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H. B. CLARK  
OVERHEAD DOOR

2,540,810

Filed March 18, 1946

2 Sheets-Sheet 1

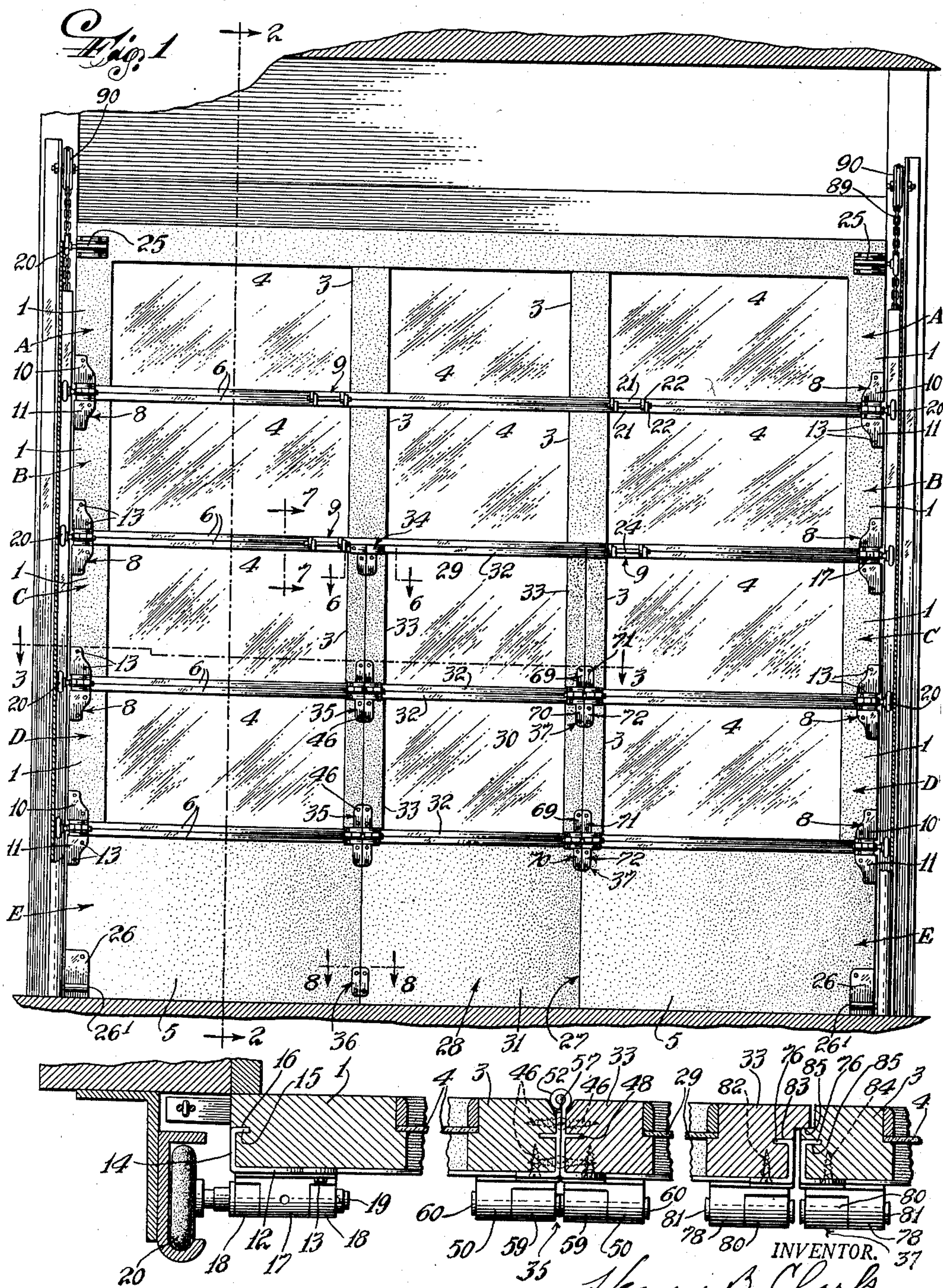


Fig. 3

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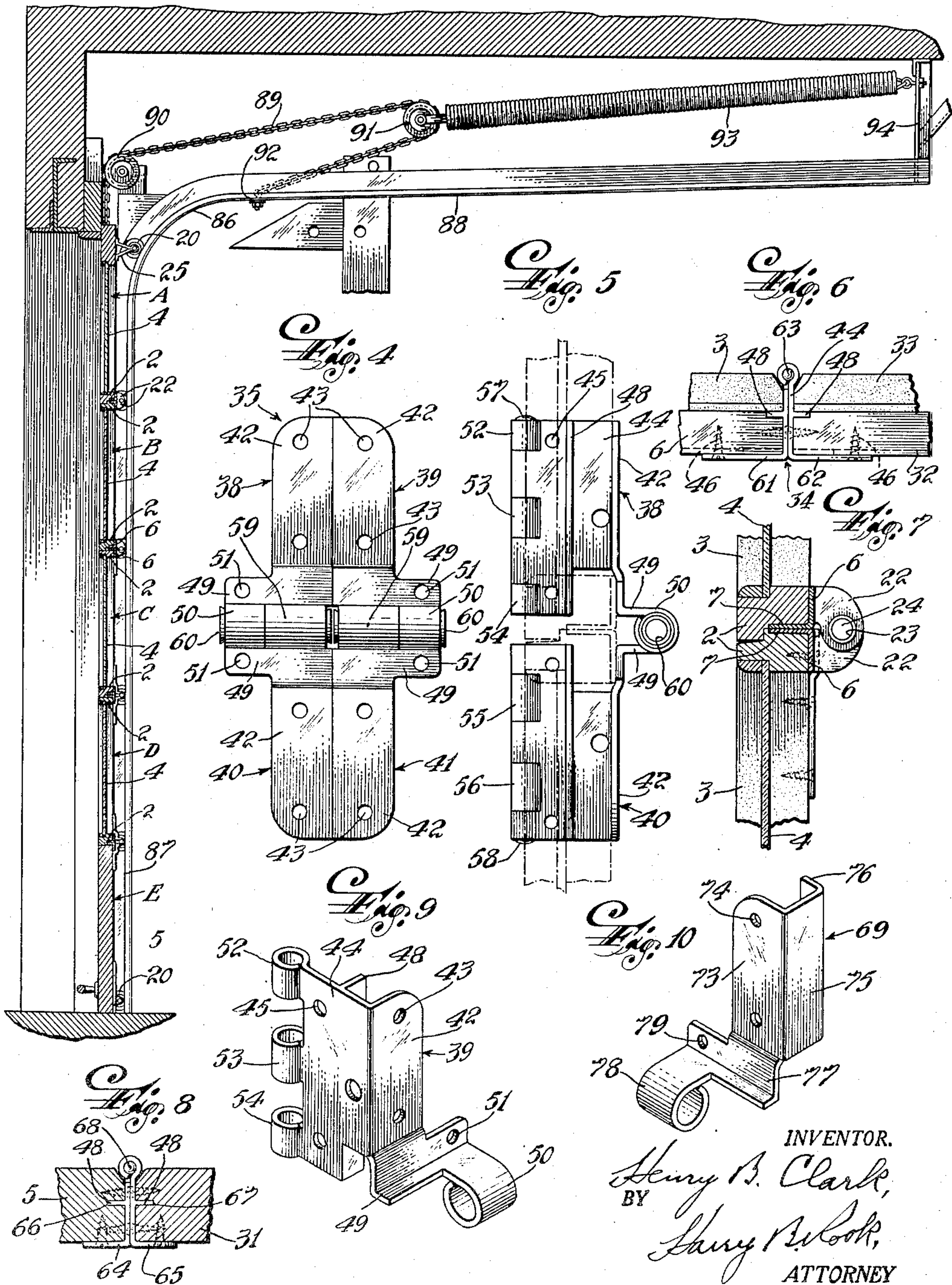
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2 Sheets-Sheet 2

*Fig. 2*



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## UNITED STATES PATENT OFFICE

2,540,810

## OVERHEAD DOOR

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This invention relates in general to doors of the so-called overhead type. These doors usually include a plurality of panel sections hingedly connected at their edges on horizontal axes so that the panel sections may be arranged in a common plane in a door opening for closing the door and may pivotally relatively move to permit raising of the panel sections and movement thereof from the vertical plane into a horizontal plane overhead for opening the door, the panel sections being mounted on rollers running in tracks.

One object of my invention is to provide such an overhead door with means for ingress and egress in the form of a small pass or wicket door. This pass door is so constructed that it will not interfere with the operation of the overhead door and may be used for the passage of an individual while the overhead door is in closed position.

