

No. 709,009.

Patented Sept. 16, 1902.

H. S. GODFREY.  
FREIGHT CAR.

(Application filed Sept. 20, 1901.)

(No Model.)

7 Sheets—Sheet 1.

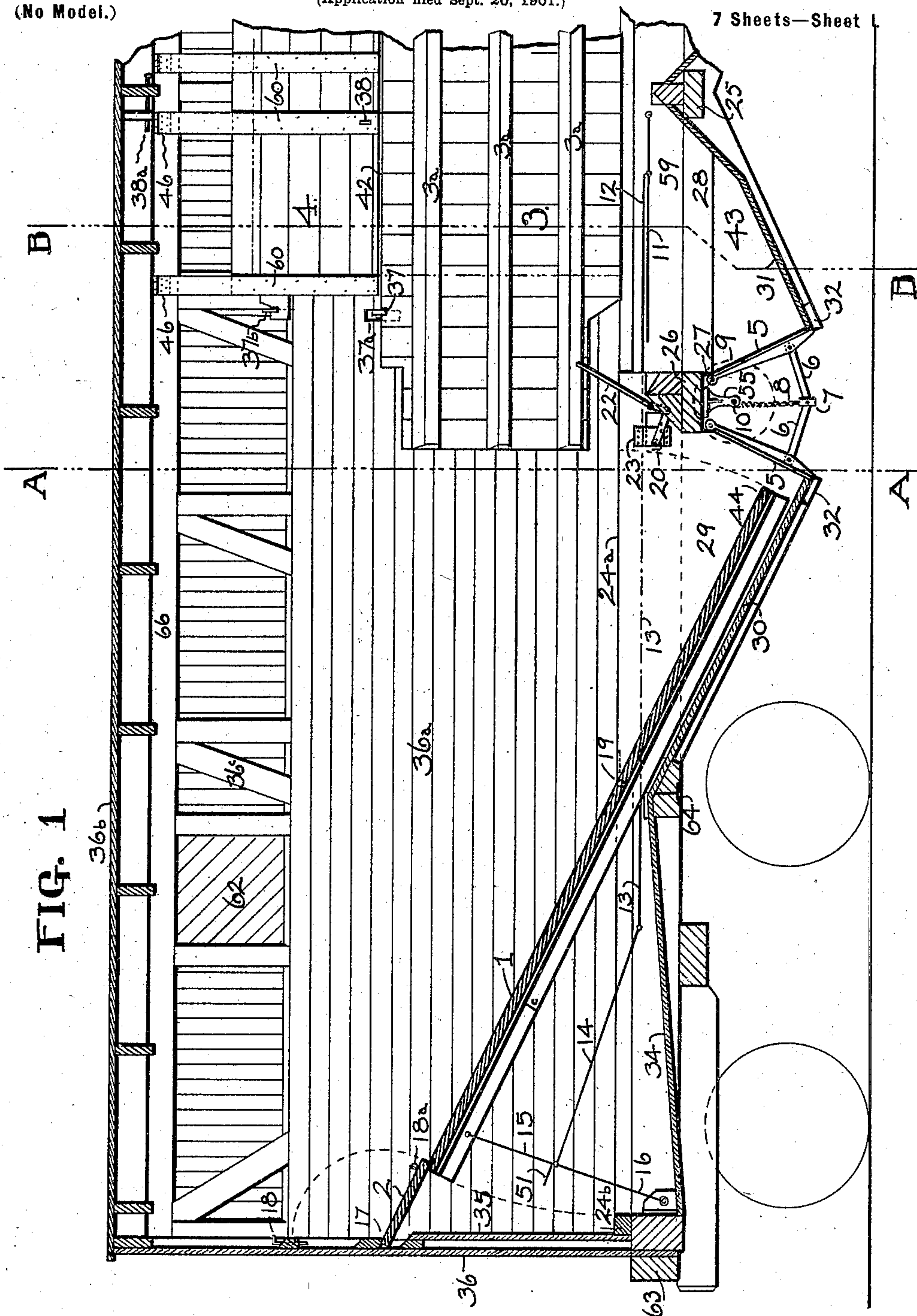


FIG. 1

Witnesses:  
*E. F. Johnson*  
*S. J. Wilson*

Inventor:  
*Horace S. Godfrey*  
*By Frederick Benjamin*  
*Att.*

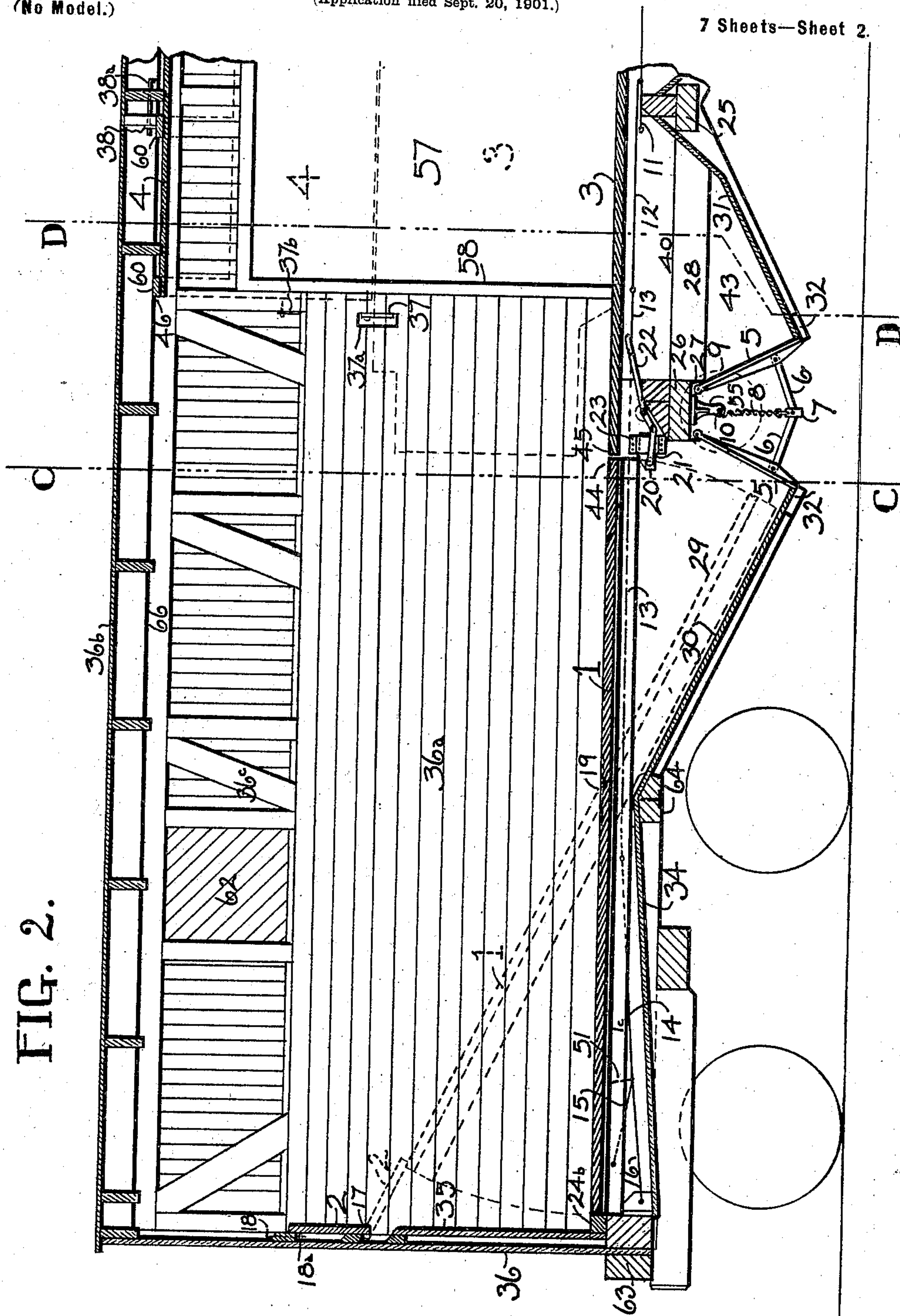
H. S. GODFREY.  
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(No Model.)

