

April 12, 1960

F. D. CROSSWELL

2,932,056

HINGE

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2 Sheets-Sheet 1

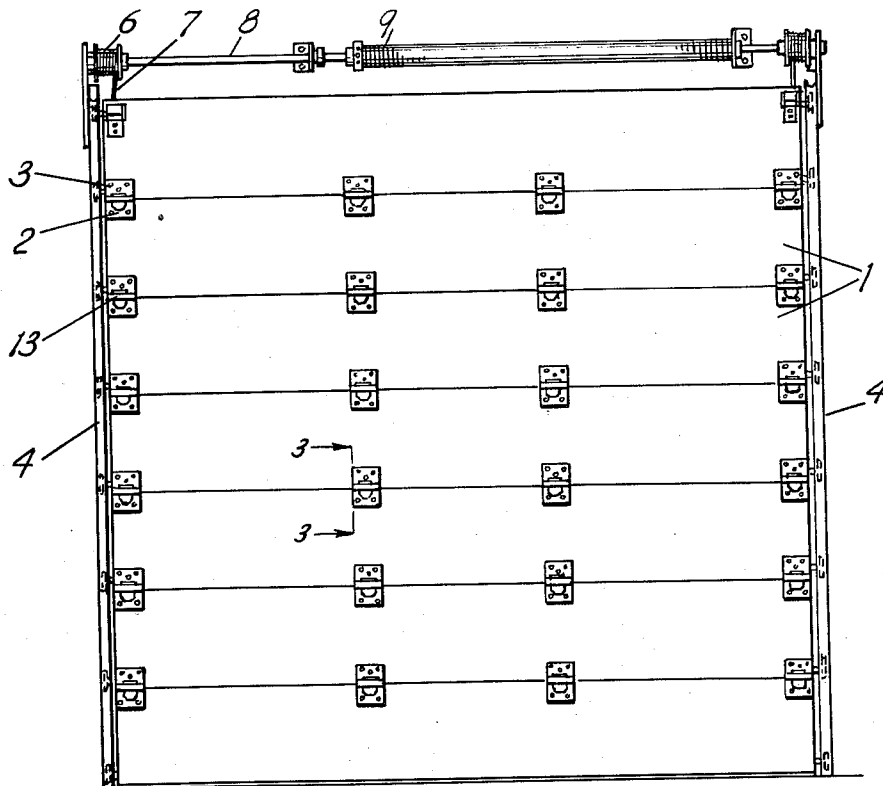


Fig. 1

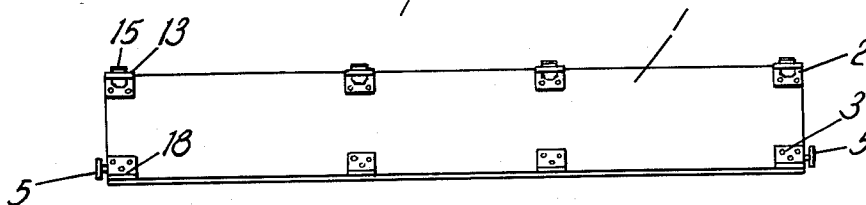


Fig. 2

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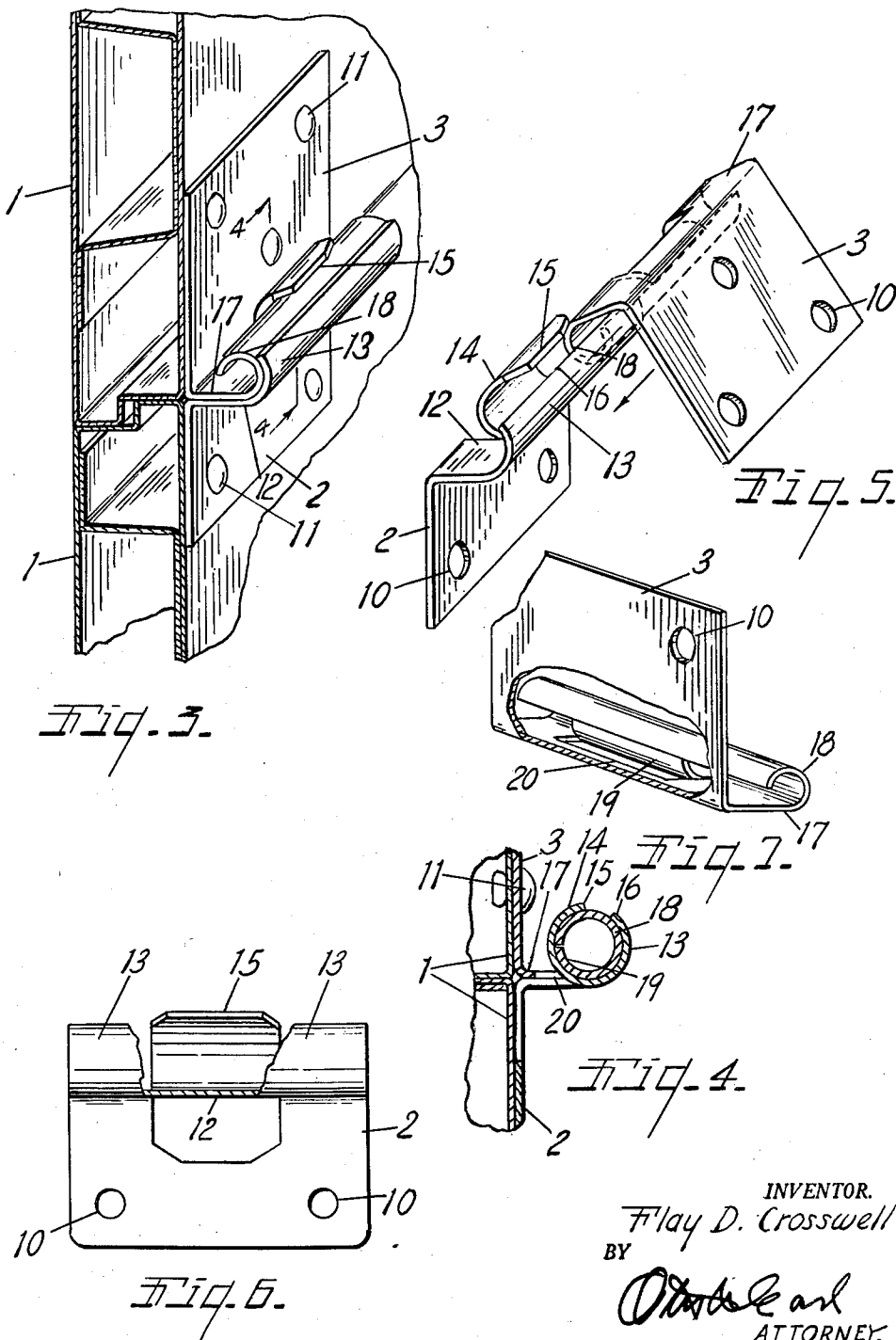
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6 Claims. (Cl. 16—171)

This invention relates to a hinge well adapted for upwardly acting sectional doors and the like.

The main objects of this invention are:

First, to provide a hinge which is well adapted for upwardly acting sectional doors and the like which permits the hinge members being fixedly mounted on the door sections at the factory or other convenient place of assembly and the sections being quickly assembled at the place where the door is installed.

Second, to provide a two part hinge comprising coacting knuckle and pintle hinge members, each of which is formed as a unit desirably from sheet metal stock of uniform thickness and at the same time the hinge is provided with effectively coacting knuckle and pintle.

Third, to provide a sectional door assembly comprising a plurality of hingedly connected sections provided with hinges which are highly effective in resisting lateral thrust on the door sections.

Fourth, to provide a hinge embodying these advantages which may be very economically produced and at the same time is capable of withstanding severe stresses.

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 drawings, in which:

Fig. 1 is an inside elevational view of an upwardly acting sectional door equipped with hinges embodying my invention.

Fig. 2 is an inside elevational view of one of the door sections with hinge members mounted thereon for engagement with hinge members of adjacent sections.

Fig. 3 is an enlarged fragmentary perspective view on a line corresponding to line 3—3 of Fig. 1.

