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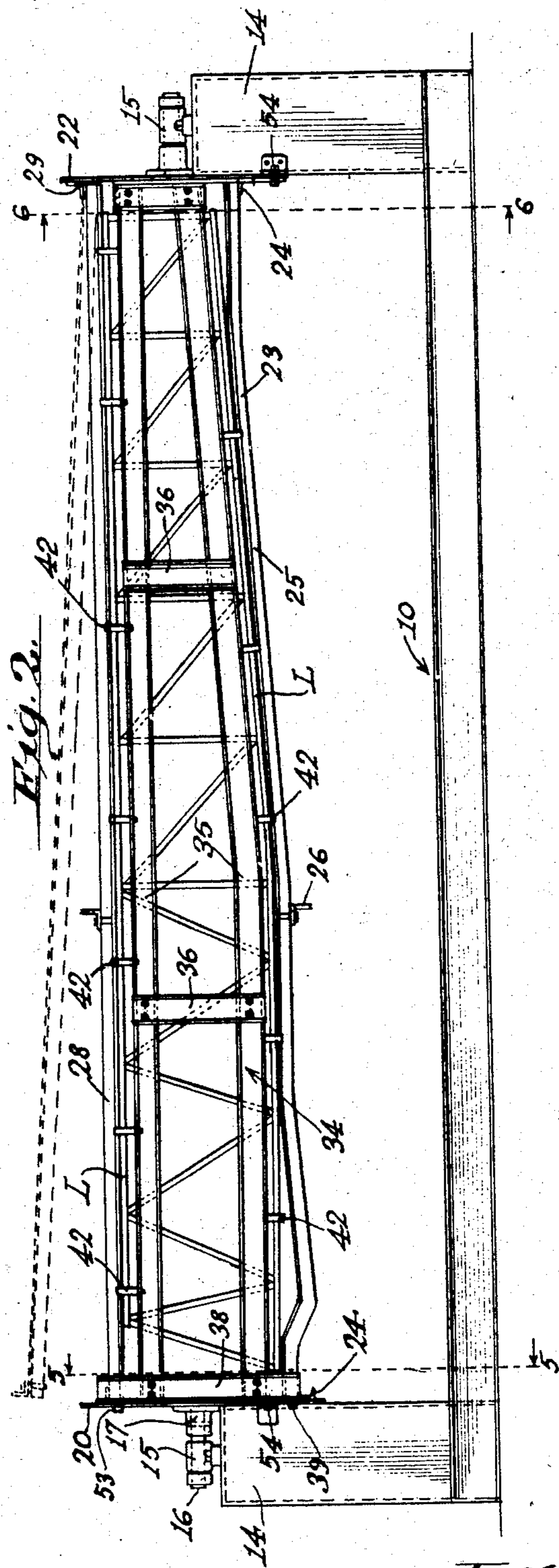
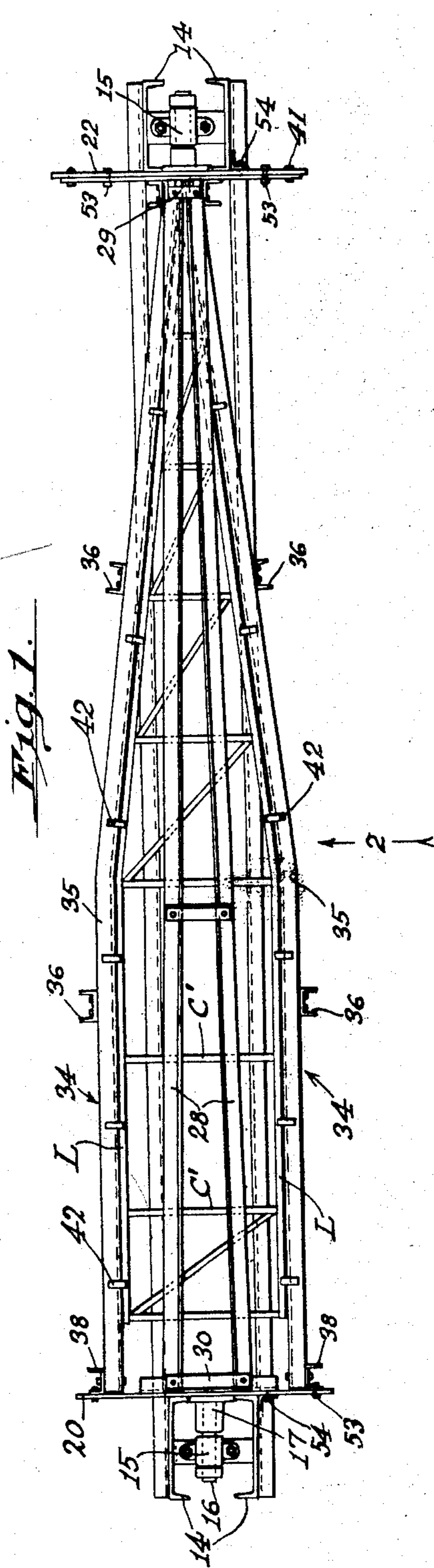
J. D. BUNCH

