

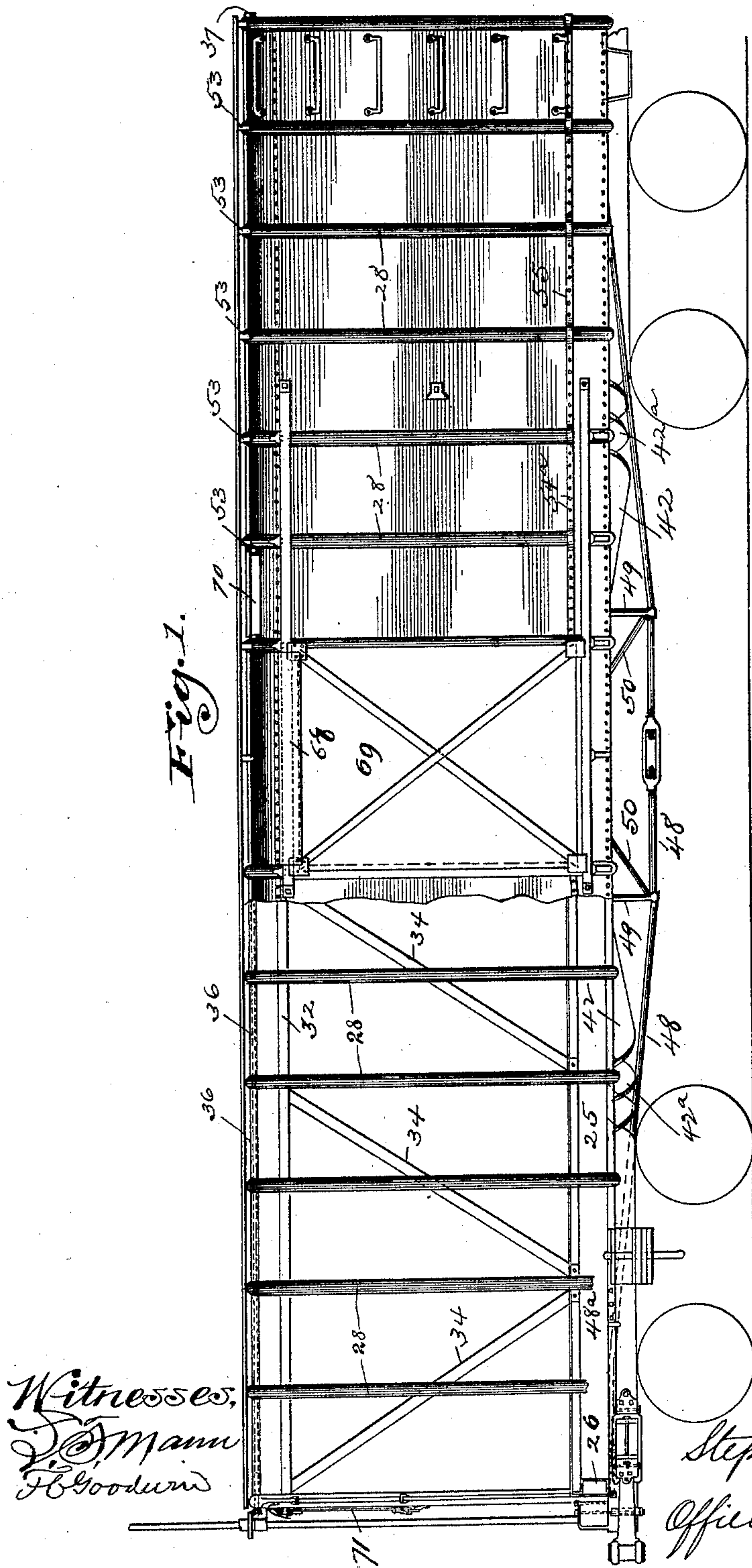
(No Model.)

8 Sheets—Sheet 1.

S. A. JENNINGS.
CAR CONSTRUCTION.

No. 485,198.

Patented Nov. 1, 1892.



(No Model.)

8 Sheets—Sheet 2.

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Fig. 22.

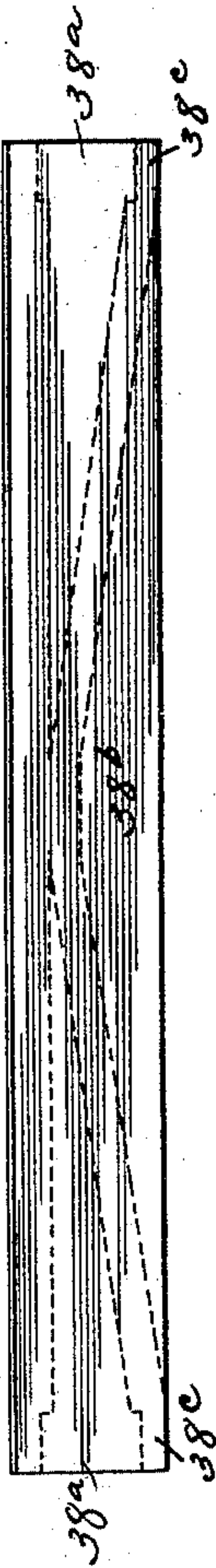


Fig. 2.

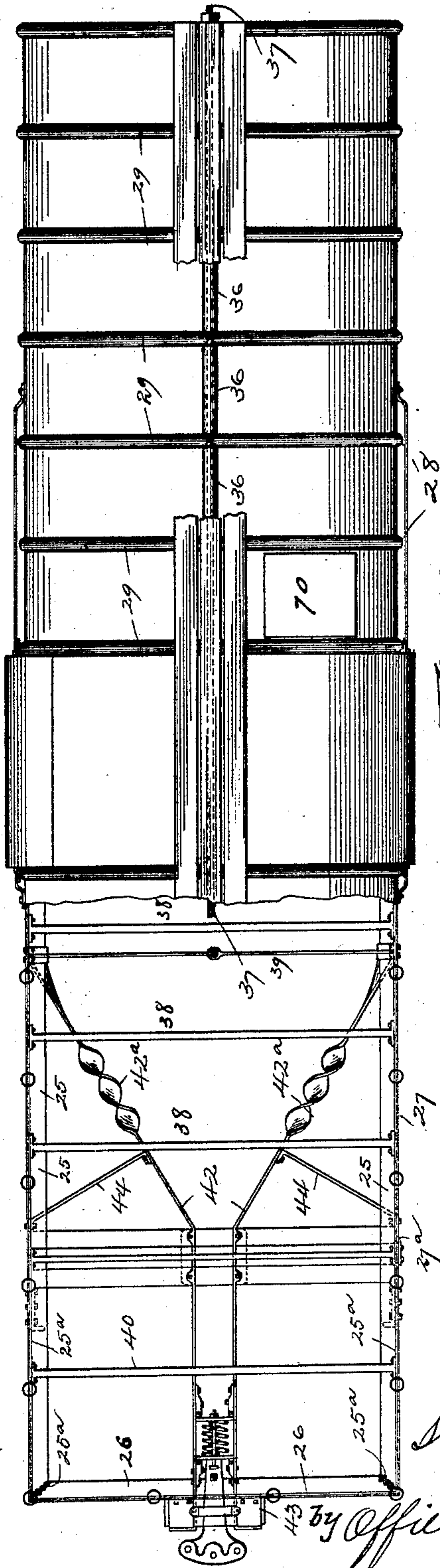
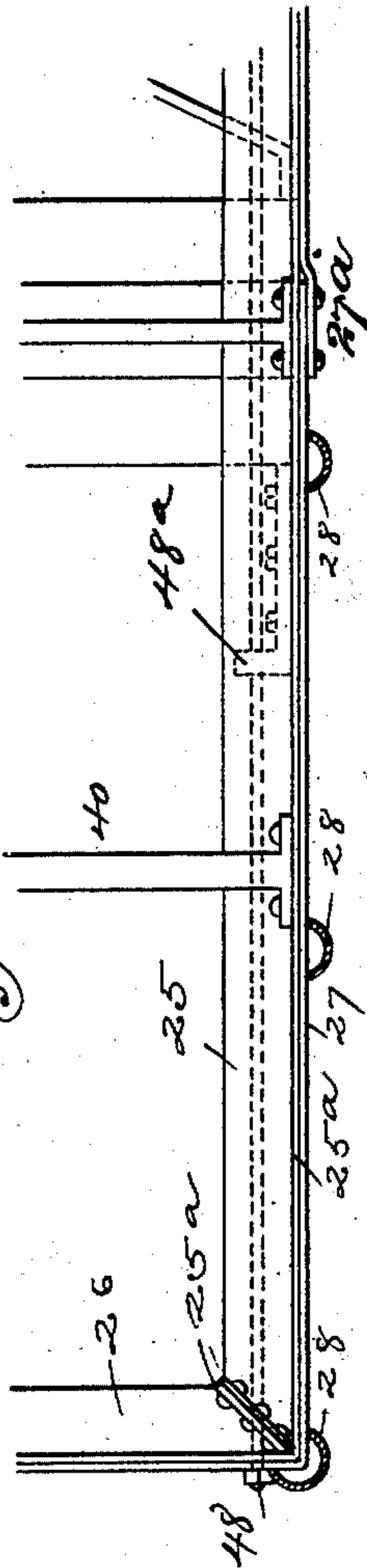