7 Sheets—Sheet 2.

FIG. 2.



Witnesses:

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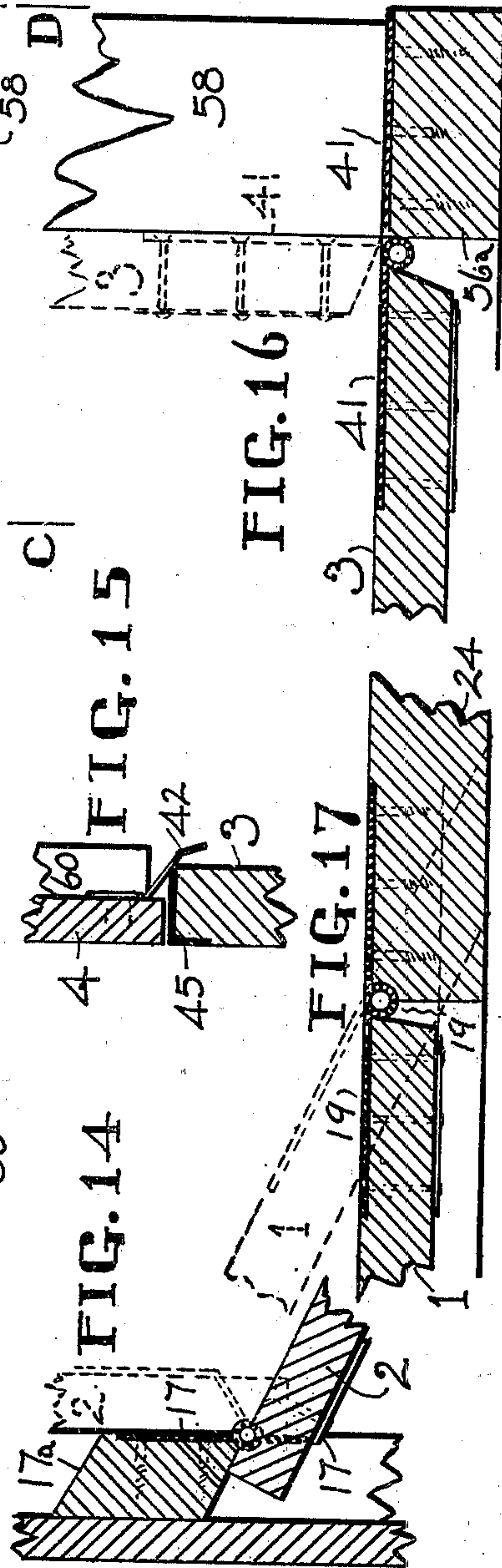
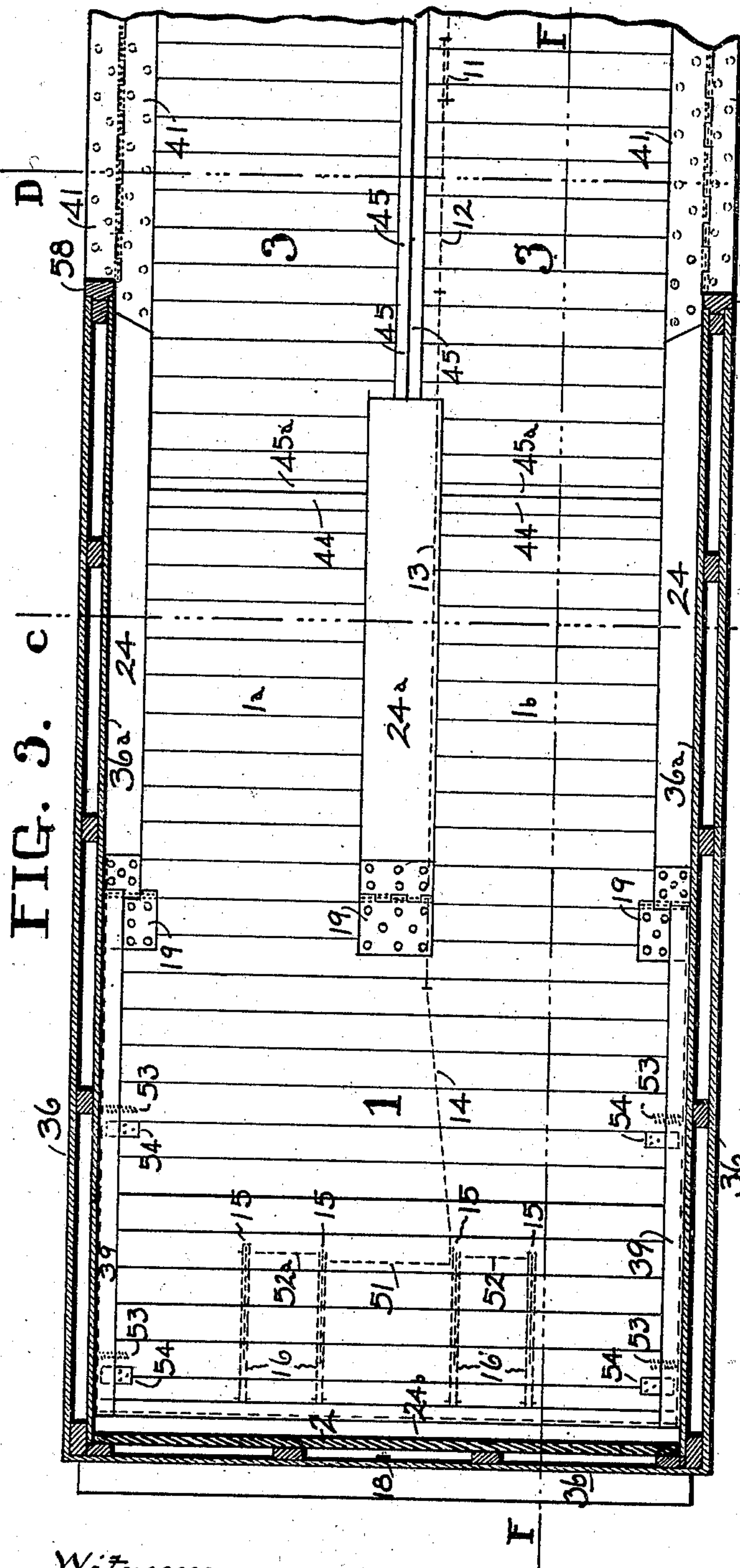
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7 Sheets—Sheet 3.