Another object is to provide such a pass door that is easily operated and will securely close the passage in the overhead door.

Another object is to provide an improved hinge construction for connecting the pass door to the overhead door and for connecting the panel sections of the pass door to each other whereby said pass door may be swung on a vertical axis and its panel sections articulated for movement in an arcuate path.

Other objects are to provide a novel and improved construction for overhead doors whereby the hinges may be applied to the panel sections at the factory and panel sections may be coupled easily and quickly at the site of installation, and to provide an improved hinge construction that is simple, rugged and inexpensive, and to obtain other advantages and results as will be brought out by the following description.

Referring to the accompanying drawings in which corresponding and like parts are designated throughout the several views by the same reference characters—

Figure 1 is a rear elevational view of an overhead door embodying my invention showing the door in closed position.

Figure 2 is a transverse vertical sectional view on the line 2—2 of Figure 1.

Figure 3 is a horizontal sectional view taken on the line 3—3 of Figure 1, on an enlarged scale.

Figure 4 is an enlarged front elevational view of a pair of adjacent hinges.

Figure 5 is a side elevational view of the hinges shown in Figure 4.

Figure 6 is an enlarged horizontal sectional view taken on the line 6—6 of Figure 1.

Figure 7 is an enlarged vertical sectional view taken on the line 7—7 of Figure 1.

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Figure 8 is an enlarged horizontal sectional view taken on the line 8—8 of Figure 1.

Figure 9 is a perspective view of a leaf of one of the hinges of Figure 4.

Figure 10 is a perspective view of another form of hinge leaf.

Referring to the drawings, a sectional door of the overhead type is shown in Figure 1 comprising five panel sections A, B, C, D and E. Each of the sections A, B, C and D comprises a pair of stiles 1, a pair of rails 2 and a pair of mullions 3, all of which are preferably formed of wood and support glass panels 4. The lower panel section is formed of wooden panels 5.

For reinforcing the panel sections and attaching hinges and roller mountings to the panel sections, I apply an angle bar, preferably of metal, to each rail 2 of adjacent sections, with one flange 6 thereof lying against the side of the panel section and the other flange 7 lying along the edge of the panel section as shown in Figure 7.

The panel sections are hinged to one another by means of end hinges 8 and intermediate hinges 9. Each end hinge comprises an upper leaf 10 and a lower leaf 11. Each upper leaf 10 is secured to the lower edge of the stile 1 and adjacent angle bar of one panel section, and the lower leaf 11 is secured to the upper edge of the stile and angle bar of the adjacent panel section as shown in Figure 1. Each leaf consists of an angle plate having a portion 12 secured to the rear face of the stile 1 and to the flange 6 of the angle bar by means of screws 13, and having its other portion 14 extending along the outer edge of the stile and having a flange 15 embedded in a groove or slot 16 in the edge of the stile for securing said leaf to the stile. Upper leaf 10 is formed with a central knuckle 17 on the lower end thereof and leaf 11 is provided with two spaced knuckles 18 on the upper end thereof. The knuckles are interlocked and held together by a pintle 19 extending through the knuckles and projecting outwardly from one end thereof. The pintles 19 may also serve as axles for rollers 20 on the hinges at the ends of the panel sections.

The intermediate hinges 9 may be identical and each includes a base 21 and arms 22 projecting perpendicularly therefrom. The arms have openings 23 registering with the corresponding openings of the other hinge section for receiving a hinge spindle 24. The bases 21 of the hinge sections are secured to the flanges of the angle bars which lie along the sides of the panel sections with the arms 22 projecting perpendicularly to the plane of the corresponding panel section. The openings 23 are so arranged that when



the complemental hinge sections of a hinge are connected by the hinge pintle, the axis of the pintle is approximately in the same plane as the meeting edges of the adjacent sections.

The angle bars with their associated hinges 8 and 9 may be assembled on the panel sections at the factory and the panel sections may be connected together at the site of installation by the simple insertion of the hinge pintles.

On the upper rail 2 of the upper panel section A is a bracket 25 adjacent each end thereof for supporting the upper axle and roller 20. A plate 26 having an eye portion 26' is fastened to the lower edge of the panel section E at each end thereof for supporting the lowermost axle 19 and its roller 20.

In the overhead door proper there is provided an opening 27 which extends across the space between mullions 3 of panel sections C and D and between the panels 5 of the lower panel section E and from the top of panel section C to the bottom of panel section E. This opening is closed by a pass door or wicket door 28 comprising an upper glass panel section 29, an intermediate glass panel section 30 and a lower wooden panel section 31.