Fig. 16.



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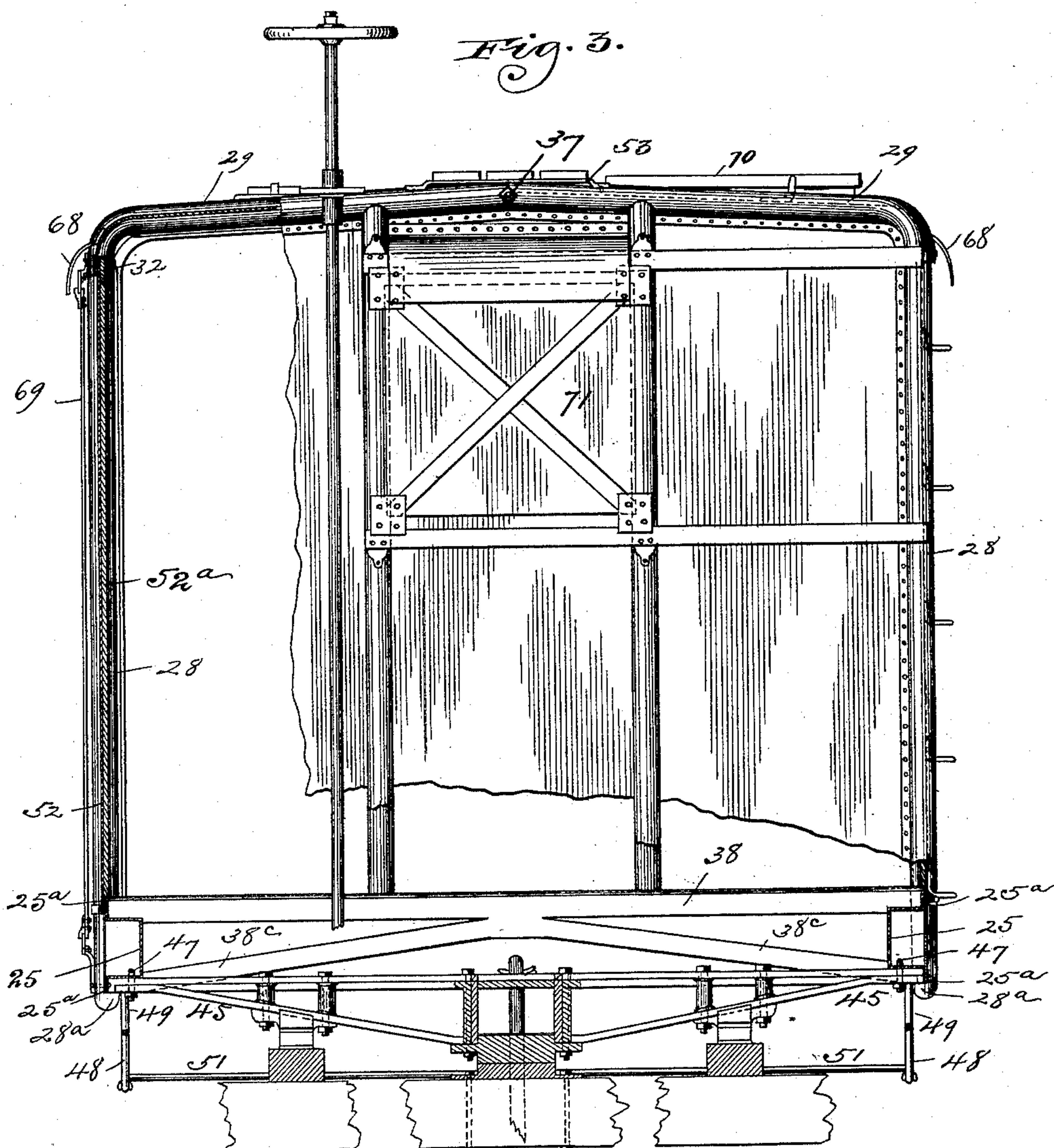
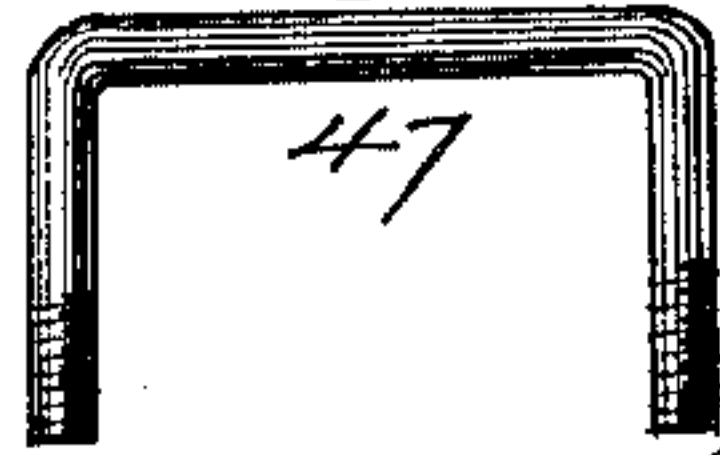


Fig. 3a.