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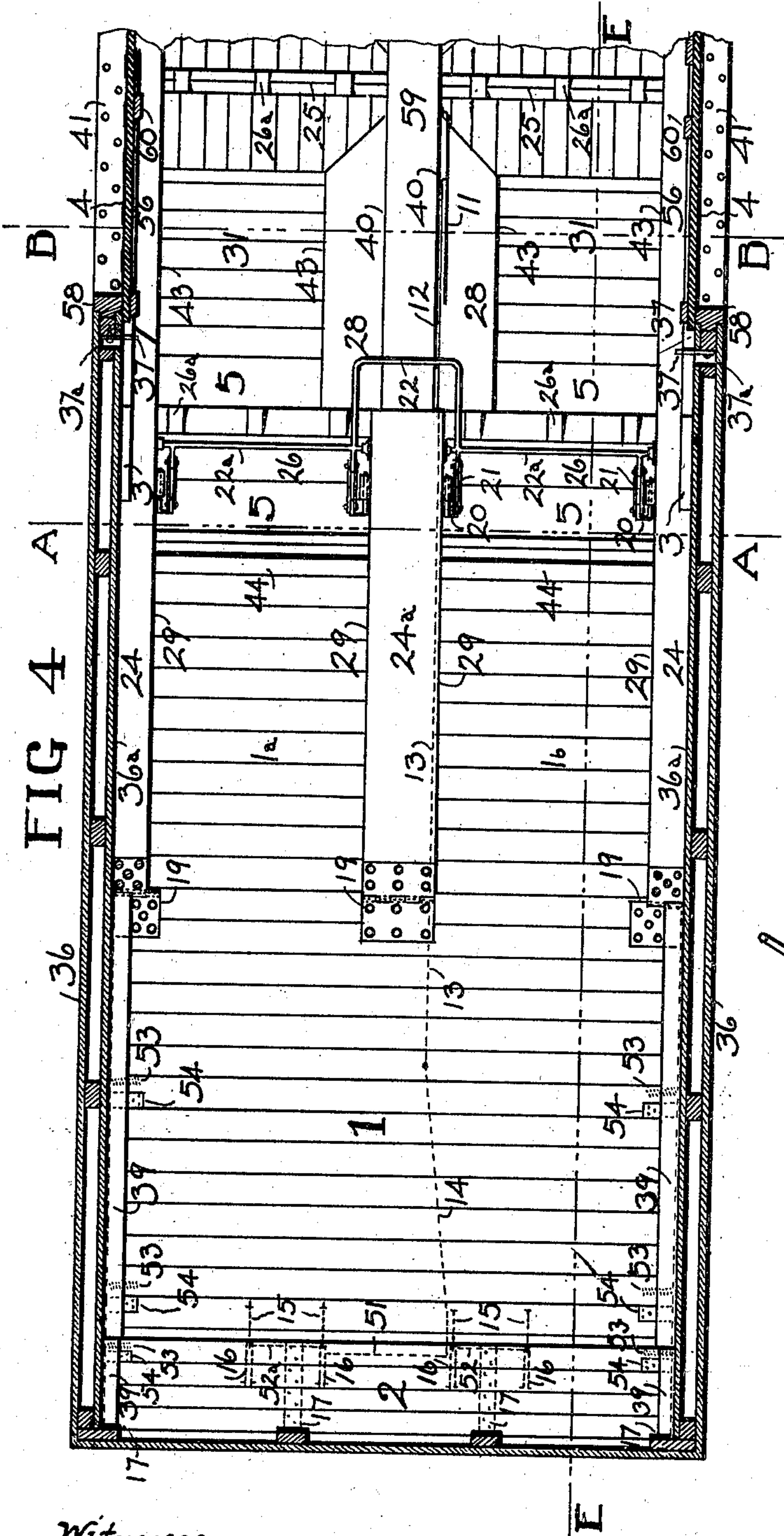
H. S. GODFREY.  
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7 Sheets—Sheet 4.



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FIG. 6.