The panel sections of the pass door have bars 32 along their upper and lower edges and have mullions 33 along their side edges for supporting the glass and wooden panels. The bars 32 and mullions 33 are separate from the angle bars and mullions 3 of the panel sections of the main door but are aligned with the latter sections and form a prolongation thereof.

The pass door panel sections 29, 30 and 31 are hinged to each other and to the panel sections of the main door by means of an upper hinge 34, intermediate hinges 35, 35 and a lower hinge 36 adjacent the left hand edge and by hinges 37, 37 along the right hand edge of the pass door as viewed in Figure 1.

Intermediate hinges 35, 35 are identical and as shown in Figure 4, each consists of a pair of upper hinge leaves or sections 38 and 39 and a pair of lower hinge leaves or sections 40 and 41 hinged together along a vertical axis and along a horizontal axis as shown in Figures 1, 4 and 5.

Each of the upper hinge leaves 38 and 39 comprises an angular plate, one main portion 42 of which has holes 43 and the other secondary portion 44 thereof has holes 45 for receiving fastening members. A central rib or flange 48 is formed on portion 44 and on the lower end of portion 42 is an angular extension 49 formed with an integral knuckle or eye 50 which is perpendicular to the portion 42 and is offset or disposed to one side of the free edge of said portion. Extension 49 has a hole 51 for receiving a fastening member. Three spaced knuckles 52, 53 and 54 are formed on the free edge of portion 44 of hinge leaf 38 as shown in Figure 9 and only two knuckles 55 and 56 on the free edge of portion 44 of hinge leaf 39. These knuckles are interlocked and held together by a hinge pintle 57 whose axis is disposed approximately at the outer face of the doors as shown in Figures 3 and 5.

The lower hinge leaves 40 and 41 are constructed similarly to the upper leaves 38 and 39, respectively. That is, leaf 41 is provided with the three knuckles on the free edge of its portion 44 and leaf 40 with two knuckles which interlock and are held in vertical arrangement by a pintle 58. The end knuckles or eyes 59 of the lower hinge leaves 40 and 41, however, are centrally disposed with respect to the portions 42 instead

of being offset thereto as in the case of the upper hinge leaves 38 and 39 so that they can be aligned and interlocked with the knuckles or eyes 50 of the upper leaves. The adjacent interlocked knuckles or eyes are held together in horizontal arrangement by a bushing 60 extending through them and which has its ends flared or spun over to prevent displacement. The bushing provides a horizontal axis for the interlocking hinge leaves, which lies outwardly of the inner face of the door.

As shown in Figure 1, the upper leaf 38 of the upper hinge 35 is secured to the rear face of the lower end of mullion 3 and to the angle bar of main door panel section C by screws 46 passing through the holes 43, 45 and 51. The other upper leaf 39 is similarly secured to the rear face of the adjacent lower end of mullion 33 and bar 32 of pass door panel 29. Lower leaf 40 of said upper hinge 35 is secured to the rear face of the adjacent upper end of mullion 3 and to the angle bar of main door panel section D by screws 46 passing through the holes in said leaf. Lower leaf 41 of said hinge is similarly secured to the rear face of the adjacent upper end of mullion 33 and bar 32 of pass door panel 30.

Upper leaves 38 and 39 of the lower hinge 35 are secured to similar lower portions of the adjacent mullion and angle bar portions of the main door panel section D and pass door panel 30, and lower leaves 40 and 41 of said hinge are similarly secured to the upper adjacent ends of the panel section 5 of the lower main door section E and of panel 31 of the pass door and to the adjacent angle bar portions.

The upper hinge 34 consists of a pair of leaves 61 and 62 constructed and shaped substantially the same as lower leaves 40 and 41 of the intermediate hinges 35, 35 but without the extensions 49 and end knuckles or eyes 59. Leaf 61 is secured to the upper end of the rear face of mullion 3 and to the angle bar of main door panel section C by means of screws 46, and leaf 62 is secured to the upper end of the rear face of the adjacent mullion 33 and bar 32 of pass door panel 29 by similar means. However the ribs or flanges 48 of the leaves 61 and 62 seat against the mullions of the main door panel section C and of the pass door panel 29.