1,822,270

AEROPLANE FUSELAGE JIG

Filed July 7, 1930

4 Sheets-Sheet 1



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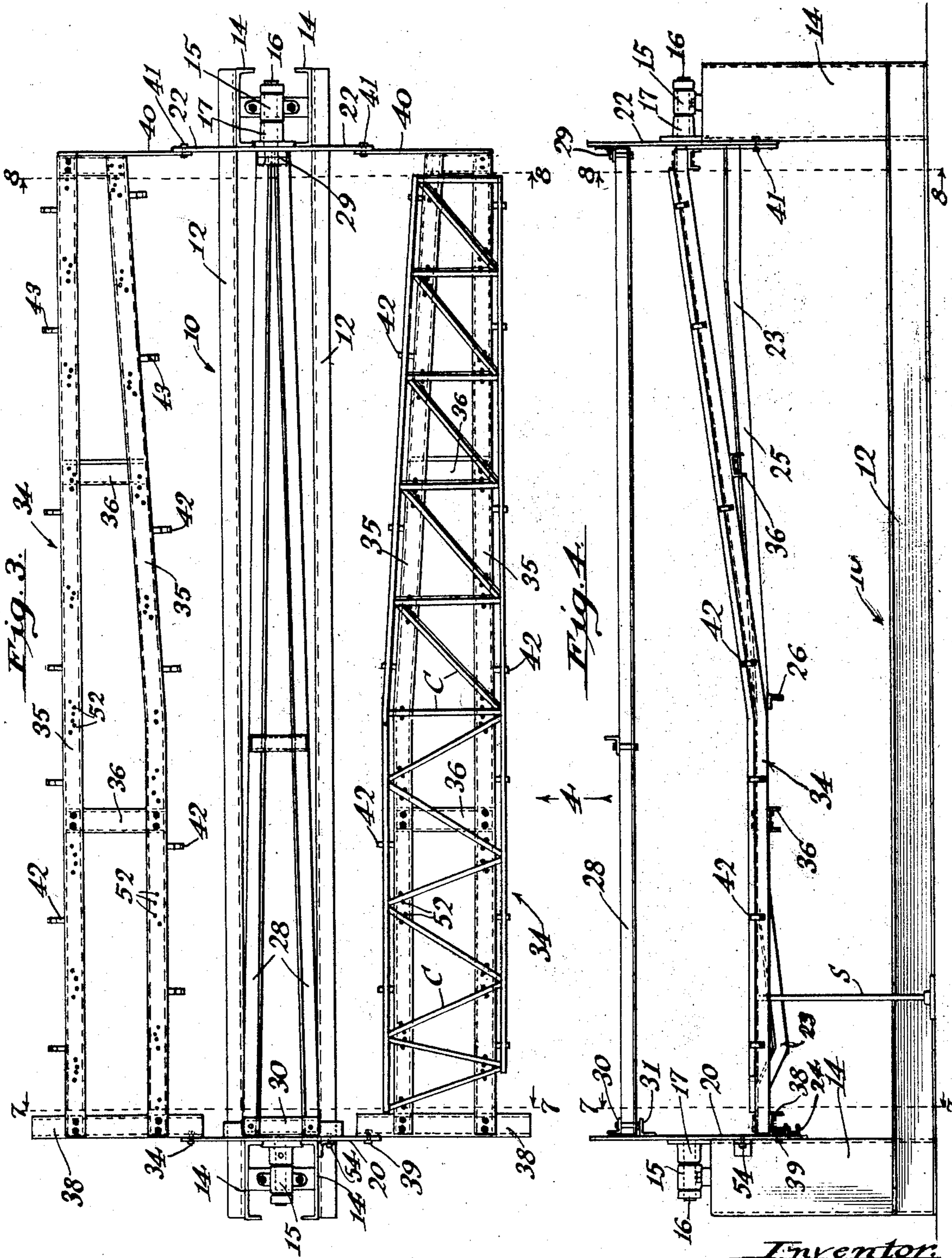
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4 Sheets-Sheet 2.