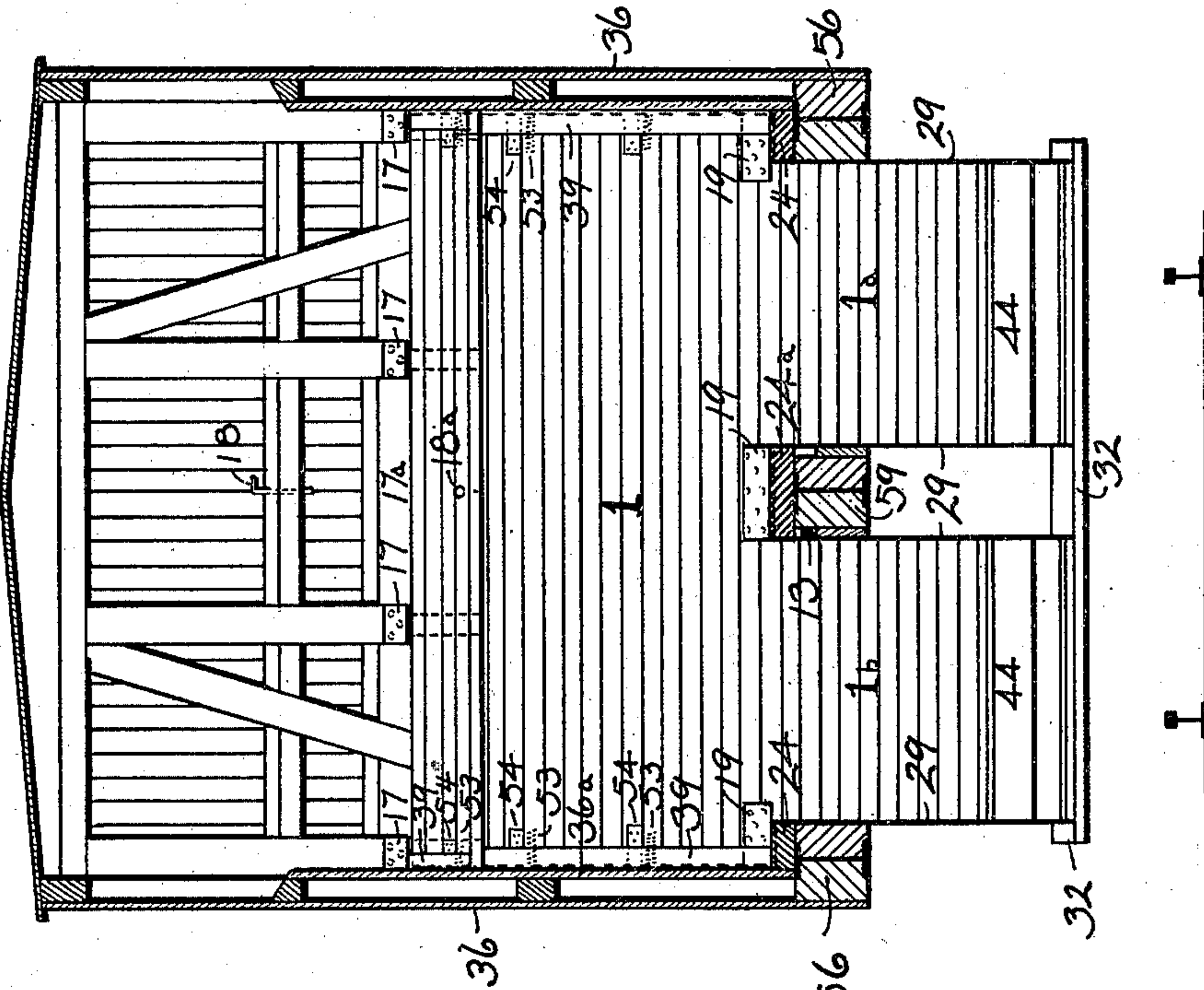
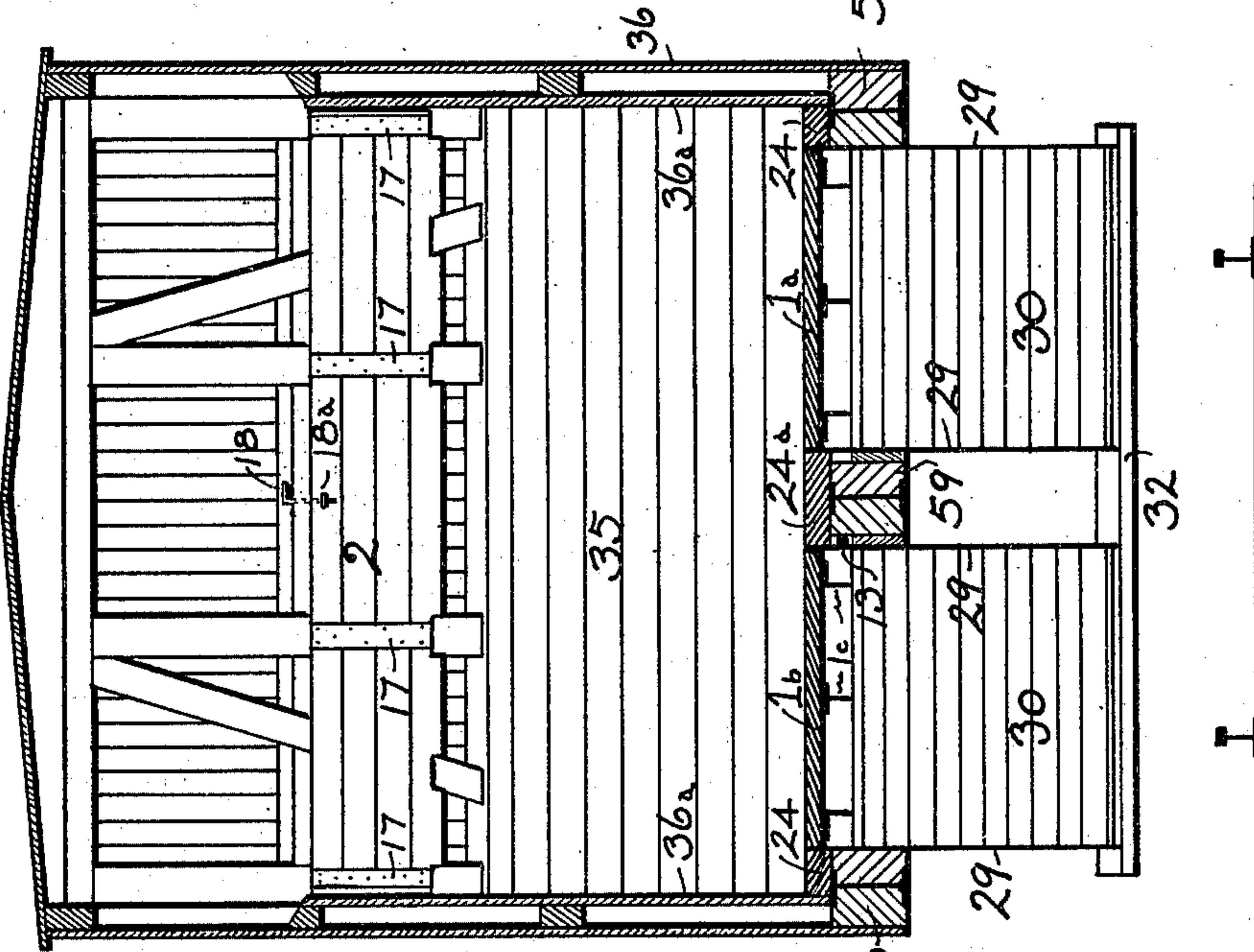


FIG. 5.



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7 Sheets—Sheet 6.

FIG. 8.

