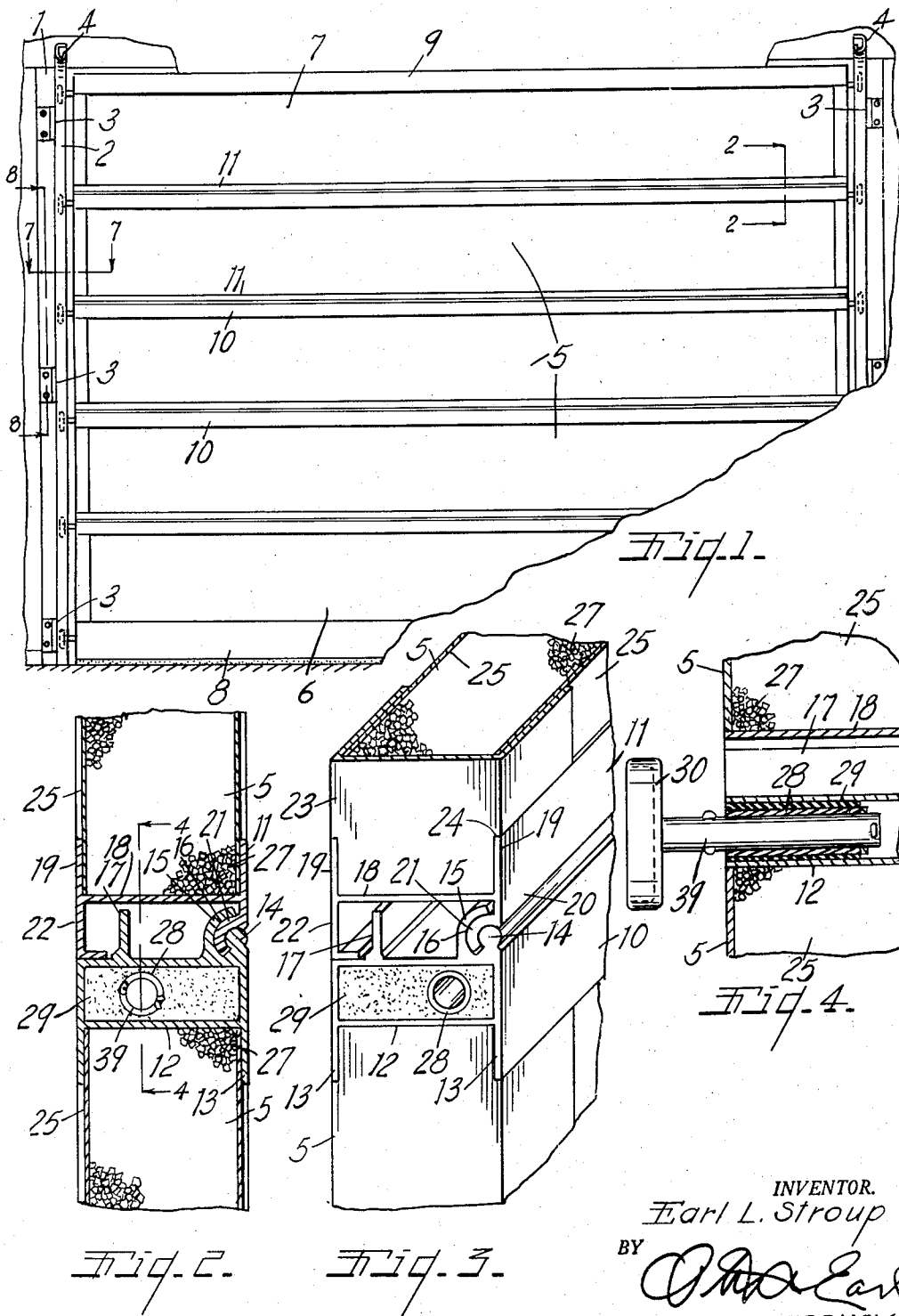
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2,880,796