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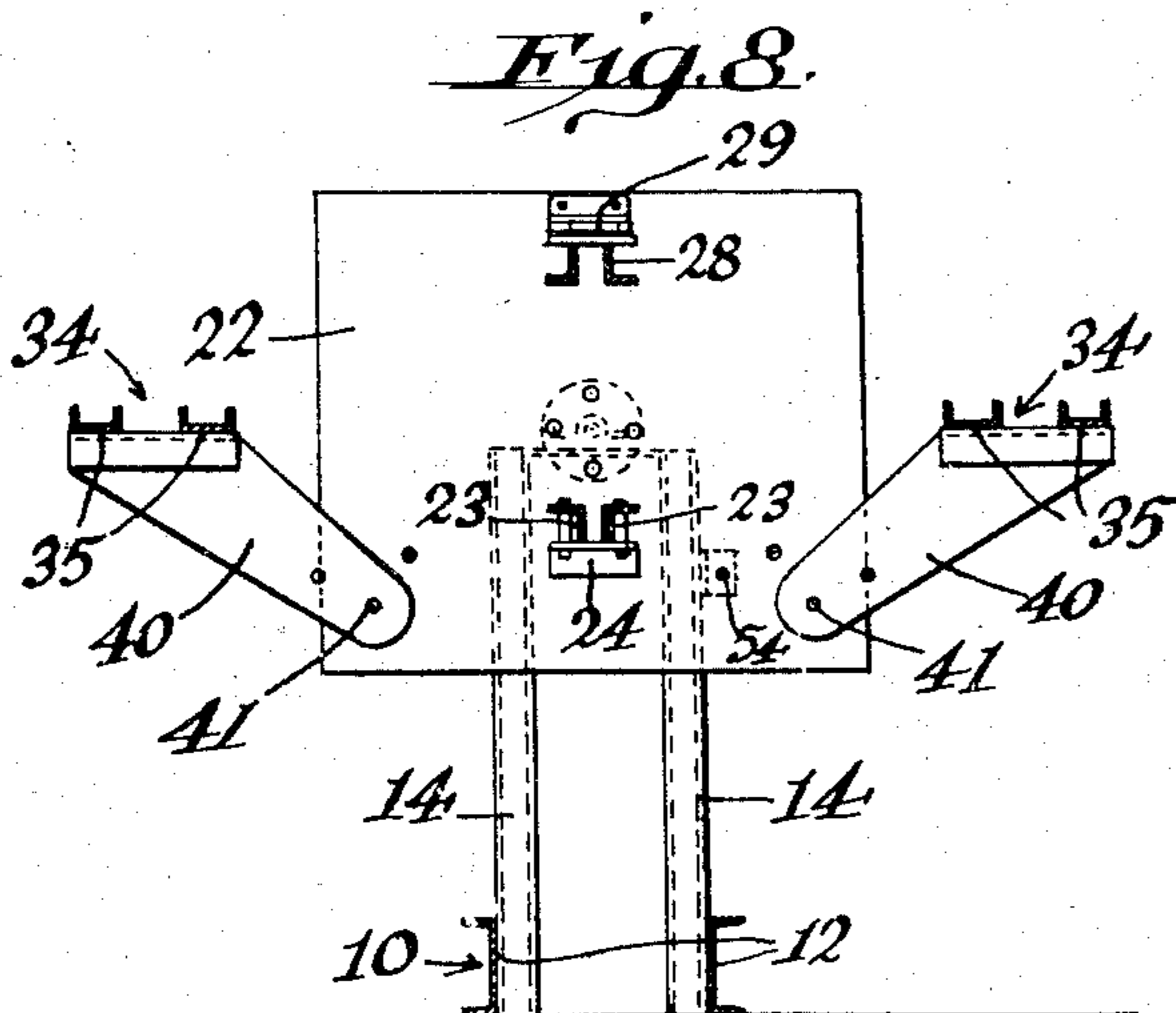