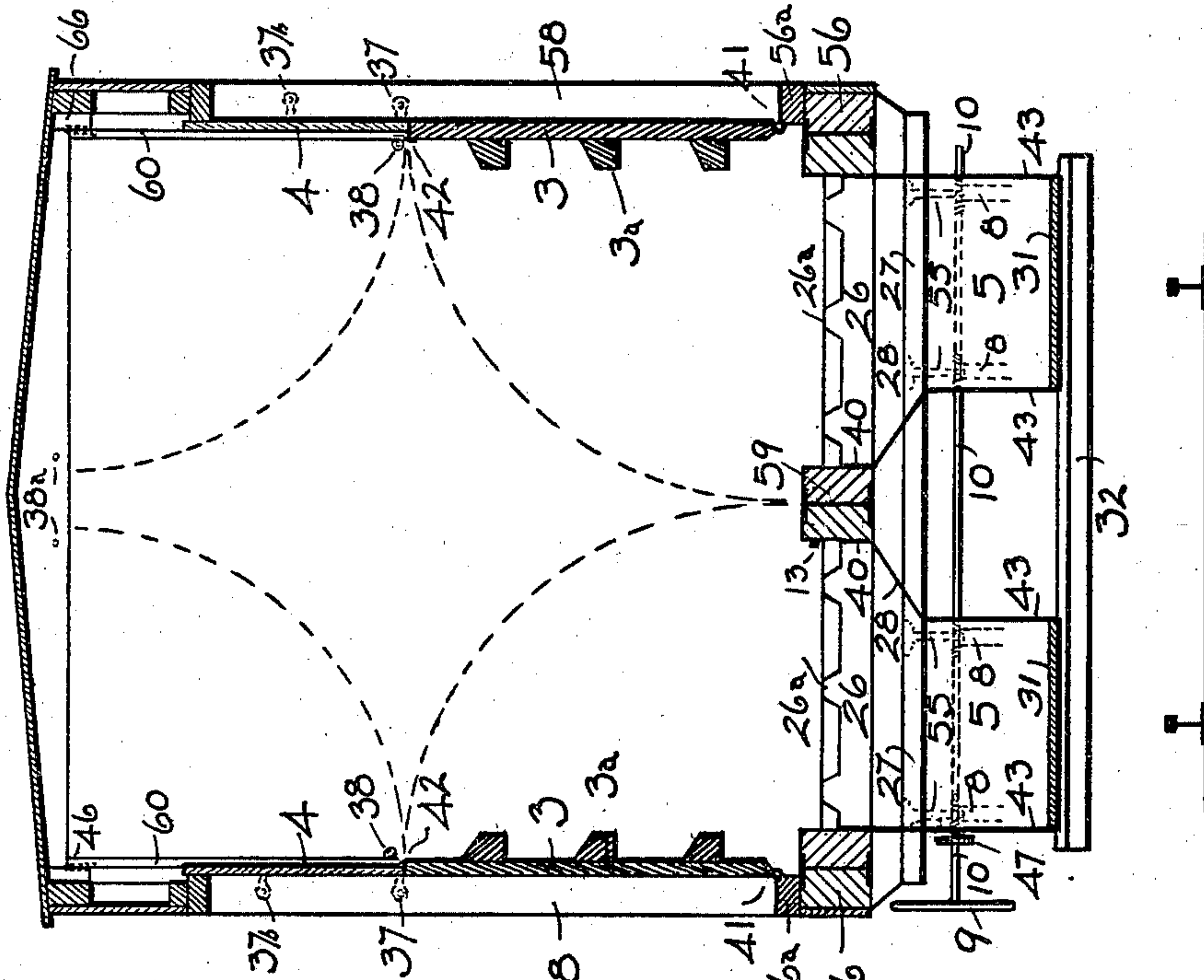
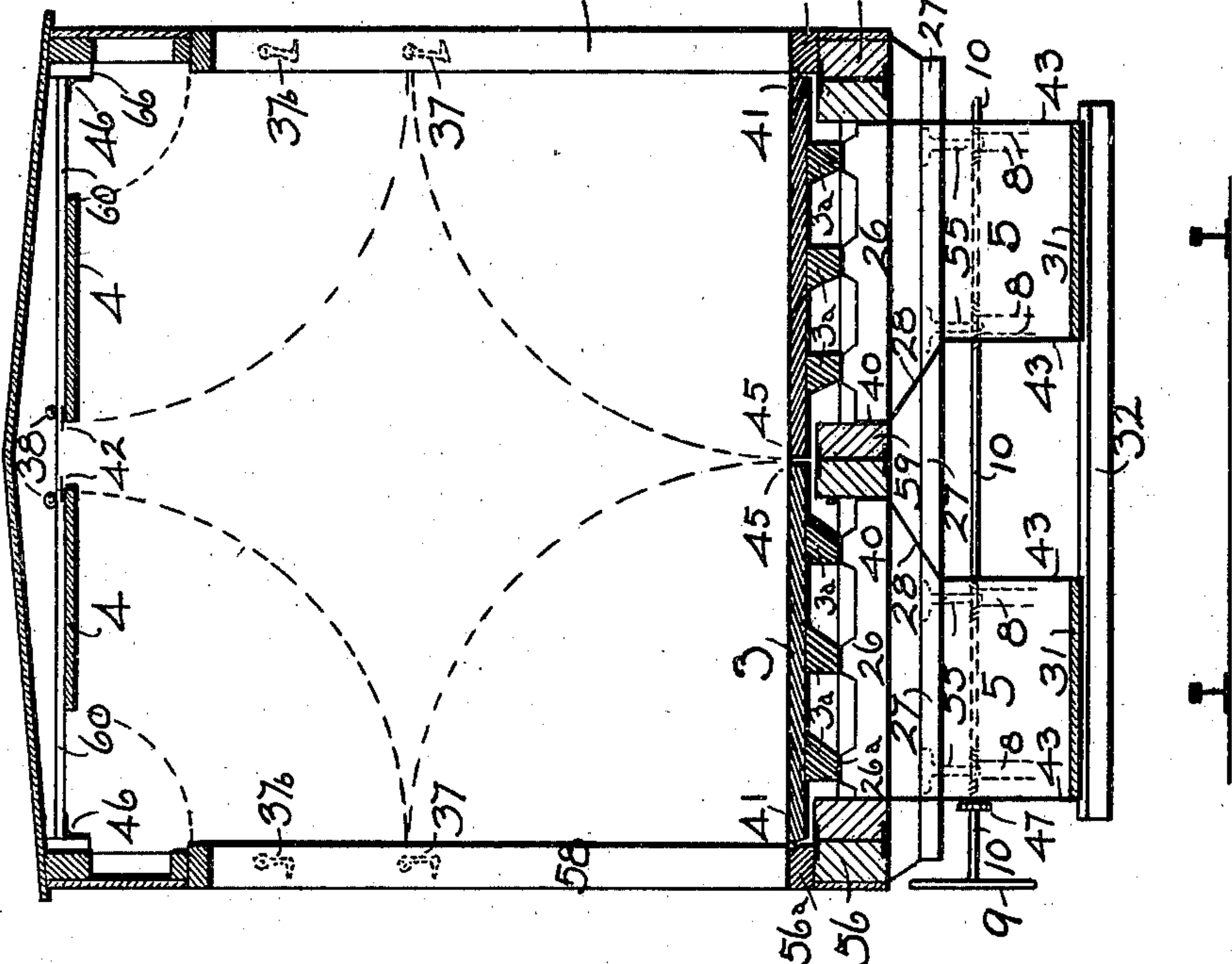


FIG. 7.



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7 Sheets—Sheet 7.