SECTIONAL DOOR STRUCTURE

Filed Jan. 15, 1957

2 Sheets-Sheet 1



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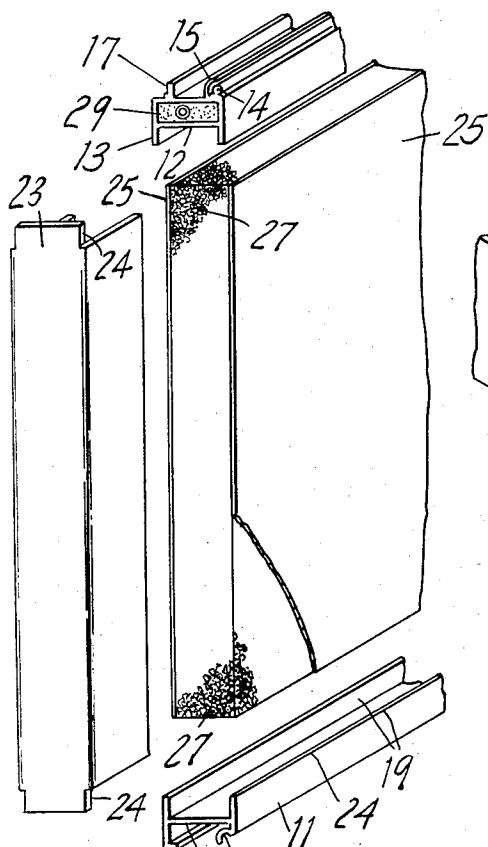


Fig. 4.

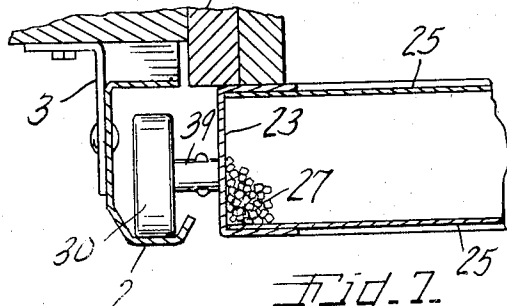


Fig. 7.

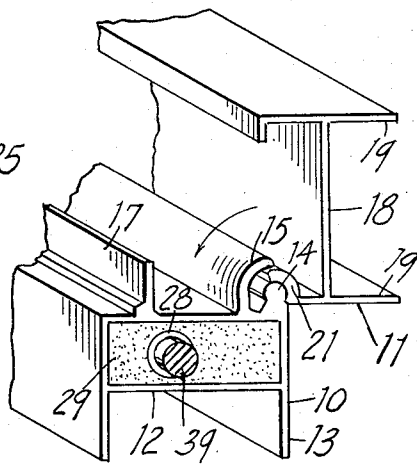


Fig. 5.

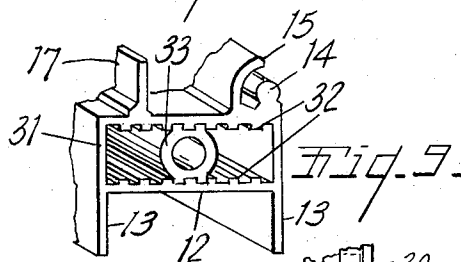


Fig. 9.

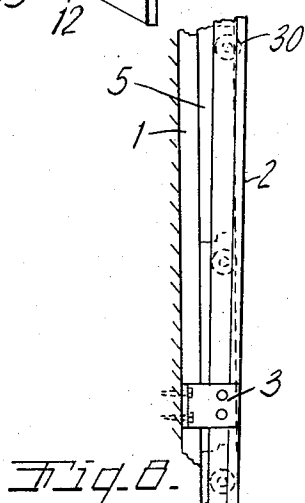


Fig. 8.

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SECTIONAL DOOR STRUCTURE

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9 Claims. (Cl. 160—232)

This invention relates to sectional doors or closures and particularly to the upwardly acting type.

The main objects of this invention are:

First, to provide a sectional door or closure structure of the upwardly acting type in which both the inner and outer sides of the door are substantially smooth when the door is in closed position or the sections in planar relation to each other.

Second, to provide a sectional door in which the top and bottom or meeting rails of the sections are formed of extruded aluminum and constitute hinged connections for the sections.

Third, to provide a sectional door or closure which is relatively light weight and at the same time is strong and rigid, and is effectively insulated.