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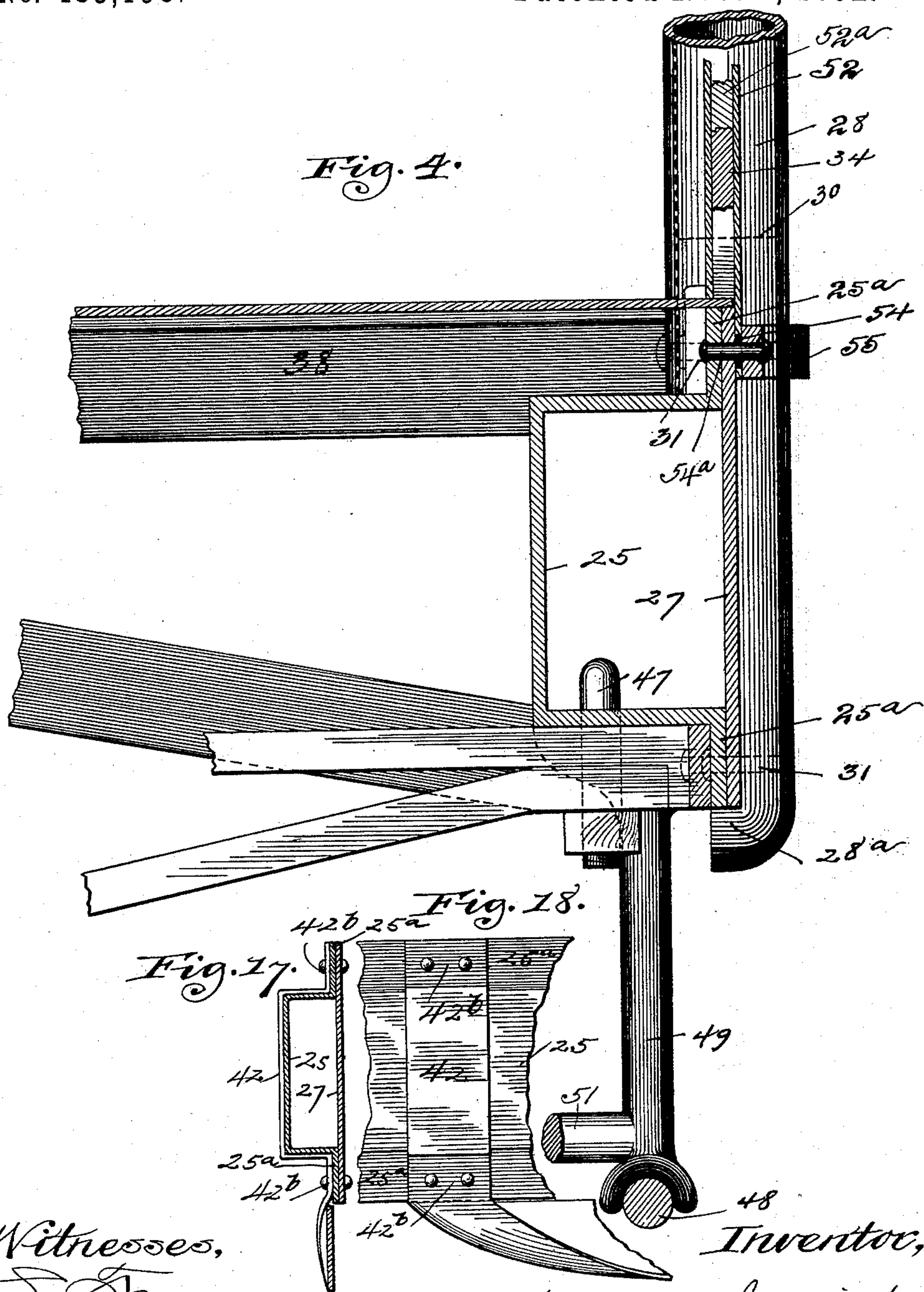
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Fig. 5.

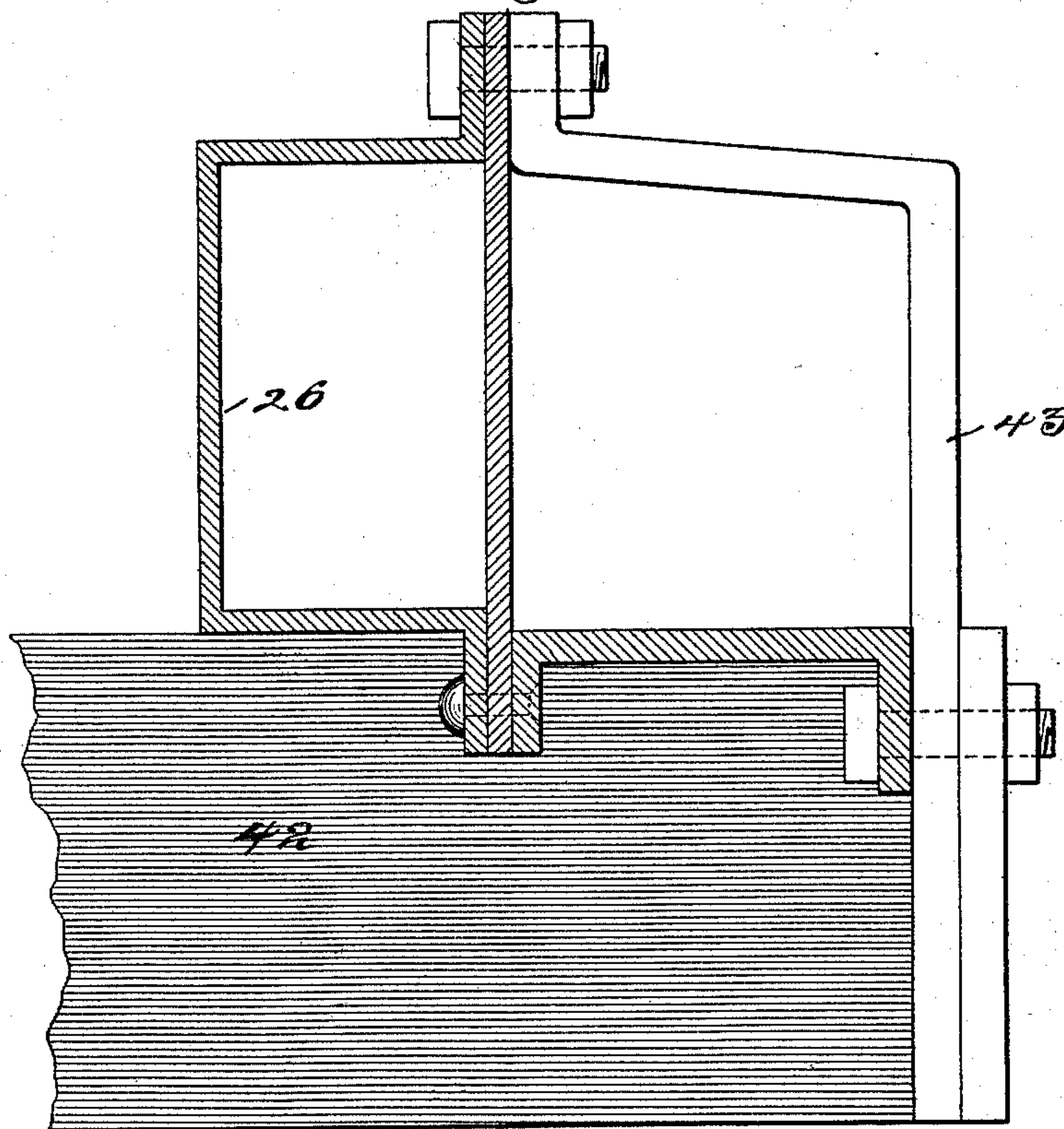
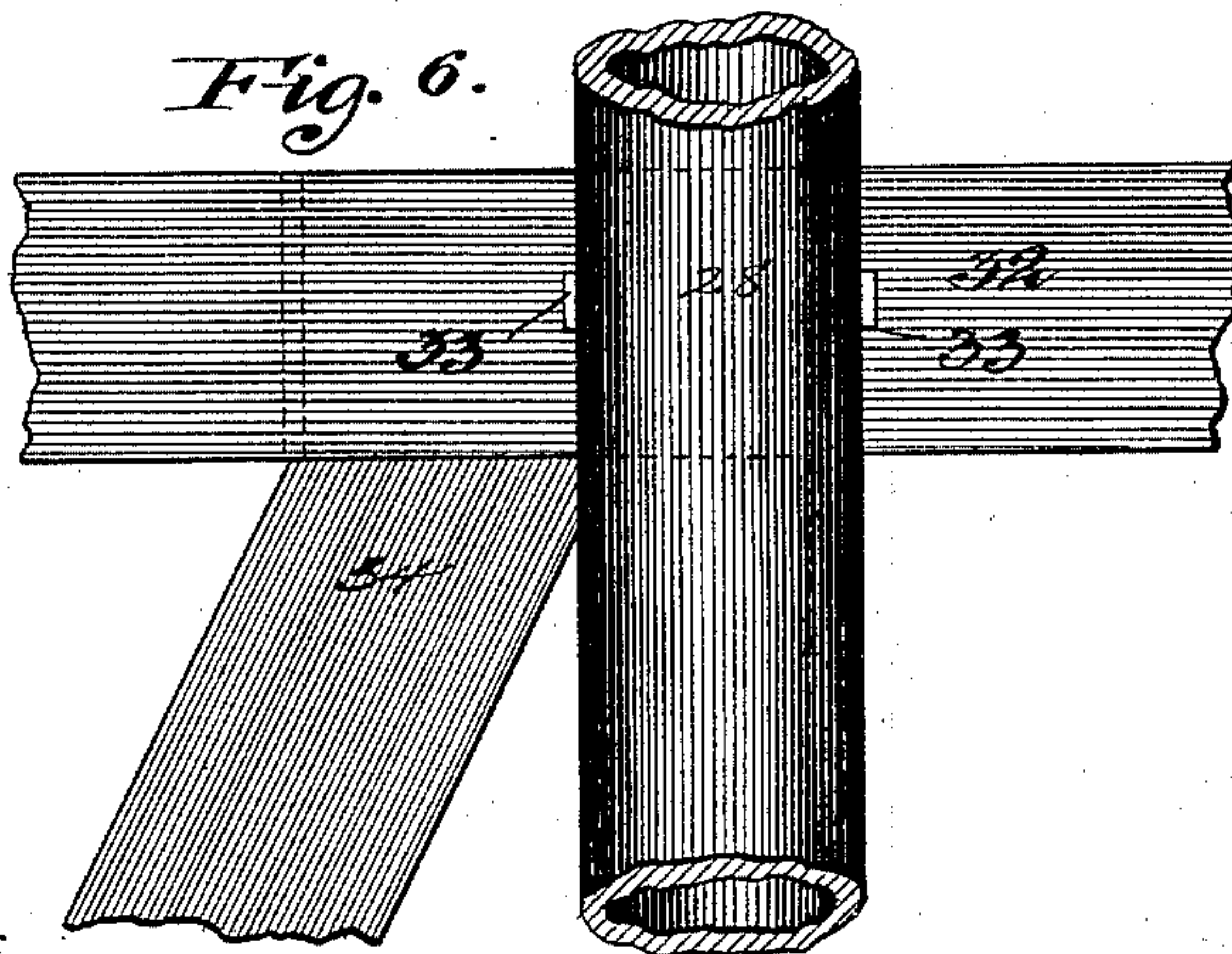