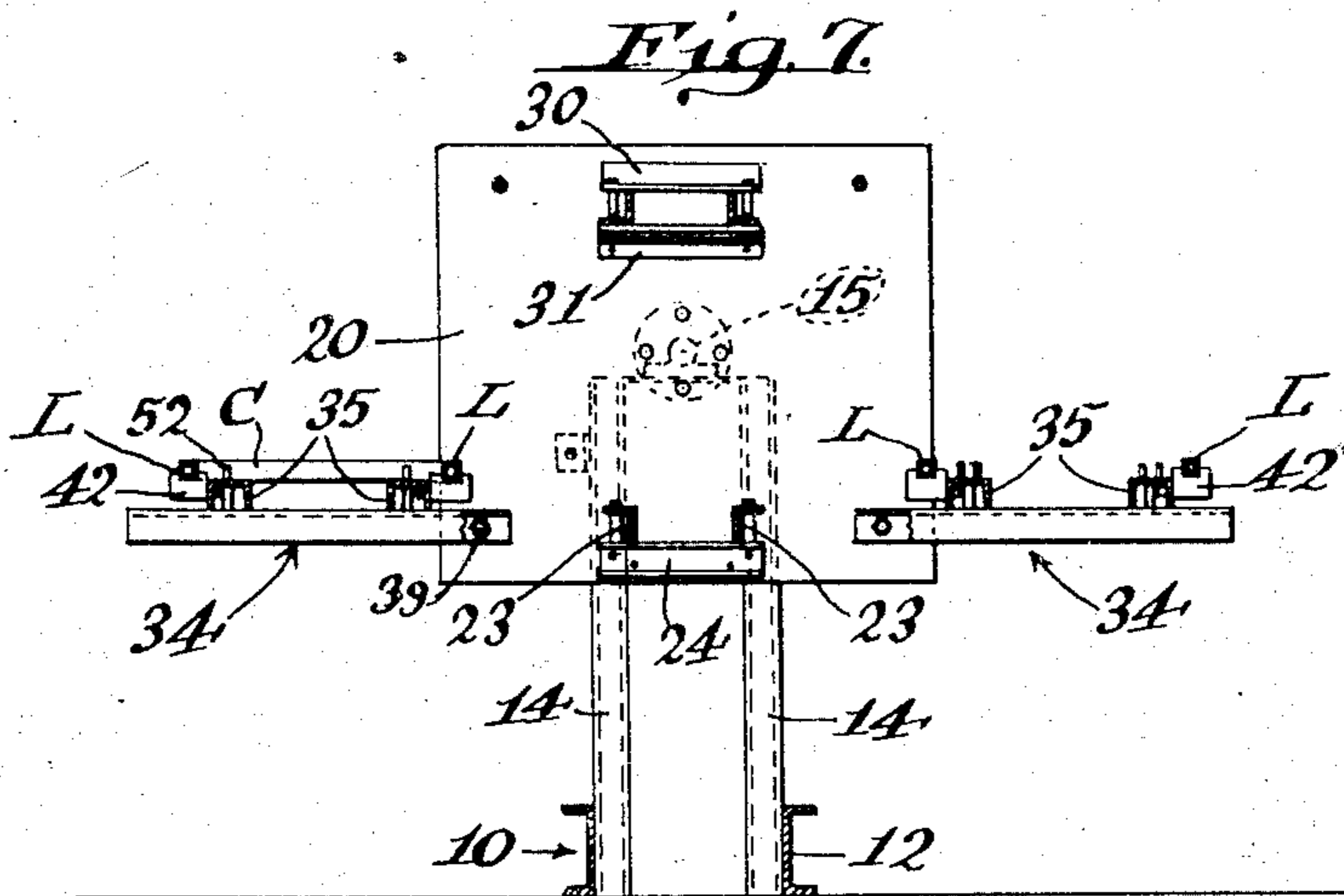
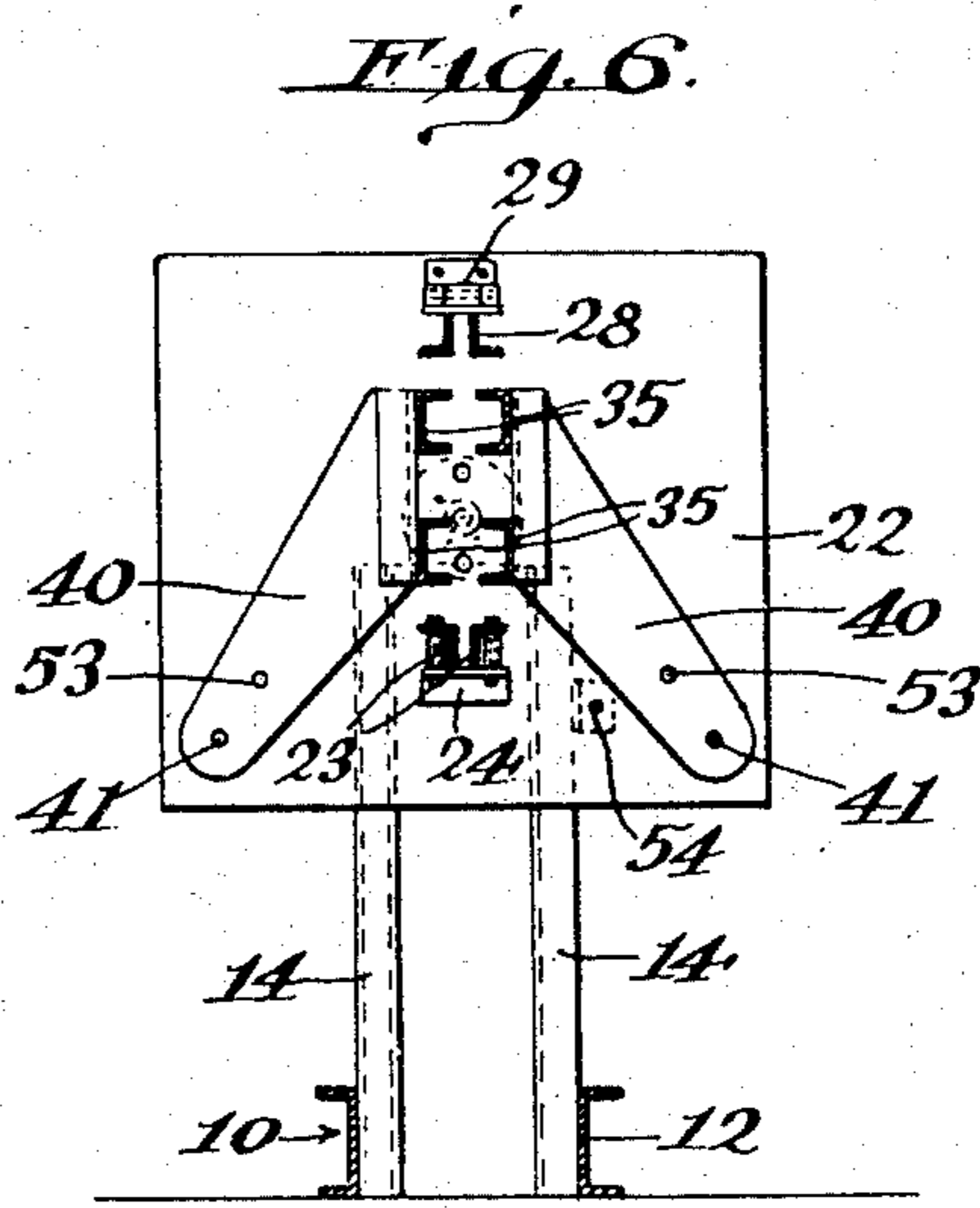