Fig. 4 is a fragmentary view in section on a line corresponding to line 4—4 of Fig. 3.

Fig. 5 is a perspective view of the hinge members illustrating the manner of assembling.

Fig. 6 is a fragmentary front elevational view of the knuckle hinge member with parts being broken away and sectioned to illustrate structural details.

Fig. 7 is a rear perspective view of the pintle hinge member with parts broken away to disclose structural features thereof.

I have illustrated my invention embodied in an upwardly acting door comprising a plurality of hingedly connected sections 1 which are provided with a plurality of knuckle or female hinge members 2 on their upper edges and coacting male or pintle members 3 on their lower edges. Tracks 4 are conventionally illustrated in Fig. 1, the sections being provided with track engaging rollers 5 at each end thereof.

Drums 6 are provided for the cables 7, the shaft 8 of the drums being torsioned by means of the spring 9. I have not described the details of the track and cable winding drums as they form no part of my present invention.

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The knuckle hinge member 2 is formed integrally of sheet metal stock and comprises an attaching leaf with holes 10 therein adapted to receive attaching elements 11. The leaf or body portion of the hinge member has an outturned flange 12 on its upper edge terminating in a curved inwardly facing knuckle element 13. A curved coacting tongue-like knuckle element 14 is struck out from the body and flange of the member 2 and concentrically disposed relative to the knuckle element 13. The edge 15 of the knuckle element 14 is spaced from the edge 16 of the knuckle element 13 providing a slot-like opening to facilitate the assembly and disassembly of the hinge members as will be further pointed out.