Fig. 6.



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Fig. 7.

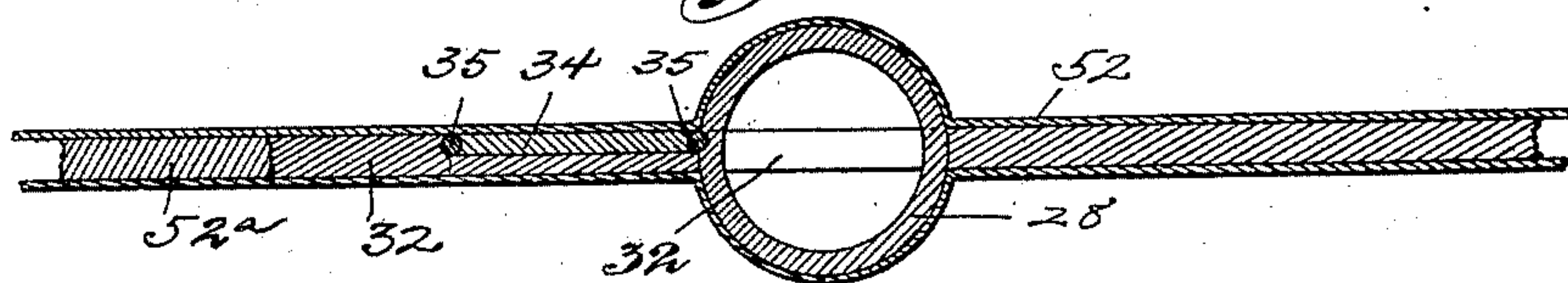


Fig. 8.

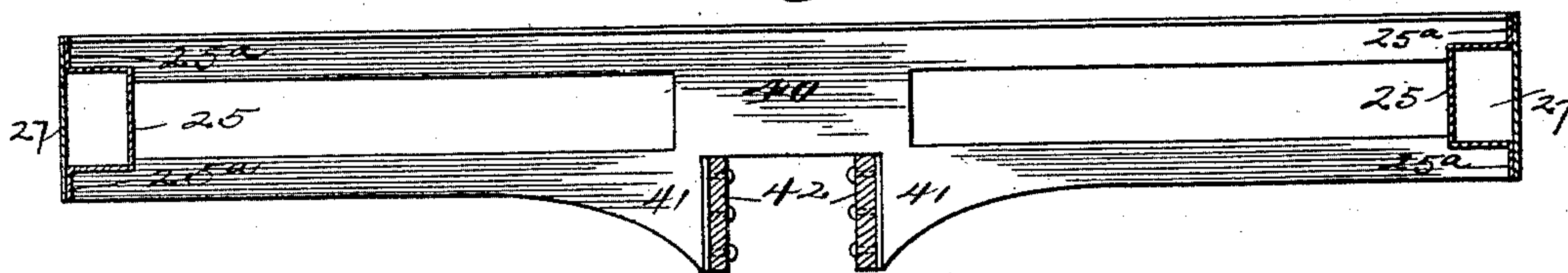


Fig. 9.

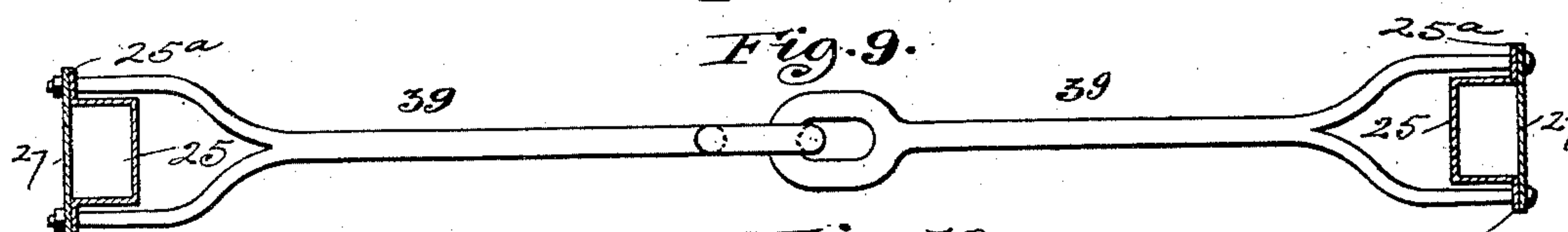


Fig. 10.

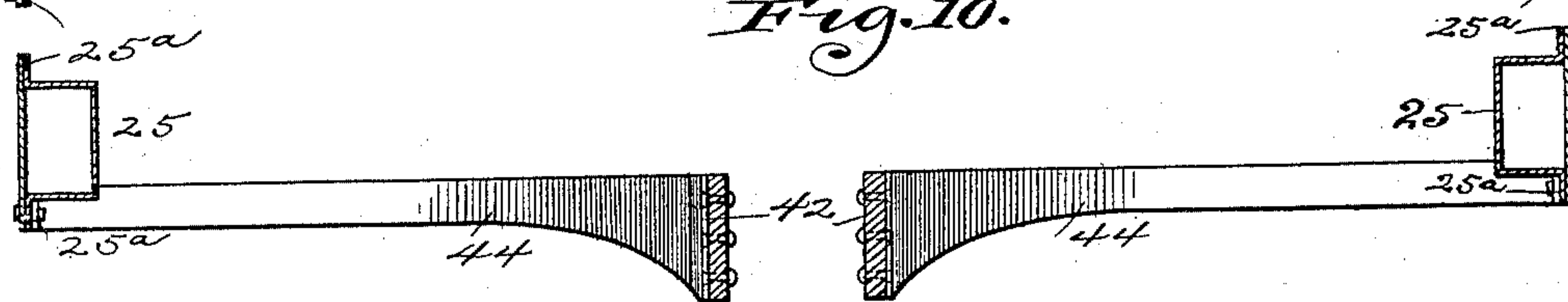


Fig. 12.