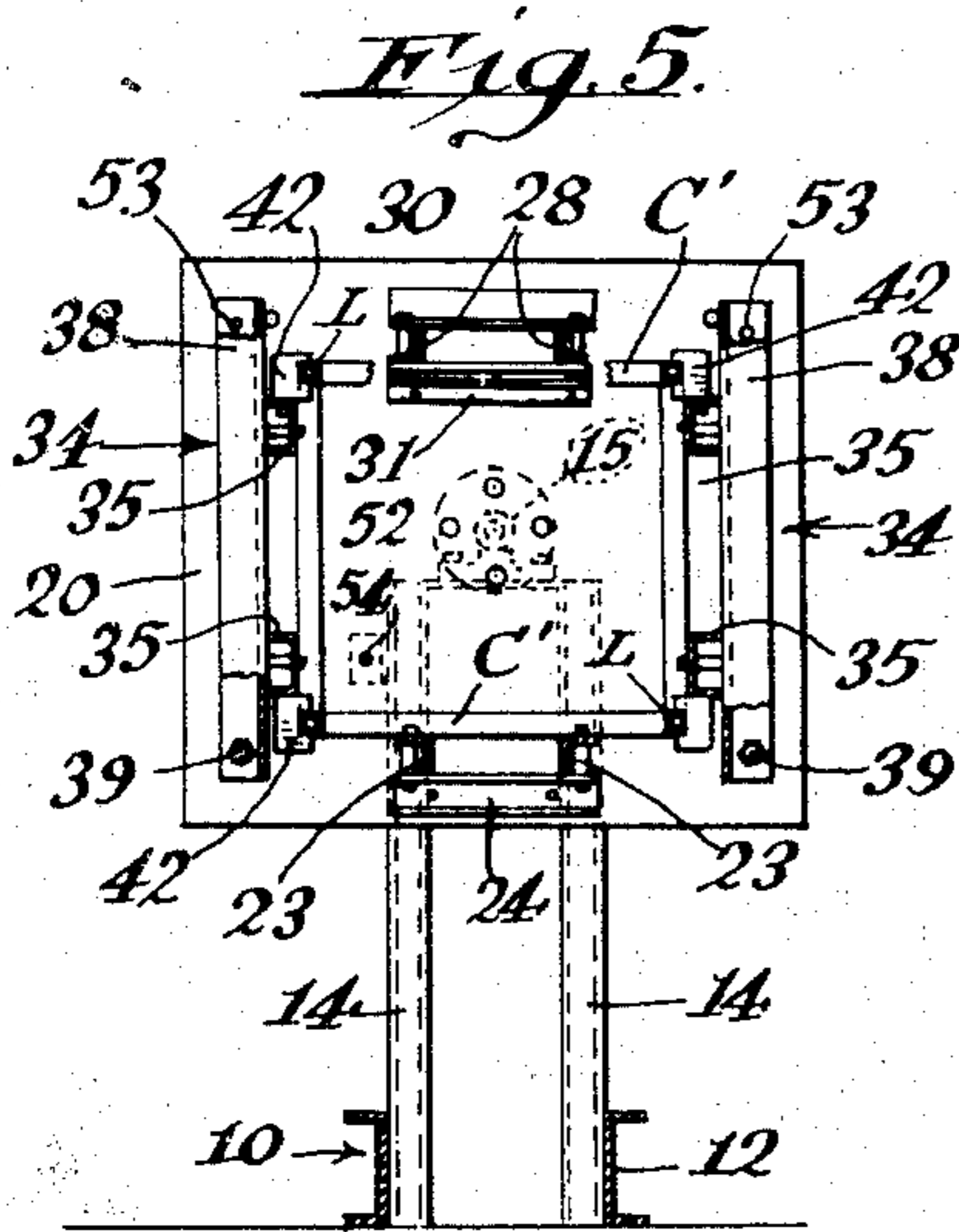
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AEROPLANE FUSELAGE JIG