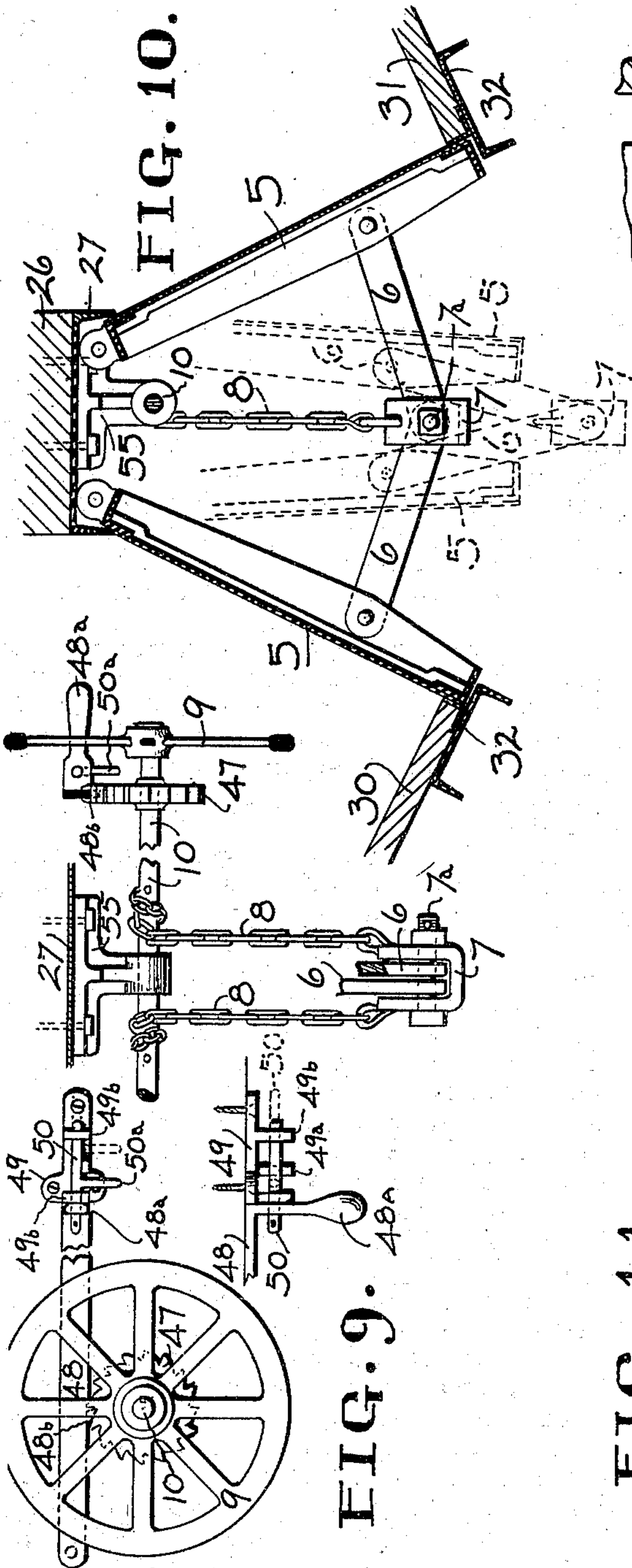


FIG. 9.

FIG. 10.

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FIG. 11.

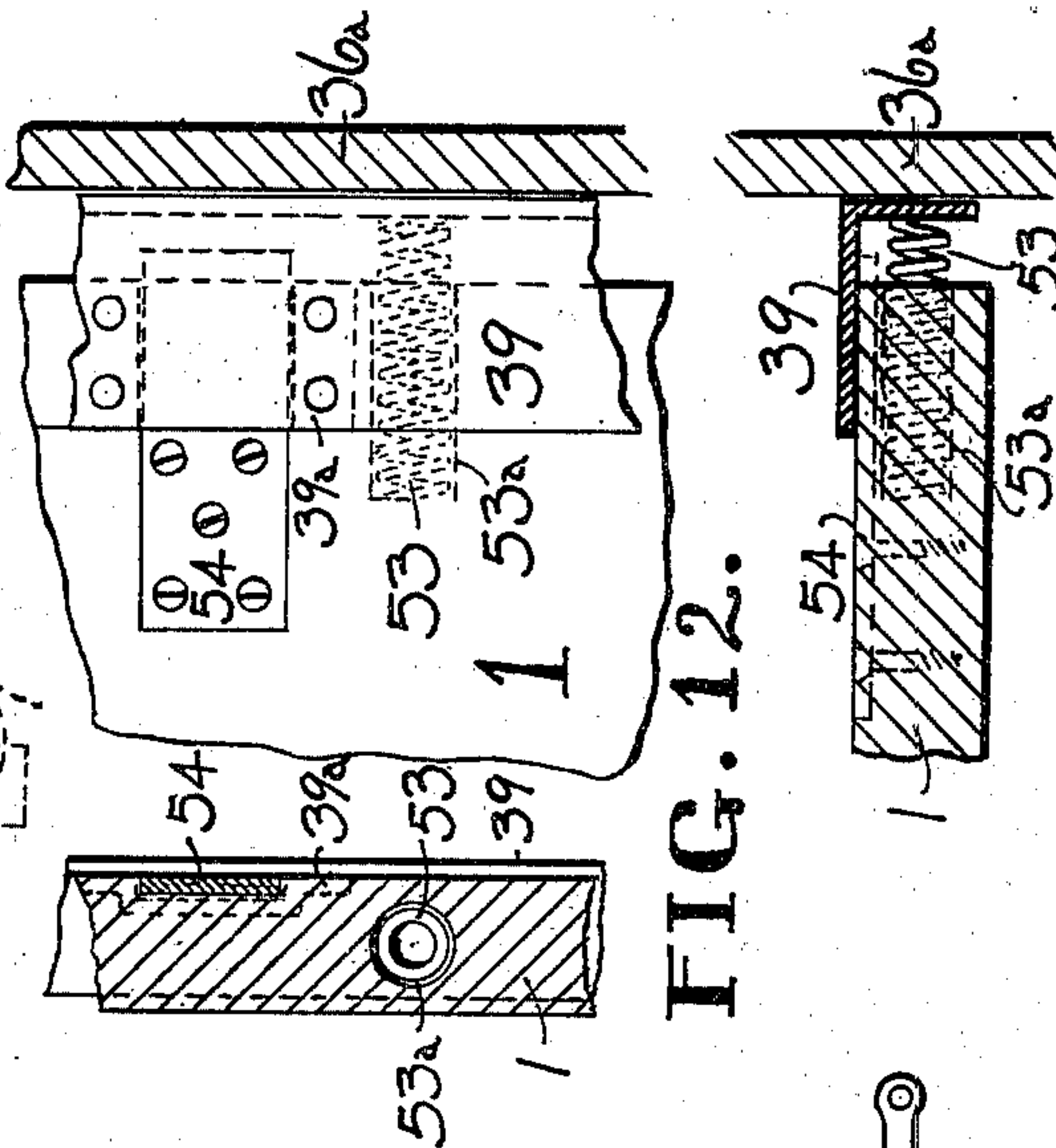
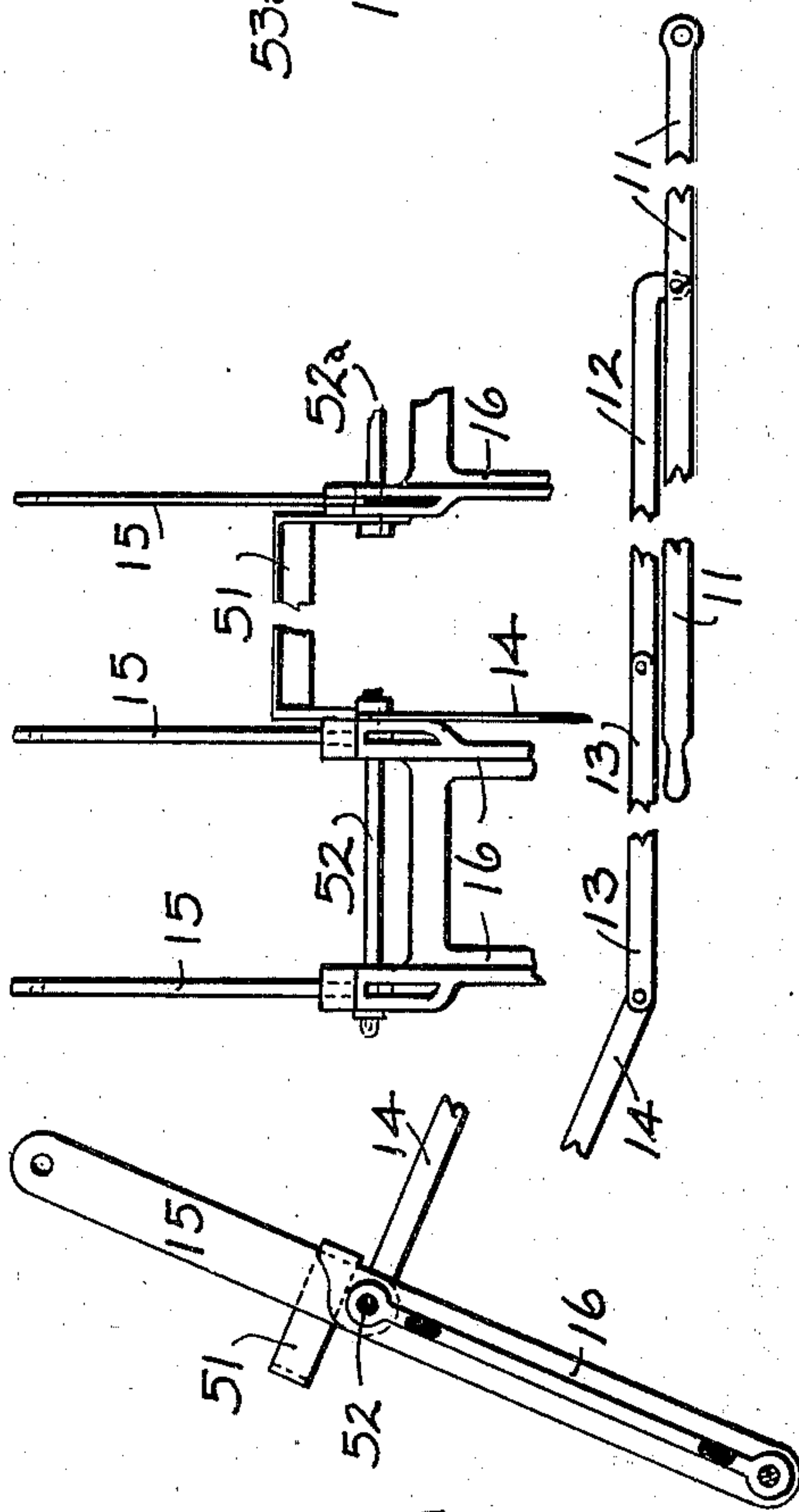