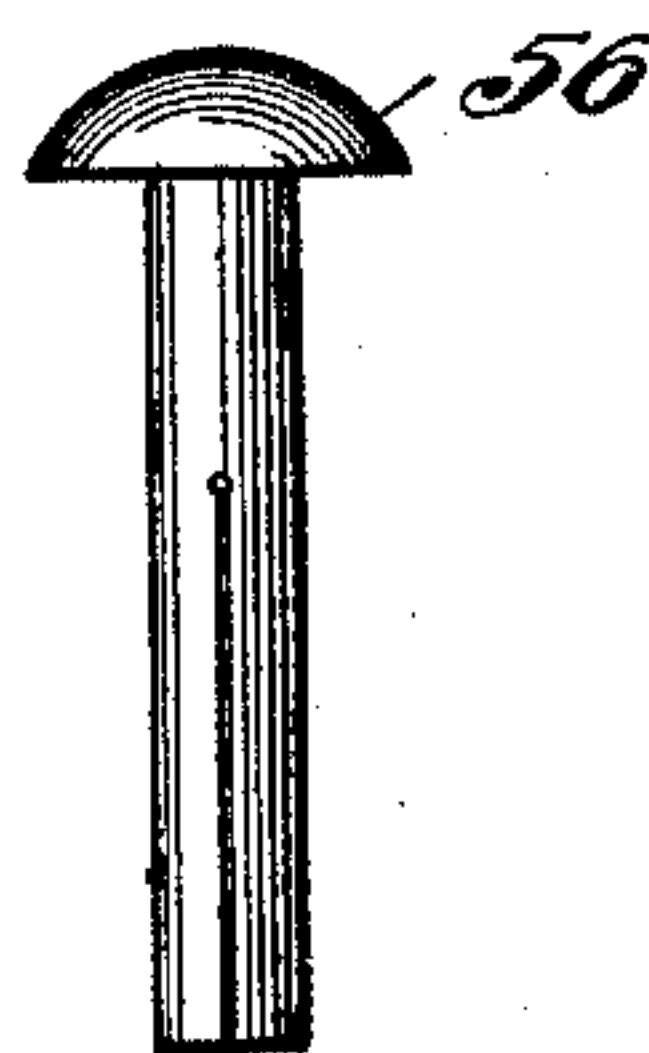
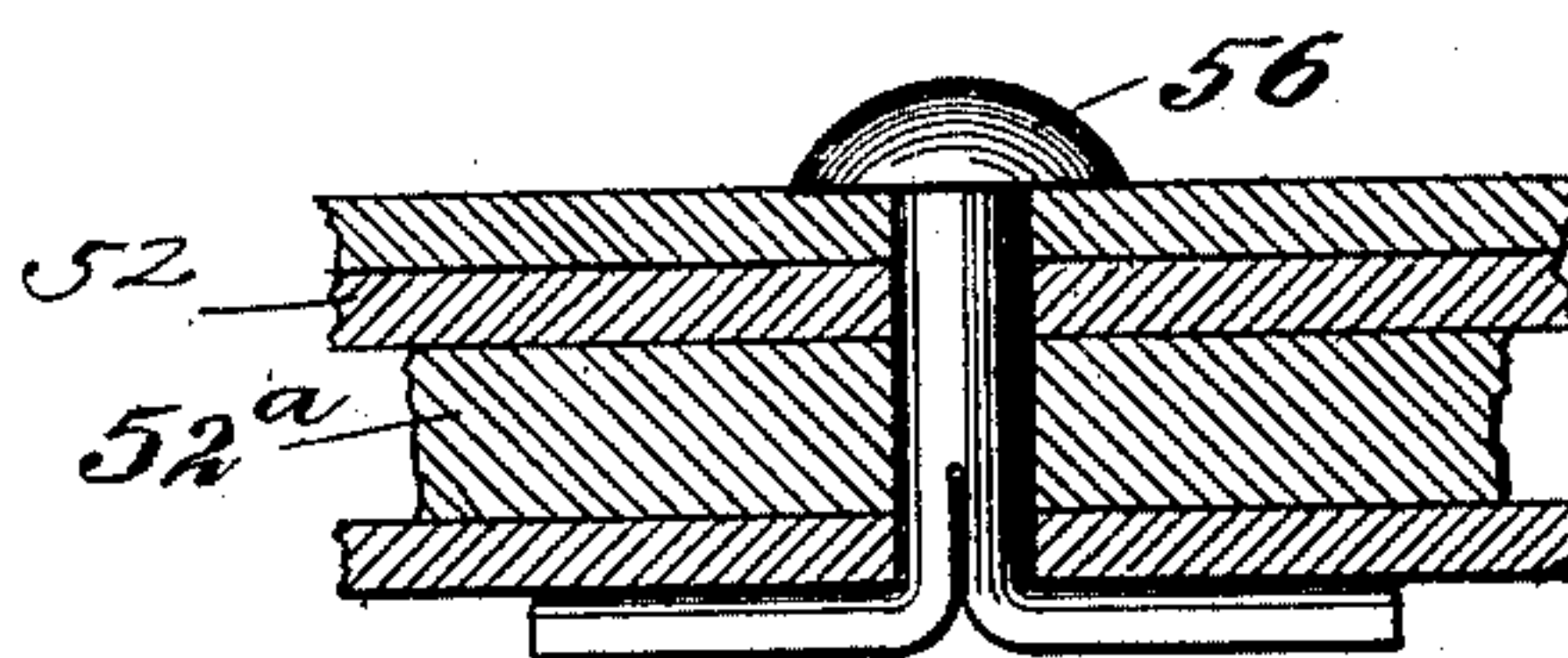


Fig. 11.



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Fig. 14.

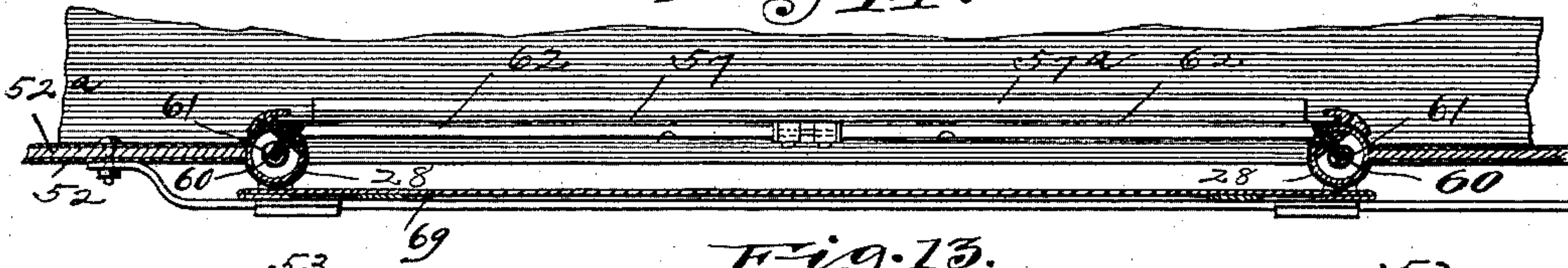
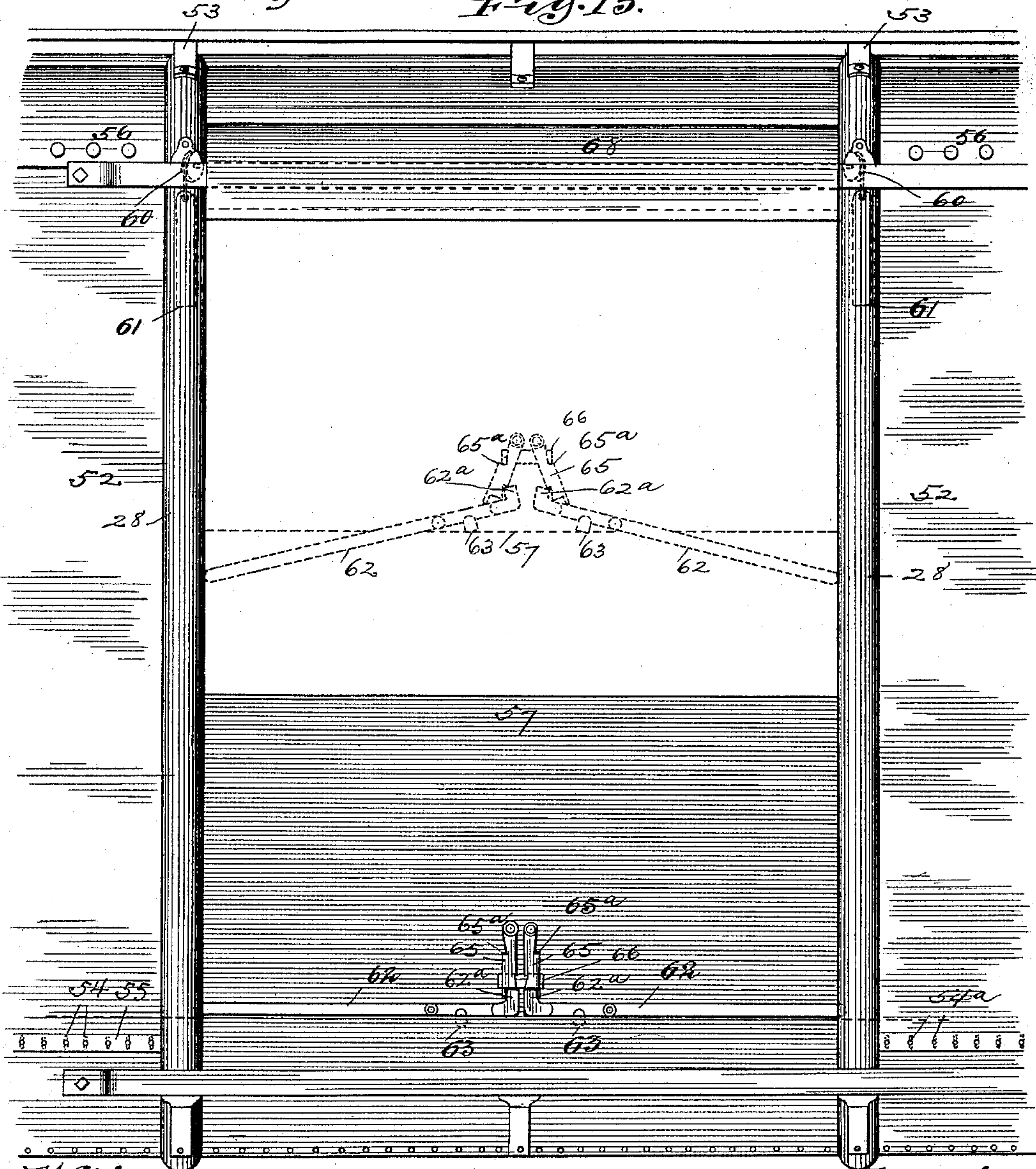