The pintle hinge member 3 is also formed as an integral sheet metal stamping and is provided with a leaf or body portion having holes 10 therein adapted to receive attaching elements 11. The member 3 has an outturned flange 17 on its inner edge terminating in a curved pintle element 18. This hinge element 18, in the embodiment illustrated, is approximately 270 degrees in extent. The complementary pintle element 19 is struck up from the flange of the pintle member 3 and concentrically disposed relative to the pintle element 18 coacting therewith to provide a cylindrical pintle. The striking or forming of this pintle element 19 from the flange results in a slot-like opening 20 in the flange of the pintle member adapted to receive the second pintle element 14 of the knuckle hinge member when the parts are assembled in operating relation.

The edges 15 and 16 of the knuckle elements 13 and 14 are spaced so that when the hinge members are disposed in a substantially angular relation, as shown in Fig. 5, and at a greater angle than would normally result in the operation of the door, the hinge members may be engaged by relative axial movement and when swung to normal operative relation the tongue-like knuckle element 14 passes through the opening 20 in the pintle member thereby preventing relative axial movement of the hinge members.

When the sections of the door hingedly connected by the hinge members of this invention are in alignment the flanges 12 and 17 of the hinge members are in supporting engagement. These flanges being of substantial width also serve as reinforcing means for the hinge members thereby permitting their being made of sheet metal stock and at the same time they are capable of carrying substantial loads and resisting substantial stresses.

The door sections are desirably provided with these hinges positioned at the edges of the door and also with intermediate hinges as illustrated in the accompanying drawing. The hinges may be mounted on the door sections at the factory or other place of assembly and the sections shipped or transported and quickly and easily assembled at the place of installation of the door. This not only insures the hinges being positioned in the desired manner but permits their being secured by rivets 11 which is not very practical to do when the hinges are mounted on the sections at the place of installation of the door.

I have illustrated and described my invention in a highly practical embodiment thereof. I have not attempted to illustrate or describe other adaptations or embodiments which I contemplate, as I believe this disclosure 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 as new and is desired to be secured by Letters Patent is:

1. A hinge comprising coacting knuckle and pintle hinge members, each formed of sheet stock and comprising an attaching leaf, the leaf of the knuckle hinge member having an outwardly projecting flange of sub-

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stantial width at an end thereof disposed substantially at a right angle to the leaf and terminating in a curved segmental first knuckle element, said knuckle hinge member also having a second curved segmental knuckle element struck from the leaf and its said flange and disposed concentrically relative to said first knuckle element, the opposed edges of said first and second knuckle elements being spaced to provide a slot-like opening between them, the leaf of said pintle hinge member having an outwardly projecting flange of a width corresponding to the width of said flange of said knuckle member at an end thereof disposed substantially at a right angle to the leaf and terminating in a curved segmental first pintle element, said pintle hinge member also having a second curved segmental pintle element struck from the said flange thereof and disposed concentrically relative to said first pintle element and with its outer edge in abutting relation to the outer edge thereof, the striking out of said second pintle element from said flange providing an opening therein, the pintle and knuckle elements of said hinge members being cooperatively engageable by relative axial movement thereof when the hinge members are so angularly positioned relative to each other as to permit the passage of the flange of the pintle member through said slot-like opening between the adjacent edges of the knuckle elements of the knuckle hinge member and the retaining engagement of said second knuckle element of the knuckle hinge member with said opening in said pintle member flange when the hinge members are in alignment and through a relative pivotal movement thereof at least 90°, the flanges of said hinge members being in abutting engagement when the leaves of the hinge members are in alignment.

2. A hinge comprising coacting knuckle and pintle hinge members, each formed of sheet stock and comprising an attaching leaf, the leaf of the knuckle hinge member having an outwardly projecting flange of substantial width at an end thereof disposed substantially at right angles thereto terminating in a curved segmental first knuckle element, said knuckle hinge member also having a second curved segmental knuckle element struck from the leaf and its said flange and disposed concentrically relative to said first knuckle element, the opposed edges of said first and second knuckle elements being spaced to provide an opening between them, the leaf of said pintle hinge member having an outwardly projecting flange of a width corresponding to the width of said flange of said knuckle member at an end thereof terminating in a curved segmental first pintle element, said pintle hinge member also having a second curved segmental pintle element struck from the said flange thereof and disposed concentrically relative to said first pintle element, the striking out of said second pintle element from said flange providing an opening therein, the pintle and knuckle elements of said hinge members being cooperatively engageable by relative axial movement thereof when the hinge members are so angularly positioned relative to each other as to permit the passage of the flange of the pintle member through said slot-like opening between the adjacent edges of the knuckle elements of the knuckle hinge member and the retaining engagement of said second knuckle element of the knuckle hinge member with said opening in said pintle member flange when the hinge members are in alignment and through a relative pivotal movement thereof at least 90°.