FIG. 12.

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# UNITED STATES PATENT OFFICE.

HORACE S. GODFREY, OF CHICAGO, ILLINOIS.

## FREIGHT-CAR.

SPECIFICATION forming part of Letters Patent No. 709,009, dated September 16, 1902.

Application filed September 20, 1901. Serial No. 75,892. (No model.)

*To all whom it may concern:*

Be it known that I, HORACE S. GODFREY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Freight-Cars; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in the construction of that class of railway freight-cars which may be changed from what is commonly known as "box-cars" to what is termed "hopper-cars," each class or form having peculiar functions well known in the art and which therefore need not be mentioned in detail. The advantages of a car so built that it will be equally convenient and useful for carrying grain, coal, or other lump freight in bulk and burlapped, crated, boxed, or mixed freight in package form are so apparent that many inventors have devoted their abilities to producing a car having such advantages; but, so far as I am aware, no such convertible car is in practical or general use on any railway in this country, presumably for the reason that the inventions in this branch of the car-building art have been either impractical in operation or too expensive in construction, or both.

As understood in the art, the chief requirements of a convertible freight-car possessing the qualities above named, are a strong and durable construction and not greatly expensive as compared with a first-class box-car; capacity for quickly and completely unloading grain or lump freight in bulk without much manual labor, skilled or otherwise; ease with which the hopper-bottom features may be converted to flat-bottom form, and vice versa; arrangement that will not interfere with the location of trucks, brakes, couplings, or other parts making up the under equipment of a freight-car of standard general pattern; a grain-tight floor in which provision is made for the bulge or spread of the sides of the car when loaded with freight in bulk; smooth or substantially unbroken side and floor surfaces for the car in its box form, so that package freight may be easily slid along the floor and that there may be no

sharp projections on which to catch and tear cloth bags, burlap coverings, or other fabric covers on certain classes of freight usually loaded in box-cars; in which the hopper-bottom elements when not in use as such will be out of the way or capable of other uses and not lessen the capacity of the car in its box form, and which will be accessible for repairs.

The special object of this invention is to attain the above-mentioned points of utility, and the novel manner in which I have accomplished the same is illustrated in a preferred form in the accompanying drawings, which form a part of this application, and in which—

Figure 1 is a vertical longitudinal section of more than one-half of a freight-car embodying my invention, the same being taken on the line E E of Fig. 4 and showing the car in hopper form. Fig. 2 is a vertical longitudinal section of my improved car on the line F F of Fig. 3. Fig. 3 is a horizontal section through the car when in box form on a plane slightly above its floor. Fig. 4 is a similar section to Fig. 3 on a plane just below the upper edge of the inner sheathing. Fig. 5 is a transverse section on the line C C of Fig. 2, showing a portion of the car when in box form. Fig. 6 is a transverse section on the line A A of Fig. 1, showing a portion of the car when in hopper form. Fig. 7 is a transverse section on the line D D of Fig. 2, showing a portion of the car in box form. Fig. 8 is a transverse section on the line B B of Fig. 1, showing a portion of the car in hopper form. Fig. 9 comprises details in elevation of the means for operating the hopper-doors. Fig. 10 is a view, partly in section and partly in elevation, of the hopper-doors, their connections and adjacent parts. Fig. 11 comprises details of the platform-supporting means. Fig. 12 comprises sectional details showing the manner of forming a grain-tight joint between the tilting platform and the sides of the car. Fig. 13 comprises sectional details, on an enlarged scale, showing the manner of supporting the inner edge or ends of the tilting platform. Fig. 14 comprises sectional details showing the hinge connections of one of the elements forming the car-floor. Fig. 15 shows the method of forming



a grain-tight joint between the upper edge of the combined grain-door and floor-section and the lower edge of the upper or supplemental grain-door. Fig. 16 shows the method of hinging the combined floor-section and grain-door, and Fig. 17 shows the method of hinging the tilting floor-section.

The drawings show my improvements as applied in an ordinary standard pattern box-car built of wood; but it will be apparent that they are equally applicable to a box-car constructed of sheet metal and steel construction or of metal and wood combined. It will also be understood that the portion of the car not shown will simply duplicate the construction shown.