Fig. 13.



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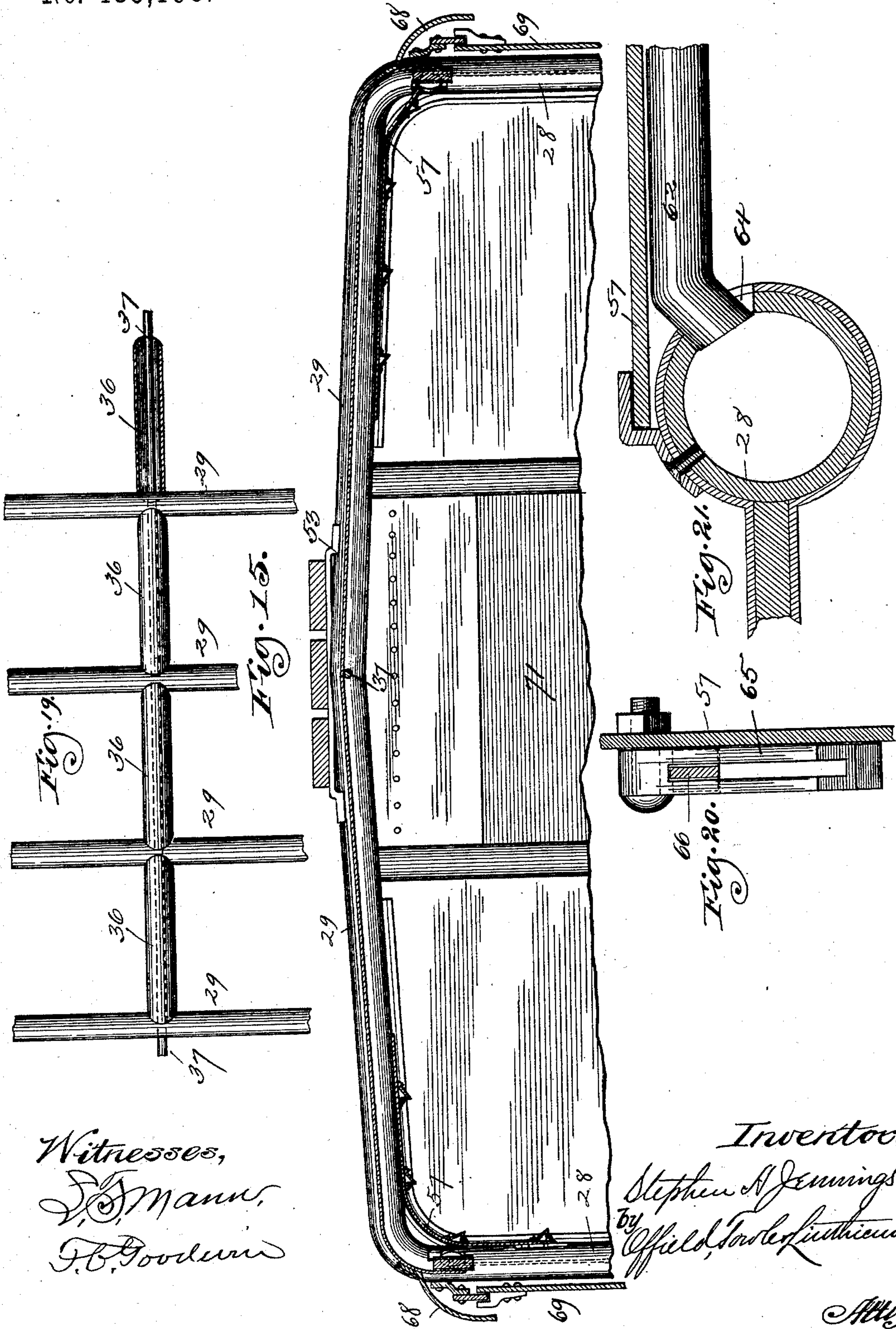
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UNITED STATES PATENT OFFICE.

STEPHEN A. JENNINGS, OF EVANSTON, ILLINOIS, ASSIGNOR TO ARTHUR S. KIRK, OF SAME PLACE.

CAR CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 485,198, dated November 1, 1892.

Application filed June 30, 1891. Serial No. 398,005. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN A. JENNINGS, a citizen of the United States, residing at Evanston, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Car Construction, of which the following is a specification.

My invention relates to certain improvements in car construction and may be employed in the building of passenger, freight, or street-railway cars; but is particularly adapted to freight-cars, and hence I have illustrated such a car in the accompanying drawings.

My improvements relate to a novel construction of the car-body. The sills are steel channel-beams, and the posts metal tubes, and the covering and sheathing metal plates. The sills are steel channel-beams presenting outwardly, and the margins of the flanges of the beam are offset. Face-plates are secured over the open sides of the sills and are riveted or bolted to the flanges of said sills. The side and end sills are joined at the corners of the car, while the face-plates are unsevered at the corners or without joints. In the preferred construction I do not employ intermediate longitudinal sills, but instead thereof I use transverse tie-rods and floor-beams, which are preferably I or T beams having their heads riveted to the side sills, so as to tie or anchor them together and prevent buckling or bending under the shocks of service. The posts are formed by bending metal tubes into an arch, the legs of which form two posts, one on either side of the car, while the middle of the arch forms a carling to support the roof. The ends of these posts project beneath the side sills and are intumed so as to secure a bearing for the posts on the lower sides of the sills and thereby anchor or securely tie the frame together. The covering of the car is made of metal plates, which are preferably of such size as that a single section will cover the side of the car from the end to the door, the ends being also made from a single section and the roof from two or more sections. The sheathing of the car is also of metal plates, and I employ a filling of straw pulp or equivalent material between the outside covering and the sheathing. I

have devised a peculiar fastening for securing the outside covering and the sheathing together at the top of the car. This fastening consists of a split key, the stem of which is passed through apertures in the covering and sheathing and the ends separated or spread so as to securely lock the two together and thereby clamp the filling in place. The lower ends of the plates forming the walls are riveted to the flanges of the side sills, the rivet-holes being elongated so as to provide for sufficient play to prevent shearing of the fastenings and for the expansion and contraction of the metal. I employ longitudinal ribs at about the location of the usual plates and diagonal braces or struts, which tie these plates to the floor-sills. The roof-frame has also a tie-rod. The floor is preferably made of metal plates. The draw-gear consists of metal plates disposed edgewise beneath the floor, the forward ends of these plates projecting beyond the car end and being turned out, so as to embrace the dead-wood. The forward ends of the draw-gear plates are parallel to each other and separated, so as to provide between them a spring-pocket, and their rear ends are spread and project diagonally until they meet the side sills, to which they are secured. The draw-gear plates are preferably twisted to increase their strength. Diagonal brace-rods support the middles of the draw-gear plates against buckling. I have also provided an inside or grain door of improved construction. This door is made of thin sheets of metal stayed at intervals by longitudinal strengthening-ribs and adapted to bend between said ribs. These doors have counterbalancing weights and cords and are adapted to be shoved up in suitable ways beneath the roof. The cords are fastened at the bottom of the doors and the weights move within the hollows of the tubular posts forming the door-jambs. I have also provided an improved lock for these doors.