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4 Sheets-Sheet 3



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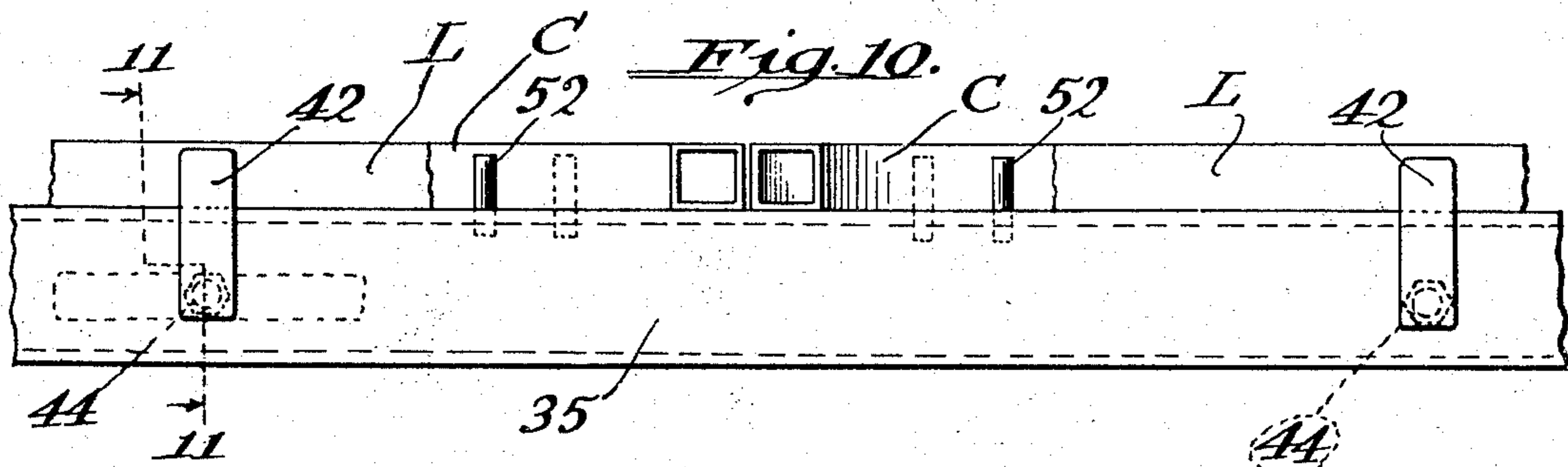
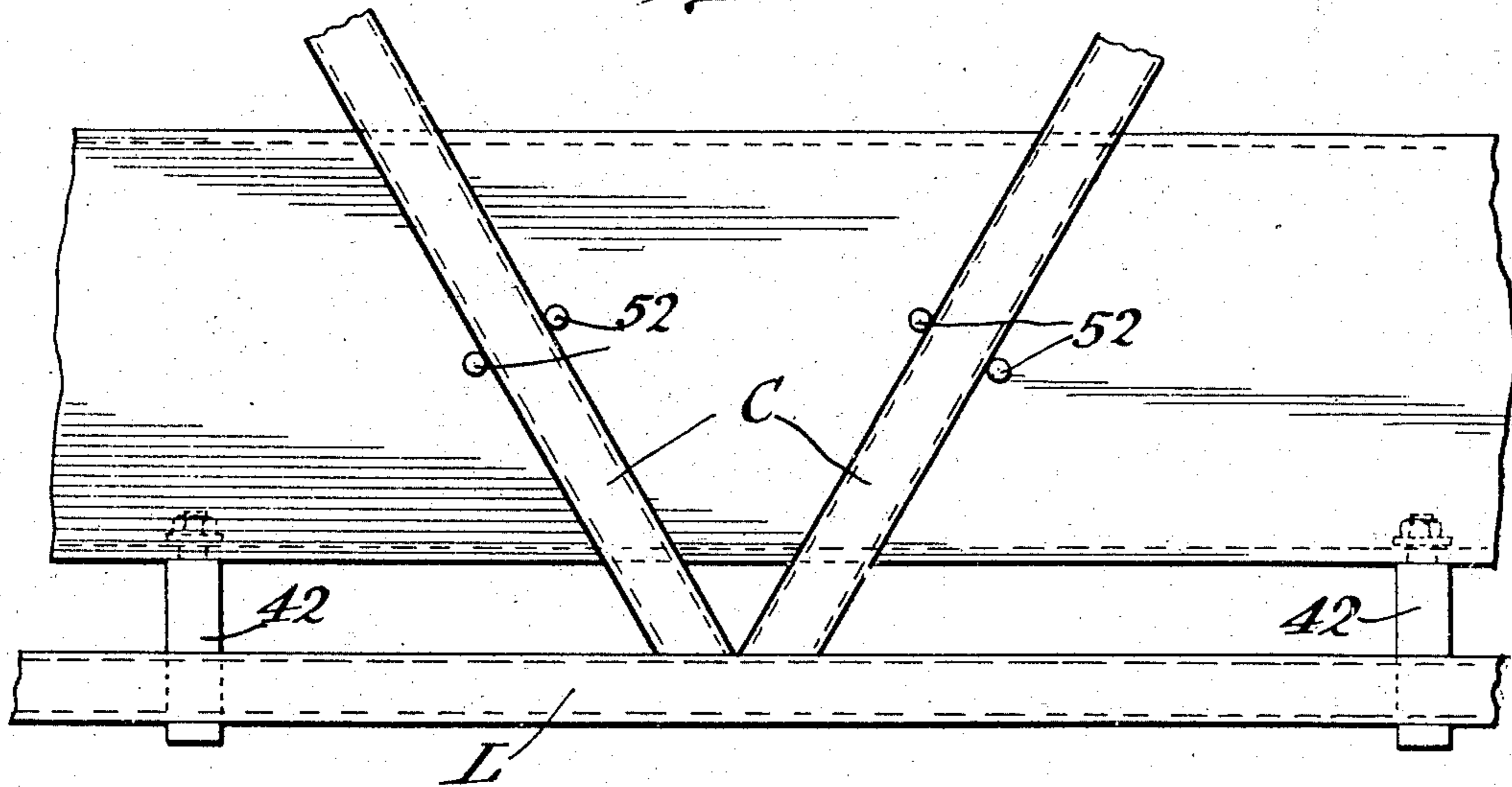
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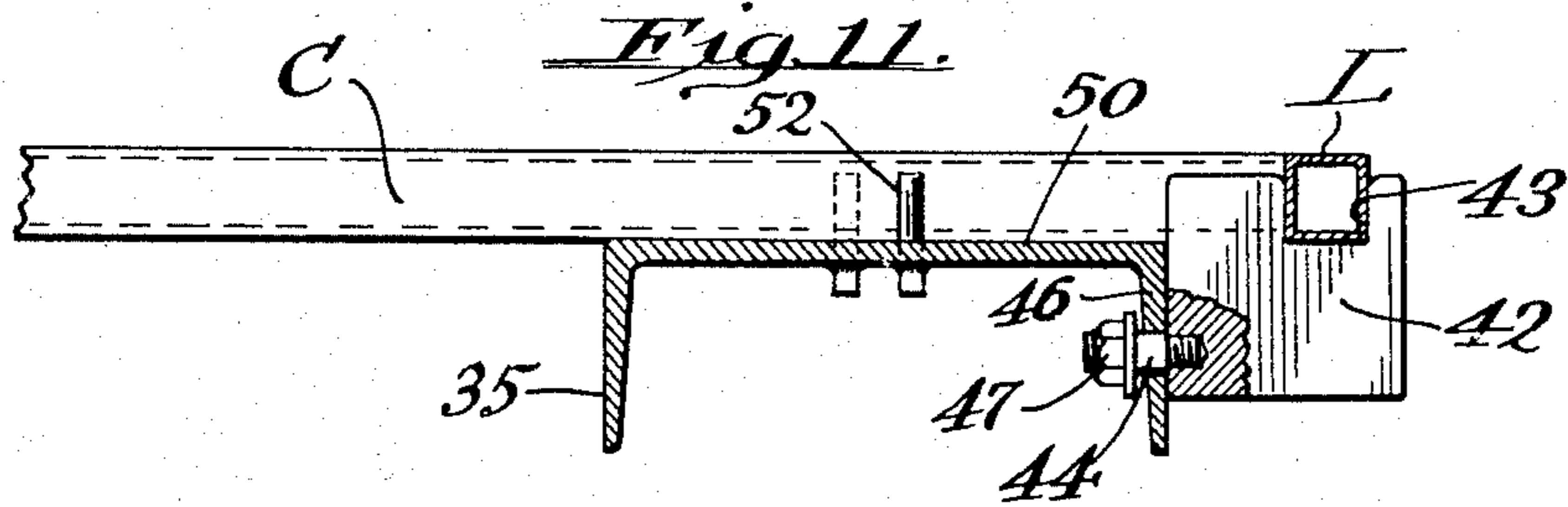
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*Fig. 9.*