One of the leaves 61 and 62 is provided with three knuckles on the edge of its portion 44 similar to the knuckles 52, 53 and 54 while the other leaf has two knuckles similar to knuckles 55 and 56 which interlock and are held in vertical arrangement by a pintle 63 as shown in Figure 6.

The bottom hinge 36 comprises a pair of hinge leaves 64 and 65 constructed and secured substantially the same as the leaves 61 and 62 of upper hinge 34. Leaf 64 is fastened to the lower end of the rear face of the left hand panel 5 of the main door panel section E with its flange 48 fitted in a groove 66 in the vertical edge of the panel 5. Leaf 65 is fastened to the rear face of the adjacent lower end of the pass door panel 31 with its flange 48 in a groove 67 in the vertical edge thereof. One leaf of the bottom hinge is provided with three knuckles and the other leaf with two knuckles similar to the knuckles of leaves 38 and 39, which knuckles are held together in vertical arrangement by a hinge pintle 68.

It will be noted that the knuckles and pintles are countersunk in adjacent notched portions formed in the edges of the adjacent mullions and panel sections and that the pintles are coaxial



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in the respective hinges and disposed approximately along the line of the joint between the main door panel sections and pass door panels connected by the hinges thereby providing vertical axes for swinging the pass door inwardly and outwardly.

Upper and lower hinges 37, 37 on the free swinging edge of the pass door are identical and each hinge comprises two pairs of hinge leaves, one pair consisting of an upper leaf 69 and a lower leaf 70 and the other pair consisting of an upper leaf 71 and a lower leaf 72. Upper leaves 69 and 71 are similar in construction and each consists of an angle plate, one portion 73 of which has holes 74 for receiving fastening members and the other portion 75 having a flange 76 along its free edge. On the lower end of portion 73 is an angular extension 77 with an integral knuckle or eye 78 perpendicular to the portion 73 and offset or disposed to one side of the free edge of said portion. Extension 77 is provided with a hole 79 for receiving a fastening member.

Lower leaves 70 and 72 are constructed and secured substantially the same as the upper leaves 69 and 71 except that the end knuckle or eye 80 of each of said leaves 70 and 72 is disposed centrally of the portion 73 and not offset therefrom so that the knuckles or eyes 78 and 80 may be interlocked and held together in a horizontal arrangement by a bushing 81 passing through them and spun over at its ends to prevent displacement.

As shown in Figure 1, upper leaf 69 of upper hinge 37 is secured to the rear face of the lower end of mullion 33 and bar 32 of pass door panel 29 by screws 82 passing through the holes 74 and 79 therein. Portion 75 of said leaf extends along the end edge of said mullion and has its flange 48 fitted in a groove 33 in said edge. Lower leaf 70 is secured to the rear face of the upper end of mullion 33 of panel 30 and its extension 77 is secured to the angle bar 32 of said panel in the same manner as the upper leaf 69.

Upper leaf 71 is secured to the rear face of the lower end of mullion 3 of main door panel section C by screws 84 passing through the holes 74 and 79 therein. Portion 75 of said leaf extends along the end edge of said mullion and has its flange 48 fitted in a groove 85 in said end edge.

Lower leaf 72 is secured to the rear face of the upper end of mullion 3 of panel section D of the main door and its extension 77 secured to the angle bar of said panel section in the same manner as the upper leaf 71.

Upper leaf 69 of the lower hinge 37 is fastened to the lower end of mullion 33 of pass door panel 30 and lower leaf 70 to the rear face of the upper adjacent end edge of pass door panel 31 in the same manner as upper leaf 69 and lower leaf 70, respectively, of the upper hinge 37. Upper leaf 71 of said lower hinge 37 is fastened to the rear face of the lower end of mullion 3 of main door panel section D, and lower leaf 72 of said lower hinge 37 is fastened to the rear face of the upper adjacent end edge of right hand section 5 of lower panel section E of the main door in the same manner as upper leaf 69 and lower leaf 70, respectively.

It will be noted that the upper and lower leaves of each pair are hinged for movement around a horizontal axis but that the pairs of upper and lower leaves are not hinged together for movement around a vertical axis.

The meeting edges of the panels of the pass door and of the main door panel sections are

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shouldered as indicated at 85 in Figure 3 to make the pass door weatherproof.

In installing the door, a track 86 is mounted at each vertical side of the overhead door opening and includes a vertical leg 87 extending throughout the height of the door opening and a horizontal leg 88 disposed above the door opening.

The panel sections of the main door may be assembled as described in my Patent 2,134,397.