Other novel details of construction will be hereinafter more fully described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of the car, the outer covering being broken away at one end and the figure being partly in section through the draw-

gear. Fig. 2 is a plan view with the roof broken away, the side walls in section, and the floor removed. Fig. 3 is an end elevation partly in section. Fig. 3^a is a detail for the transom-fastening. Fig. 4 is an enlarged sectional detail through one of the side sills. Fig. 5 is a sectional detail of the end sill, showing the dead-wood in elevation and a part of one of the draw-gear plates. Fig. 6 is a detail of one of the posts, the upper end of the brace or strut, and of the stiffening-plate applied to the car-frame at its top. Fig. 7 is a sectional plan of the parts shown in Fig. 6, with the covering, sheathing, and filling added. Fig. 8 is a side elevation of one of the transverse floor-beams, showing the side sills and face-plate in section. Fig. 9 is a similar view of a tie-rod for the side sills at the rivets where the draw-gear plates are connected to them. Fig. 10 is an elevation of the braces for the draw-gear plates shown joined to the side sills. Figs. 11 and 12 are detail views of the means for fastening the covering, sheathing, and filling together. Fig. 13 is a detail view, in elevation, of the door, some of the parts showing by dotted lines. Fig. 14 is a sectional detail on the line 14 14 of Fig. 13. Fig. 15 is an enlarged sectional detail of the roof, showing ways for the sliding door at the upper limit of its travel. Fig. 16 is an enlarged detail view of one of the corners of the car, showing the face-plate continuous at the corner. Figs. 17 and 18 are details showing the manner of connecting the rear ends of the draw-gear plates to the sills. Fig. 19 is a detail plan view of the roof, showing the carling, separators, and roof tie-rod. Fig. 20 and 21 are detail views of the grain-door lock, and Fig. 22 shows a blank from which one of the transverse floor-beams are made.

In the drawings, 25 represents the side sills, which are steel channel-beams with their openings presenting outwardly and their flanges having offset margins 25^a, which form bolt-flanges. These side sills may each be made from a single beam, and they are joined at their ends to end sills 26, which are of similar construction. At the junction of the side sills and end sills at the corners of the car the offset margins 25^a of the flanges are bent up from the body of the flange and are united at an angle of forty-five degrees.

27 represents a face-plate, which is fitted over the opening of the sills and the margins of which are bolted or riveted to the flanges 25^a of the sills. These face-plates are unsevered at the corners of the car, the joints being preferably made at the ends of the transom, as seen at 27^a of Figs. 2 and 6.

28 represents the posts. These are made from metal tubes, which in a freight-car I prefer to have of three-inch diameter. The posts are formed by bending the tube into arched shape, the legs of the arch each forming a post and the middle of the arch forming a carling 29. In order to secure a proper connection be-

tween the lower ends of these posts and the side sills I prefer to insert in the ends of such pipes or tubes solid steel-rods 30, of a diameter which will exactly fill the opening of the tubes, the rods being inserted while the metal is hot. The ends of the posts with the rods inserted are then placed in a suitable form and severed longitudinally a distance slightly greater than the width of the face-plates. The lower end of the post containing the remnant of the rod is then inturned, as seen at 28^a, to adapt it to bear upon the lower edge of the face-plate and the flange of the sill. The posts are then secured with the sill and face-plate by means of the through bolts or rivets 31. Below the roof-line the posts are strengthened by a continuous rib or plate 32, the posts being preferably slotted transversely for the passage of the plates, and keys 33 are applied on each side of the posts so as to hold them against lateral movement.

34 represent diagonal struts or braces which are secured at their lower ends to the side sills and at their upper ends are halved into the plates 32, and then apertures are drilled at each edge of the strut and filled with Babbitt metal 35, which, after it cools, makes a strong and tight joint between the ends of the struts and the posts and plate. The carlings are spaced by means of the tube-sections 36, whose ends are fitted to embrace the sides of the carlings, and a roof-tie rod 37 passes through these separating-tubes and through apertures in the carlings, one or both of its ends being provided with a nut whereby the whole may be chorded up. The roof-structure is thus rigidly tied together.

In the preferred construction I do not employ intermediate sills, but instead thereof employ transverse floor-beams and tie-rods. In order to adapt the beams to receive and brace the draw-gear, two of them are of special construction, and in order to securely tie the side sills together at the point where the rear ends of the draw-gear plates are connected thereto, I employ a special tie-rod.

38 represents the transverse floor-beams, which may be steel T-beams and having their heads bolted or riveted to the side sills of the car. By reference to Figs. 3 and 4 of the drawings it will be seen that the webs of these beams are cut away. The blank is shown in Fig. 22 and the parts to be removed are indicated at 38^a and 38^b. A considerable saving of material and weight is thus effected and a beam is produced which forms within itself an efficient truss. The beam is straight on its top to receive the floor and the depending arms 38^c form the lower chord of the truss member, the upper chord members being secured with the upper flanges of the side sills and the lower members with the lower flanges thereof.

39 represents a tie-rod having bifurcated ends which pass through the flanges of the side sills and are fastened with a nut or by being headed over. These tie-rods are ap-

plied, as will be observed, at the junction of the draw-gear plates and the side sills, and only two of them need be employed. Their purpose is to prevent buckling or bending of the side sills under shock or strain.

In Fig. 8 I have shown a special form of tie-beam, (marked 40,) which is cut away on its lower side and shouldered, as at 41, to provide side bearings or stays for the draw-gear plates 42. These plates are disposed edge-wise, their forward ends being bent to embrace the dead-wood 43, as seen in Figs. 2 and 5. These plates are parallel to each other for a sufficient distance to provide between them a spring-pocket, and their rear ends are separated and project diagonally until they meet the side sills. These extensions are preferably twisted, as seen at 42^a, and the ends are joined to the side sills, as illustrated in Figs. 17 and 18. These ends are bent to adapt them to embrace the rear side of the side sills and are provided with an upturned flange above the side sill and are bolted both above and below, as seen at 42^b. In order to sustain these draw-gear plates, they are braced by the diagonal braces 44, as seen in Fig. 2 and in detail in Fig. 10.

I construct the transom 45 from metal plates, with their middles separated and their ends lapping upon each other, as shown in Fig. 3. These overlapped ends have a bearing upon the under sides of the side sills and are secured thereto by means of U-bolts 47, the legs of which pass through the lower flange of the side sill and through registering apertures in the overlapped ends of the transom-plates and are secured by nuts. The manner of fastening the transom ends to the side sills is illustrated in detail in Fig. 3^a.

As in the preferred construction of my car no immediate sills are employed, I dispense with the usual needle-beams and modify the bearings and braces for the body truss-rod 48 and its bearing 49. These truss-rods extend to the ends of the car and pass through the lower flange of the end sills and face-plates and have tightening-nuts or are riveted. They extend back alongside the sills and pass through keepers 48^a. Struts 50 rise from the lower end of the body truss-rod bearing and are connected to the lower sides of the side sills. These provide adequate bracing against longitudinal strain; and in order to prevent lateral movement of the body truss-rods I employ the tie-rods 51, which are joined to or integrally formed with the supports 49, as seen in Fig. 9. These tie-rods have a free joint to permit of their connection with the side sills. This construction, while equally efficient, is much more simple than the common construction.