*Fig. 11.*



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# UNITED STATES PATENT OFFICE

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## AEROPLANE FUSELAGE JIG

Application filed July 7, 1930. Serial No. 466,171.

This invention relates to aeroplane fuselage constructions, more specifically to a jig for forming a fuselage frame.

In the construction of aeroplane fuselage frames the usual method is to place the longerons and cross members together according to measurements given, then weld or otherwise secure them to each other. This procedure not only requires a considerable amount of time, but often results in irregularities in the shape of the fuselage.

The chief object of this invention is to provide a jig of the character referred to adapted to receive and position the members employed in forming a fuselage frame, whereby said members may be accurately joined together. Another object of the present invention is to provide a jig of the character stated, in which the frame is rotatably mounted whereby the same may be tilted in order to facilitate joining the members of the fuselage together by welding operations.

Other objects and advantages will be apparent from the following description, reference being had to the accompanying drawings, in which:

Fig. 1 is a top plan view of the jig showing the fuselage frame disposed therein;

Fig. 2 is a side elevation taken in the direction indicated by the arrow 2 of Fig. 1;

Fig. 3 is a top plan view showing the cradles or side members in open position;

Fig. 4 is a side elevation of Fig. 3 taken in the direction indicated by the arrow 4 of Fig. 3;

Fig. 5 is a vertical section taken on line 5—5 of Fig. 2 in the direction indicated by the arrows;

Fig. 6 is a vertical section taken on line 6—6 of Fig. 2 in the direction indicated by the arrows;

Fig. 7 is a vertical section taken on line 7—7 of Figs. 3 and 4 in the direction indicated by the arrows;

Fig. 8 is a vertical section taken on line 8—8 of Figs. 3 and 4 in the direction indicated by the arrows;

Fig. 9 is a fragmentary top plan view of the cradle showing a longeron and a pair of the cross members mounted thereon;

Fig. 10 is a fragmentary side elevation of the cradle, portions of the longerons being broken away to show the means for positioning the cross pieces; and,

Fig. 11 is a detail sectional view taken on line 11—11 of Fig. 10.

Referring more specifically to the drawings, 10 designates a base formed of a pair of parallel channels 12 to which are secured at each end thereof standards 14 supporting bearings 15 in horizontal alignment.

Mounted in the bearings 15 are stud shafts 16 projecting from flanged sockets 17 secured to front and rear plates 20 and 22 respectively, between which is disposed a pair of members 23 connected thereto at the lower ends thereof by suitable brackets designated at 24.

Members 23 are preferably formed of angle iron and converge toward the rear plate 22, each of which have an inclined portion designated at 25, the members being reinforced by cross pieces 26. These members serve to receive and support the cross pieces of the bottom portion of the fuselage frame in a manner later described.

Disposed directly above and lying in substantially the same plane as the members 23, is another pair of members designated at 28 which are secured together at one end by a hinge 29 which in turn is connected to the rear plate 22, the opposite ends of which are secured together by a cross bar 30 which normally engages a supporting member 31 secured to the forward plate 20, these members are employed while forming the top portion of the fuselage frame.

Pivotaly connected at each end thereof to the plates 20 and 22 is a pair of cradles designated at 34 which are employed in forming the side portions of the fuselage frame.

Cradles 34 are of the same construction each of which consist of longitudinal members 35 preferably formed of channel iron and reinforced by a plurality of cross members 36, the forward ends of the members are secured to a bar 38 which in turn is pivotaly connected by a pin 39 to the plate 20, the rear ends thereof being secured to an arm 40 pivotaly connected to the plate 22 by a pin 41. The pins 39 and 41 being in

alignment permit the cradle to be swung inwardly or outwardly during operation of the jig as later described.

As previously referred to, the cradles are employed in forming the side portions of the fuselage frame and are provided with a plurality of saddles 42 having recesses 43 formed therein adapted to receive and position the longerons designated at —L—. The saddles are pivotally connected to the channels 35 and 36 by studs 44 projecting therefrom through apertures formed in one of the side flanges 46, and are held against outward movement by a nut 47, as clearly shown in Fig. 11.

Projecting from the faces 50 of the channels 35 is a plurality of pins 52 which serve to position the cross members —C— of the side portions of the frame, and a plurality of similar pins also project from the members employed in forming the top and bottom portions of the fuselage frame.