As usual, the door will be counterbalanced as by a chain 89 connected at one end to a bracket (not shown) at the lower end edge of the lower panel section E at each end thereof, which chains pass over corresponding guide rollers 90 and 91 and have their other ends connected to a fixed support 92, for example in a horizontal portion of the corresponding track 86. The rollers 91 float and are connected to the ends of the corresponding tension springs 93, the other ends of which are attached to a fixed support such as the track mounting 94.

By reason of the foregoing construction, the pass door will move vertically and horizontally along with the panel sections of the main door. The pass door can readily swing outwardly and inwardly on its vertical axis when it is desired to provide a small opening yet keep the main door closed. If desired, the pass door may be provided with a handle.

What I claim is:

1. A door structure comprising a main door including a plurality of panel sections with an opening across certain of said panel sections, hinge means connecting adjacent panel sections to move on a horizontal axis, a pass door for said opening having panel sections corresponding to the first-named panel sections and hinges connecting the adjacent panel sections of said pass door on a horizontal axis and for connecting said adjacent panel sections and said first-named panel sections on vertical axes along one edge of said pass door, each of said hinges including a pair of upper leaves and a pair of lower leaves, one leaf of said upper leaves being secured directly to one of said pass door panel sections on one face of the door, the other leaf of said upper leaves being secured directly to the adjacent corresponding face of the section of said first-named panel sections, one leaf of said lower leaves being secured directly to the adjacent side of the adjacent panel section of said pass door, the other leaf of said lower leaves being secured directly to the adjacent section of one of said first-named sections, said upper leaves having vertically arranged interlocked knuckles at the other face of the door, a hinge pintle fitted in said knuckles, said lower leaves having vertically arranged interlocked knuckles at the second mentioned face of the door and a hinge pintle fitted in said knuckles, said upper leaves and said lower leaves having interlocked knuckles arranged on a horizontal axis at the first-mentioned face of the door and a hinge pintle fitted in said latter knuckles.

2. A door structure comprising a main door including a plurality of panel sections with an opening through certain of said panel sections, hinge means connecting adjacent panel sections for movement on a horizontal axis, a pass door for said opening having panel sections corresponding to the first-named panel sections and hinges connecting the adjacent panel sections of said pass door on horizontal axes and for connecting said adjacent panel sections and said first-named panel



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sections on vertical axes along one edge of said pass door, each of said hinges including a first pair and a second pair of leaves, each comprising a main plate portion and a secondary plate portion rigidly connected together in perpendicular relation to each other, the main plate portions of each pair of leaves being hingedly connected on one axis to the corresponding main portions of the other pair and the secondary portions of each pair being hingedly connected together on an axis perpendicular to the first-mentioned axis, means rigidly connecting said secondary plate portions of the first and second pairs of leaves to the edges of adjacent panel sections of said main door and to the edges of the corresponding sections of the pass door at one side of said pass door opening, respectively, with the axis of the hinged connection between said secondary plates disposed vertically and approximately at one face of said door, means rigidly connecting said main plate portions of said first and second pairs of leaves to said adjacent panel sections of said main door and to the corresponding sections of said pass door at the opposite face of said door and with the hinged connections between said main plate portions disposed horizontally and outwardly of the second-mentioned face of the door and coaxial with said hinge means.

3. A door structure as defined in claim 2 with the addition of hinges connecting the adjacent panel sections of said pass door along the other edge of said pass door, each of said latter hinges including a pair of leaves each comprising a main plate portion and a secondary plate portion rigidly connected together in perpendicular relation to each other, means rigidly connecting said sec-

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ondary plate portions of said leaves to the edges of adjacent panel sections of the pass door opposite the vertically hinged edges of said pass door panel sections, means rigidly connecting the main plate portions of each of said latter hinges directly to said adjacent panel sections of the pass door at the first-mentioned face of the door, and means hingedly connecting together said main plate portions of each latter hinge on a horizontal axis outwardly of said second-mentioned face of the door and coaxial with said hinge means.

4. A double axis hinge including a first pair and a second pair of leaves each comprising a main plate portion and a secondary plate portion rigidly connected together in perpendicular relation to each other, the main plate portions of each pair of leaves being hingedly connected on one axis to the corresponding main portions of the other pair of leaves and the secondary portions of each pair being connected together on an axis perpendicular to the first-mentioned axis, and said main and secondary plate portions having openings for fastening elements to secure the hinge to members to be connected by the hinge.

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