The outside covering is made from sheet-metal plates 52, and I prefer to have the side plates of such size as to cover the car from the bottom to the roof-line and from the end of the car to the door. The side and end plates are duplicated on the inside of the structure

to provide a sheathing, the intervening space being filled with straw pulp 52^a or equivalent material. The ends of the car will each be made of a single sheet of metal. The roof for convenience may be made in parts joined centrally of the car, and the roof-sections are lapped down upon the sides and riveted thereto. The run-board is made of wood and secured to brackets 53, the latter being secured to the carlings in any convenient manner. The metal covering-plates are provided at their lower extremities with elongated slots 54, through which rivets 54^a pass, and the rivets also pass through holes in a continuous strip 55 and through the flanges of the sills and face-plate. The elongated apertures allow for contraction and expansion of the metal and for vibration of the car-structure without injury to the rivets or plates. The roof is made of a single outside covering and joined to the sides and ends of the car by split pins 56, as shown in Figs. 11 and 12. The covering and sheathing plates are vertically fluted to adapt them to fit over the posts, so as to give the wall-coverings a bearing upon said posts, thus adding to the rigidity of the structure and also reducing the thickness of the wall and economizing space in the interior of the car.

The inner or grain door 57 is made from a single sheet of metal, preferably provided at intervals with stiffening or strengthening ribs 57^a, secured horizontally to the inner face of the door. Secured to the lower corners of the door are weight-cords passing over pulleys 60 and provided with the weights 61, said weights moving in the hollow of the posts. These doors are sufficiently elastic to conform to the curvature of the roof when not in use, the design being to elevate them by means of the cords and weights to a position beneath the roof of the car, as clearly shown in Fig. 15.

Pivotally secured to the outer face of the door toward its lower edge are locking-bars 62, having on their under side studs 63, which fit into sockets in the floor. The ends of these locking-bars in their locked position project through apertures 64 in the door-posts. The inner ends of these bars are upturned, as at 62^a, and above them are pivoted the gravity-latches 65. These latches are slotted horizontally, as shown in the sectional detail of Fig. 21. The double T-headed key 66 couples these gravity-latches together and in its normal position—that is, when the door is locked—confines their offset ends upon the upturned ends 62^a of the pivoted locking-bars. The outer edges of the latches 65 are cut away near their pivots, as shown at 65^a in Fig. 13, and when the locking-key is raised it will rest in said cut-away portions when the lower ends of the latches are separated, so as to clear the upturned ends of the locking-bars. When the bars are thus unlocked, the door may be raised, and in this movement the studs 63 will be lifted out of their sockets and the outer ends of the locking-bars 62 will be withdrawn from

the apertures 64 in the door-posts, the bars swinging on their pivots sufficiently to permit this clearance. When the door is lowered to place, the outer ends of the locking-bars will enter the apertures 64 in the door-posts and they will thus be straightened again, the studs 63 entering their sockets. The key will drop down and the latches will swing into a vertical position, so as to lock the bolts. This device not only serves as a lock, which in its principal action is automatic, but it also serves as a strengthening-bar for the lower edge of the door.

Suitable hoods 68 are provided over the outer doors 69, and these doors may be made to slide upon tracks in the usual way. The roof is provided with scuttles 70, and one or both ends of the car with a door 71.

It is obvious that many of the features hereinabove described may be modified and that some of them may be employed in a car in which others are omitted; but it is my purpose to build car-bodies almost entirely from metal, as I thereby obtain a car having great carrying capacity, weighing much less than the ordinary wooden car, and which will much better withstand the shocks of service, as well as being practically fire-proof.

Without limiting myself to the precise details of construction, I claim—

1. In car-construction, sills composed of channel-beams having their flanges offset or marginally bent and face-plates secured to said flanges, substantially as described.

2. In car construction, the combination, with sills composed of channel-beams presenting outwardly and having the margins of their flanges angularly bent or offset, of face-plates riveted or otherwise secured to said flanges, said face-plates being continuous around the corners of the car, substantially as described.

3. In car construction, the combination, with side sills composed of flanged metal beams, of transverse floor-beams composed of T-bars having portions of the ends of their webs cut away and the bifurcations thereof embracing the side sills and secured to the side sills by bolts or rivets, substantially as described.

4. In car construction, the combination, with sills composed of flanged metal beams, of tie-rods having their ends forked and secured with the side sills by being passed through the flanges thereof, substantially as described.

5. In car construction, the combination, with the frame of the car, of a draw-gear composed of metal beams disposed edgewise and having their outer ends projecting beyond the ends of the car and bent to engage the dead-wood, substantially as described.

6. In car construction, the combination of a draw-gear composed of two metal plates separated toward their forward ends to provide between them a spring-pocket and having their inner ends spread apart and connected to the side sills, respectively, substantially as described.

7. In car construction, the combination of a draw-gear composed of metal plates disposed edgewise and separated toward their forward ends to provide a spring-pocket and having their rear ends spread and connected to the side sills and having their bodies twisted, substantially as described.

8. In car construction, the combination of a draw-gear composed of plates vertically disposed, their forward ends being separated and parallel to each other and their rear ends spread and connected to the side sills, and diagonal bracing-rods interposed between the bodies of the draw-gear plates and the side sills, substantially as described.

9. In car construction, the combination, with the floor-frame, of a draw-gear composed of two metal plates, disposed edgewise, and a transverse floor-beam 40, having its middle portion recessed and provided with shoulders to form side bearings for the draw-gear plates, substantially as described.

10. In car construction, the combination, with metallic side sills, of combined posts and carlings constructed integrally from tubes bent into arched form, the legs of the arch forming two posts for opposite sides of the car and the middle forming a carling, and the ends of the posts projecting along the faces of the side sills and inturned beneath said sills, substantially as described.

11. In car construction, the combination of the frame posts or uprights composed of metal tubes having their lower ends cut away to provide a scarf-joint with the side sill and their extremities inturned to engage the lower edge of the side sill, substantially as described.

12. In car construction, frame-posts composed of metal tubes cut away toward their lower ends to provide one member of a scarf-joint and the remaining portion being provided with a core or filler of metal, the parts being fused together and the extremities of the posts inturned to engage the lower edge of the side sills, substantially as described.

13. In car construction, the combination, with posts composed of metal tubes, of an outer covering and an inner sheathing or lining for the side walls, composed of metal plates fluted to embrace the posts, substantially as described.

14. In car construction, the combination, with posts composed of metal tubes, of longitudinal plates passing through apertures in said posts and keyed thereto, substantially as described.

15. In car construction, the combination, with posts composed of metal tubes, of plates connecting said tubes, and struts or braces secured at their lower ends to the side sills and at their upper ends to said plates, the joints being filled with Babbitt metal, substantially as described.

16. In car construction, the combination, with the frame of the car, of an outer covering of metal plates secured to the frame by means of rivets or bolts passing through elon-

gated apertures in the plates, and a continuous strip 55, through which these securing means also pass, substantially as described.

17. In car construction, the combination, with posts composed of metal tubes, of an outer wall covering and an interior sheathing fitted to said posts and an intermediate filling or lining of straw pulp or equivalent material, substantially as described.

18. In car construction, the combination, with posts and carlings composed of metal tubes bent into an arched form, of a tie-rod for the roof structure passing through the carlings and through interposed separating or spacing tubes, substantially as described.

19. In car construction, the combination, with the side sills composed of metals beams, of body truss-rods, a bearing interposed be-

tween the truss-rods and the sills, transverse tie-rods connecting said bearings, and diagonal struts 50, connected at their lower ends to the truss-rod bearing and at their upper ends to the side sill, substantially as described.

20. In car construction, the combination, with posts composed of metal tubes and an outer covering and a sheathing composed of metal plates, of an interposed filling and a fastening consisting of a split key passed through apertures in the covering and sheathing plates and having its ends spread, substantially as described.

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