Fourth, to provide a sectional closure in which the meeting rails of the sections are provided with integral co-engaging hinge elements which permit the ready engagement and at the same time swinging through a substantial arc without disengagement.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a fragmentary elevational inside view of an upwardly acting door structure embodying my invention.

Fig. 2 is an enlarged fragmentary view in section on a line corresponding to line 2—2 of Fig. 1.

Fig. 3 is a fragmentary perspective view of a pair of adjacent door sections.

Fig. 4 is a fragmentary view illustrating one of the track engaging rollers in its relation to the sections and the meeting rails thereof.

Fig. 5 is a fragmentary exploded view of the parts of one of the door sections.

Fig. 6 is a fragmentary perspective view illustrating the manner of engaging the hinge elements of a pair of adjacent sections, a track engaging roller spindle being shown in section.

Fig. 7 is a fragmentary sectional view on a line corresponding to line 7—7 of Fig. 1.

Fig. 8 is a fragmentary view on a line corresponding to line 8—8 of Fig. 1.

Fig. 9 is a fragmentary view illustrating a modified form of track engaging spindle support.

I have illustrated my invention as embodied in an upwardly acting door of the sectional type, 1 representing a door frame, 2 tracks of inwardly facing channel section, and 3 the supporting brackets therefor. The horizontal portions 4 of the track are conventionally illustrated. The upright portions of the track are desirably inclined inwardly, as is illustrated in Fig. 7. It will be understood that these details of the track and their relation to the door frame are old in the art, and one of the objects of my present invention is to provide a door structure which is adapted to be used with tracks having inclined upright portions.

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The embodiment of my invention illustrated comprises a plurality of intermediate door sections 5, a bottom section 6, and a top section 7. The bottom rail 8 of the bottom section and the top rail 9 of the top section are not illustrated in detail, but they may be of channel section and do not require hinge elements. The intermediate sections, designated generally by the numeral 5, are provided with top rails 10 and bottom rails 11, those illustrated being formed of extruded aluminum or other metal capable of being extruded.

The top rail 10 comprises a hollow body member 12 of rectangular section and has downwardly projecting panel engaging flanges 13 on its edges. The body member 12 also has an upwardly projecting rib-like transversely curved hinge knuckle 14 on its inner edge and desirably extending the full length thereof. It also has a flange-like hinge element 15, the curved face 16 of which is concentric to the curved surface of the knuckle member 14. The hinge element 15 is spaced to provide a hinge socket of curved section. Adjacent to the hinge knuckle 14 and spaced from its outer edge, the rail 10 is provided with a flange-like baffle member 17.

The bottom rail 11 comprises a bar-like body portion 18 having panel engaging flanges 19 projecting upwardly from the edges thereof. The rail 11 has a downwardly projecting flange-like portion 20 on its inner edge terminating in a curved hinge element 21 disposed in the hinge socket of the rail 10 in supported engagement with the knuckle hinge element 14. The rail 11 also has a downwardly projecting flange 22 of inwardly facing angled section which rests upon the top of the rail 10 when the door sections are in aligned or planar relation, as is shown in Figs. 2 and 3 at the outer side of the baffle member 17.

The stiles 23 are of inwardly facing channel section, their ends being notched at 24 to receive the flanges of the rails 10 and 11. The panel walls 25 are desirably of relatively thin sheet metal or plastic and are disposed with their side edges between the panel receiving flanges of the rails and their end edges within the stiles, as is clearly shown in Figs. 2 and 3. The panels include a filler 27 of insulating material desirably in sheet-like form. With the parts thus formed, the hinge elements of the section may be quickly engaged in assembling the door, and they are retained in hinging relation throughout a very substantial swinging arc.

In Fig. 6, I illustrate the manner of engaging and disengaging the sections. Doors embodying this structure provide effective insulation. The baffles 17 not only constitute reinforcing elements, but they also serve to minimize or reduce the passage of air between the sections. The hinge connection also provides a closed joint preventing the direct passage of substantial amounts of air between the sections.

The top rails are provided with bearings 28 for the spindles 39 of the track-engaging rollers 30. The bearings 28 are supported by the block-like holders 29 inserted in the ends of the body member 12. In Figs. 2 and 3, I illustrate that the bearings may be so positioned in the holders 29 as to support the rollers in proper relation to compensate for the inclination of the inclined upright portions of the track so that the door closes against the jamb or door frame when in closed position. The spindle supports 31 may be substituted for the spindle supports 29. The supports 31 are provided with opposed ribs 32 with which the spindle bearing 33 may be selectively engaged to properly locate the spindle to compensate for the inclination of the track.