In constructing a fuselage frame with the improved jig the cradles are swung outwardly as shown in Figs. 3, 4, 7 and 8 and rest on a pair of temporary supports —S— placed under the cradles as shown in Fig. 4. The longerons —L— are placed in the saddles and the cross members between the pins 52, the abutting ends are then secured together by spot welding, the above operation forming the sides of the fuselage frame.

The cradles are then swung inwardly to the position shown in Figs. 1, 2, 5 and 6 and are then adapted to be retained in this position by pins 53 inserted through aligned apertures formed in the plates 20 and 22, the channels 28 and the arms 40.

The cross members indicated at —C'— forming the top and bottom portion of the fuselage, are next placed on the members 23 and 28 respectively, between the longerons, the pins 52 holding these cross members in proper position. The abutting ends of the cross members are then secured to the longeron preferably by welding, thus completing the fuselage frame.

While the cross members forming the top and bottom portions are being joined to the longerons or thereafter, the jig may be rotated about the axis of the shafts 16 to facilitate the above operation, or to inspect the parts thus assembled. The plates 20 and 22 are normally held against rotation by removable pins 54 extending through aligned openings in the standards 14 and said plates.

By turning the saddles to either of the positions shown in dotted lines in Fig. 10, then swinging the cradles outwardly and raising top members 28 as indicated in dotted lines in Fig. 2, the completed fuselage frame may be removed from the jig.

I claim:

1. A fuselage jig comprising a base, a pair of plates, connected to said base a

pair of cradles pivotally connected to said plates, a pair of horizontally disposed members between said plates, said cradles having means adapted to position the members forming the side portions of a fuselage frame said horizontal members having means for positioning the members forming the top and bottom portions of the fuselage frame, said cradles adapted to swing inwardly so that the portions of the frame formed therein may be joined to the members forming the top and bottom portions, and means for pivotally connecting said plates to said base whereby said cradles, horizontal members and plates may be rotated in unison to facilitate inspection and joining of the members forming the fuselage frame by welding operation.

2. A fuselage jig comprising a pair of oppositely disposed plates, a pair of cradles pivotally connected to said plates, means carried by said cradles for receiving and positioning the longerons and cross members forming the side portions of a fuselage frame, a pair of horizontal members disposed between said plates and connected thereto, and means carried by said pair of horizontal members for positioning the cross pieces forming the top and bottom portions of a fuselage frame.

3. A jig for forming an aeroplane fuselage frame comprising a base, standards secured to each end of said base, a plate connected to each of said standards, a pair of cradles pivotally connected to said plates, upper and lower members disposed between and connected to said plates, said cradles adapted to receive and position the longerons and cross pieces forming the side portions of the fuselage frame, whereby the same may be joined together, said upper and lower members adapted to receive and position the cross pieces employed in forming the top and bottom portions respectively of the fuselage frame, said cradles adapted to be swung inwardly after the longerons and side pieces forming the side portion of the frame are joined together, whereby the longerons of the portions thus formed may be joined to the cross pieces forming the top and bottom portions of the fuselage frame.

4. A fuselage jig comprising a pair of oppositely disposed plates, a pair of cradles pivotally connected to said plates, said cradles having projections formed thereon adapted to position the cross members forming the side portions of a fuselage frame, a pair of horizontal members disposed between said plates and connected thereto having projections formed thereon adapted to position the cross pieces forming the top and bottom of a fuselage frame, and means carried by said cradles for holding the longerons, whereby the same may be joined to said cross pieces.

5. A fuselage jig comprising a pair of vertically disposed plates, a pair of cradles pivotally connected to said plates, a pair of horizontally disposed members connected at each end thereof to said plates, a plurality of saddles pivotally connected to the sides of said cradles adapted to receive the longerons employed in forming a fuselage frame, and a plurality of pins projecting from said cradles between which the cross pieces adapted to be joined to the longerons are placed when forming side portions of a fuselage frame, said cradles adapted to be swung inwardly after the longerons and side pieces forming the side portion of the frame are joined together, whereby the longerons of portions thus formed may be joined to the cross pieces forming the top and bottom portions of the fuselage frame.

6. A fuselage jig comprising a base, a standard secured to each end of said base, a pair of plates, means for pivotally connecting said plates to said standards, a pair of cradles pivotally connected to said plates, an upper member disposed between said plates, a hinge secured to one end of said upper member and connected to one of said plates, a plurality of saddles secured to said cradles adapted to receive and position the longerons employed in forming the side portions of the fuselage frame, a lower member disposed between and connected to said plates, and a plurality of pins projecting from said cradles between which the cross pieces adapted to be joined to the longerons are placed when forming side portions of a fuselage frame, said cradles adapted to be swung inwardly after the longerons and side pieces forming the side portion of the frame are joined together, whereby the longerons of portions thus formed may be joined to the cross pieces forming the top and bottom portions of the fuselage frame, said cradles adapted to be swung outwardly and said upper member raised when removing the completed fuselage from the jig.

7. In a fuselage jig, a pair of cradles, a plurality of saddles pivotally connected to said cradles, each of said saddles having a recess formed therein adapted to receive the longerons of a fuselage frame and hold the same in spaced relation to the sides of said cradles, and a plurality of pins projecting from the face of said cradles between which the cross pieces employed in forming the fuselage are adapted to be mounted and secured to the longerons.

In testimony whereof I affix my signature.

JOEL DANNER BUNCH.