3. A hinge comprising coacting knuckle and pintle hinge members, each formed of sheet stock and each comprising an attaching leaf and having an outwardly projecting flange of substantial width and length disposed substantially at right angles to its attaching leaf, the flange of the knuckle member terminating in a curved segmental laterally offset first knuckle element of a length corresponding to the width of the flange, said knuckle hinge member having a second segment knuckle element struck centrally therefrom and disposed concentrically relative

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to said first knuckle element with the end edges of said knuckle elements spaced to provide a slot-like opening between them, the flange of said pintle hinge member terminating in a curved segmental first pintle element and having a second curved pintle element struck therefrom and disposed concentrically relative to said first pintle element with the end edges of said pintle elements in abutting relation, the end edges of the first and second knuckle elements being disposed relative to the plane of the knuckle member hinge leaf so that the hinge members are engageable and disengageable by relative axial movement thereof only when their attaching leaves are disposed at an obtuse angle to each other, the striking out of said second pintle element from said pintle hinge member flange providing an opening therein in which said second knuckle element of said knuckle hinge member is retainingly engaged when the hinge members are in assembled relation, said knuckle member and pintle member flanges being in seated engagement when the leaves thereof are in alignment.

4. A hinge comprising an integral knuckle member comprising an attaching leaf having an outwardly projecting flange of substantial width disposed substantially at a right angle thereto and terminating in a curved segmental knuckle element and having a second segmental knuckle element struck therefrom and disposed concentrically relative to said first knuckle element with the end edges of said knuckle elements spaced to provide a slot-like opening between them, and an integral pintle member comprising an attaching leaf having an outwardly projecting flange of substantial width disposed substantially at a right angle thereto and terminating in a curved segmental pintle element and having a second curved segmental pintle element struck therefrom and disposed concentrically relative to and complementing said first pintle element, the side edges of said opening resulting from the striking out of said second pintle element corresponding to the width of the second knuckle element and constituting stops limiting the axial movement of the hinge members relative to each other when their knuckle and pintle elements are in engagement, the opposed end edges of said first and second knuckle elements being spaced to receive the flange of said pintle member when presented edgewise thereto with the flanges of the hinge members positioned at a substantial angle relative to each other, said flanges of said knuckles and pintle members being in thrust seating engagement with each other when the leaf members are in alignment.

5. A hinge comprising coacting knuckle and pintle hinge members, each formed of sheet stock and each comprising an attaching leaf and having an outwardly projecting flange of substantial width and length disposed substantially at right angles to its attaching leaf, the flange of the knuckle member terminating in a curved segmental laterally offset first knuckle element, said knuckle hinge member having a second segmental knuckle element struck centrally therefrom and disposed concentrically relative to said first knuckle element with the end edges of said knuckle elements spaced to provide a slot-like opening between them, the flange of said pintle hinge member terminating in a curved segmental first pintle element and having a second curved pintle element struck therefrom and disposed concentrically relative to said first pintle element, the opening resulting from the striking out of said second pintle element from said pintle hinge member flange providing an opening therein receiving the said second knuckle element of said knuckle hinge member when the hinge members are in assembled relation, the opening between the adjacent edges of the first and second knuckle elements being disposed relative to the plane of the hinge leaf of the knuckle member so that the hinge members are engageable and disengageable by relative axial movement thereof only when their attaching leaves are disposed at a substantial angle to each other,

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said flanges being in abutting relation when the leaf members are in substantially the same plane.

6. A hinge comprising an integral knuckle member comprising an attaching leaf having an outwardly projecting flange of substantial width disposed substantially at a right angle thereto, the flange terminating in a curved knuckle element and having a second segmental knuckle element struck therefrom and disposed concentrically relative to said first knuckle element with the end edges of said knuckle elements spaced to provide a slot-like opening between them, and an integral pintle member comprising an attaching leaf having an outwardly projecting flange of substantial width disposed substantially at a right angle thereto and terminating in a curved pintle element and having a second curved pintle element struck therefrom and disposed concentrically relative to said first

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pintle element with the end edges of said pintle elements in abutting relation, the side edges of said opening in said pintle member flange constituting stops limiting the axial movement of the hinge members relative to each other when their knuckle and pintle elements are in engagement, the opposed end edges of said first and second knuckle elements being spaced to receive the flange of said pintle member when it is presented edgewise thereto with the flanges of the hinge members positioned at a substantial angle relative to each other.

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