It will be noted that both the inner and outer sides of the door are without substantial projections or are substantially smooth. This is desirable for doors used in various relations, for example, in trailers and the like in which loads are quite likely to shift against the door,

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and if there are projections, prevent the opening of the door or at least make it difficult to open. There are many other relations where this elimination of projections is a desirable feature.

I have illustrated and described my invention in a highly practical embodiment thereof. I have not illustrated other embodiments or adaptations to other types of closures, as it is believed that this invention will enable those skilled in the art to embody or adapt my invention as may be desired.

Having thus described the invention, what is claimed to be new and is desired to secure by Letters Patent is:

1. A closure of the class described including a plurality of hingedly connected sections comprising top and bottom rails having opposed panel supporting flanges on their edges, the top rail comprising a rectangular hollow body member having an upwardly projecting transversely curved rib-like hinge knuckle element on its inner edge, and a curved flange like hinge element disposed inwardly of and spaced from said knuckle element and coacting therewith to provide a transversely curved socket, the bottom rail comprising a bar like body member having a downwardly projecting flange like member at its inner edge terminating in a transversely curved hinge element engaged with the socket of the top rail of an adjacent lower section and in supported bearing engagement with the hinge knuckle thereof, said bottom rail having a flange at its outer edge sealing on the top rail of an adjacent lower section, and a panel comprising end stiles of inwardly facing channel section disposed between said panel supporting flanges of said rails, panel side walls disposed within said panel supporting flanges of said rails and said stiles, and filler material within said panel walls, and block-like pintle bearing supports disposed in said top rails and provided with pintle bearings.

2. A closure of the class described including a plurality of hingedly connected sections comprising top and bottom rails having opposed panel supporting flanges on their edges, the top rail comprising a body member having an upwardly projecting transversely curved rib like hinge knuckle element on its inner edge, and a curved flange like hinge element disposed inwardly of and spaced from said knuckle element and coacting therewith to provide a transversely curved socket, and bottom rail comprising a body member having a downwardly projecting flange like member at its inner edge terminating in a transversely curved hinge element engaged with the socket of the top rail of an adjacent lower section and in supported bearing engagement with the hinge knuckle thereof, said bottom rail having a flange at its outer edge sealing on the top rail of an adjacent lower section, and a panel comprising end stiles of inwardly facing channel section disposed between said panel supporting flanges of said rails, panels side walls disposed within said panel supporting flanges of said rails and said stiles, and filler material within said panel walls.

3. A closure of the class described including a plurality of hingedly connected sections comprising top and bottom rails having opposed panel supporting flanges on their edges, the top rail comprising a body member having an upwardly projecting transversely curved rib like hinge knuckle element on its inner edge, and a curved flange like hinge element disposed inwardly of and spaced from said knuckle element and coacting therewith to provide a transversely curved socket, said top rail also having an upwardly projecting flange like baffle spaced inwardly from the outer edge thereof, the bottom rail comprising a body member having a downwardly projecting flange like member at its inner edge terminating in a transversely curved hinge element engaged with the socket of the top rail of an adjacent lower section and in supported bearing engagement with the hinge knuckle thereof, said bottom rail having a flange at its outer edge sealing on the top rail of an adjacent lower section

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at the outer side of the baffle thereof when the sections are aligned, and a panel comprising end stiles of inwardly facing channel section disposed between said panel supporting flanges of said rails, panel side walls disposed within said panel supporting flanges of said rails and said stiles, and filler material within said panel walls.

4. A closure of the class described including a plurality of hingedly connected sections provided with top and bottom rails of extruded metal, the top rail comprising a body member having an upwardly projecting transversely curved rib-like hinge knuckle element on its inner edge, and a curved flange like hinge element disposed inwardly of and spaced from said knuckle element and coacting therewith to provide a transversely curved socket, said top rail also having an upwardly projecting flange-like baffle spaced inwardly from the outer edge thereof, the bottom rail comprising a body member having a downwardly projecting flange like member at its inner edge terminating in a transversely curved hinge element engaged in the socket of the top rail of an adjacent lower section and in supported bearing engagement with the hinge knuckle thereof and in lateral thrust sustaining engagement with said flange-like hinge element of said first rail, said bottom rail having a flange at its outer edge seating on the top rail of an adjacent lower section at the outer side of the baffle thereof when the sections are aligned.

5. A closure of the class described including a plurality of hingedly connected sections provided with hingedly engaged meeting rails, one of said rails comprising a body member having a projecting transversely curved rib-like hinge knuckle element on its inner edge, and a curved flange-like hinge element disposed inwardly of and spaced from said knuckle element and coacting therewith to provide a transversely curved socket, said rail also having a projecting flange-like baffle spaced inwardly from the outer edge thereof, the other rail comprising a body member having a flange-like transversely curved hinge element engaged in said socket of the first named rail in bearing engagement with the hinge knuckle thereof and in lateral thrust sustaining engagement with said flange-like hinge element of said first rail, said second named rail having a flange at its outer edge seating on the opposed rail at the outer side of the baffle thereof when the sections are aligned.

6. A multiple section closure hinge comprising a first rail and a second rail of extruded metal adapted for attachment to adjacent edges of the closure sections and constituting the meeting rails therefor, the first rail comprising a body member having a projecting transversely curved rib-like hinge knuckle element on its inner edge, and a curved flange-like hinge element disposed inwardly of and spaced from said knuckle element and coacting therewith to provide a transversely curved socket, the second rail comprising a body member having a projecting flange-like member at its inner edge terminating in a transversely curved hinge element oscillatingly engaged with the socket of the first rail in thrust bearing engagement with the hinge knuckle thereof and in lateral thrust sustaining engagement with said flange-like hinge element of said first rail, the second rail having a portion at its outer edge in supporting engagement with the first rail when the hinges are in closed position.

7. A multiple section closure hinge comprising a first rail and a second rail adapted for attachment to adjacent sections to constitute a part thereof and constituting the meeting rails therefor, the first rail comprising a body member having a projecting rib like hinge knuckle element, and a curved flange like hinge element disposed inwardly of and spaced from said knuckle element and coacting therewith to provide a transversely curved socket, the second rail comprising a body member having a projecting transversely curved flange like hinge element oscillatingly disposed in the socket of the first rail while in thrust bearing engagement with the hinge knuckle

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thereof and in lateral thrust sustaining engagement with said flange-like hinge element of said first rail, the second rail having a portion at its outer edge in supporting engagement with the first rail when the hinges are in closed position.

8. An upwardly acting door assembly including a plurality of hingedly connected sections comprising elongated top and bottom rails of generally rectangular section and having opposed panel supporting flanges on their side edges, side panels disposed on the inner sides of said flanges and fixedly secured thereto, the top rails having upwardly projecting transversely curved rib like hinge knuckles on their inner edges and curved flange like hinge elements disposed inwardly of and spaced from said knuckle element and coacting therewith to provide transversely curved sockets concentric with said hinge knuckles, the bottom rails having downwardly projecting flange like hinge knuckle engaging members on their inner side transversely curved to fittingly engage said sockets of the top rails in swingably supported bearing engagement with the hinge knuckles thereof, one of the rails of a coacting pair having a longitudinal flange on its outer edge supportingly engaging the other rail of the pair when the sections are positioned in alignment and acting to limit the outward swing of the sections relative to each other in aligned position.

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9. An upwardly acting door assembly including a plurality of hingedly connected sections comprising elongated top and bottom rails and panels supportingly connected thereto, the top rails having upwardly projecting transversely curved rib like hinge knuckles on their inner edges and curved flange like hinge elements disposed inwardly of and spaced from said knuckle element and coacting therewith to provide transversely curved sockets concentric with said hinge knuckles, the bottom rails having downwardly projecting flange like hinge knuckle engaging members on their inner side transversely curved to fittingly engage said sockets of the top rails in swingably supported bearing engagement with the hinge knuckles thereof, one of the rails of a coacting pair having a longitudinal flange supportingly engaging the other rail of the pair when the sections are positioned in alignment and acting to limit the outward swing of the sections relative to each other in aligned position.

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