Referring to the drawings in detail, it will be seen that the car-body 36, inner sheathing 36<sup>a</sup>, roof 36<sup>b</sup>, posts 36<sup>c</sup>, together with the braces, roof-supports, and other beams forming the car-frame, (all of which are of the usual standard construction,) are supported on center sills 59, side sills 56, and cross-beams 25, 26, 63, and 64, which, except as hereinafter specified, are of the usual form and arrangement. Extending from the end cross-beam 63 to the cross-beam 64 is a fixed false dust-tight bottom 34, and from the beams 64 and 25 to the hopper-doors are fixed hopper-bottoms 30 and 31, respectively provided with sides 29 and 43. The cross-beams 25 and 26 are beveled, as shown, on their upper faces, so that no grain may lodge thereon as the car is being unloaded through the hoppers. In the sides of the car are the main doorways 57, having the usual frame 58 and normally closable by the customary outside sliding doors (not shown) and when used for grain by the additional grain-doors to be described. The customary loading-ports in the sides of the car near the top are closed by the doors 62, of common form and the usual operation. The car floor or bottom is made up of fixed side and end pieces 24, a center plank 24<sup>a</sup>, secured to and supported by the sills and formed in sections, as shown and as will be hereinafter described in detail, and of certain movable parts, as follows: Approximately two-thirds of one-half of the car-floor, extending from the ends to a point near the car-door, is formed by sections capable of being tilted and of being held in a horizontal position, a portion of said sections extending the full width of the car, and another portion is divided into the parts 1<sup>a</sup> and 1<sup>b</sup>. Each tilting floor-section is secured to the floor-pieces 24 and 24<sup>a</sup> by a form of hinge which does not project above the surface of the pieces to which it is attached, thus presenting when the sections are in horizontal position an unbroken and grain-tight joint at the hinge connections, as shown in Figs. 16 and 17. This form of hinge is preferably used by me throughout the construction of my improvements, and, unless otherwise indicated, when the term "hinge" is used in this description such style of hinge is meant.

To effect a grain-tight joint between the sides or inner sheathing 36<sup>a</sup> and the edges of the tilting floor-section, I provide the special construction shown in detail in Fig. 12, consisting of projecting flat plates 54, secured to the upper side of the floor-section 1 at its side edges, angle-plates 39, provided with straps 39<sup>a</sup>, which slidably embrace the plates 54, and open spiral springs 53, partially housed in sockets 53<sup>a</sup> in the sides of the floor-section and having their outer ends bearing against the vertical wall of the angle-plates. The tension of the springs holds the vertical portion of the angle-plate snugly against the inner sheathing of the car irrespective of the position of the floor-section and of whether the car is loaded or empty, the plate sliding in or out in its bearings 39<sup>a</sup> and the springs yielding to permit the section to be tilted or returned to its horizontal position. The same provision may be made for effecting a tight joint between the ends of the section 2 and the sides of the car as indicated by dotted lines in Fig. 4, but as so near the corners of the car there is very little spread to the sides when loaded a tight joint may be effected at this point by simply nailing a piece of thick canvas on the ends of the section, the same taking the place of the short strip of metal or plate 39.

To close the space between the outer end of the floor-section 1 and the end of the car when the section is tilted, I provide the drop-hinged floor-section 2, secured by hinges 17 to the vertical studs at the end of the car, the manner of hinging being shown in detail in Fig. 14, from which it will be seen that the rear edge of the section is cut out to fit around the vertical studs and leave a portion of the section to form an abutting shoulder on the underside of the cross-piece 17<sup>a</sup>, thus effecting a tight joint at this point and affording a support for the section against downward pressure. The lower or outer edge of the section 2 overlaps the rear end of the section 1 for several inches, and the weight of the grain and the inclination of the sections will prevent the escape of the grain at this joint. The relative arrangement of the sections 1 and 2 when in operative position for a hopper form of car presents a continuous inclined floor from the end of the car to the hopper-door, whereby all grain resting thereon will be precipitated by gravity through the hopper doorways or openings. When the car is not in its hopper form, the section 2 is turned upward and secured against the end wall by a latch-bolt 18, the lower end of which engages an eyebolt 18<sup>a</sup> in the upper side of the section, as shown in Figs. 2 and 5.

The floor-section 1 when in its horizontal position is supported at the end near the end of the car by the cross-beam 63<sup>a</sup> and at its inner end by sliding plates 20, mounted on stationary socket-plates 23, bolted to the side sills of the car. The plates 20 are adapted to slide in the socket-plates 23, and their slid-



ing is effected by means of a bent hand-lever 22 and a link 21, which is pivoted at one end on said lever and at the other end on the bent-up end of the plate. There are preferably  
 5 four of these plates and they are connected with the hand-lever and with each other by a rod 22<sup>a</sup>, so that they are simultaneously operated by one movement of the lever. When  
 10 the floor-section 1 is in its tilted position, the lever 22 stands in a vertical plane and projects above the floor-line of the car, so that when the floor-section 3 (which in the hopper form is upright) is closed down, it will  
 15 strike against the lever 22, depress it, and thus shoot the several plates 20 under the lower edge of the angle-plates 44, with which the end of the section 1 is finished, thus avoiding any possibility of the ends of the tilting sections being left unsupported when the car is  
 20 converted from a hopper to a box form. To support the raised end of the tilted section when the car is in hopper form, I provide the means shown in detail in Fig. 11 and diagrammatically indicated in operative and in-  
 25 operative positions in Figs. 1 and 2, respectively, the same being as follows: A hand-lever 11 is pivoted to the middle sill at a point near the center of the car. Pivoted on  
 30 this lever is a rod consisting of hinged sections 12, 13, and 14, and the end of the last section is pivotally secured by a bolt 52 to a foldable standard formed of upright single bars 15, the upper ends of which are pivoted  
 35 on the angle-bars 1<sup>c</sup>, which brace the under side of the section 1, the double bars 16, and yoke 51, all of which are secured together by pivot-bolts 52 and 52<sup>a</sup> and adapted to fold or turn in one direction, as clearly shown in Fig. 11. When it is desired to convert the  
 40 car from flat-bottom into hopper-bottom form, the operator, after raising the hinged sections 3 and retracting the plates 20 by pulling up the lever 22, tilts the section 1 by standing upon its inner end, thus causing its outer end  
 45 to partially unfold the legs or bars 15 and 16, whereupon, by throwing the lever 11 from the position shown in Fig. 2 to the position shown in Fig. 1, the unfolding of the legs will be completed, and they will assume the  
 50 upright position, (shown in Figs. 1 and 11,) and at the same time the section will be tilted to its full limit and supported in such position by the legs or bars described. While I have designed and here shown the elements  
 55 just described as means primarily for supporting the floor-section 1 when tilted, it is apparent that by changing some of the pivotal points (such alterations involving mere mechanical skill) I may utilize the parts for  
 60 tilting the section, as well as for its support after being tilted.

The floor-sections 3 occupy the portion of the floor area not taken by the tilting sections described and extend on each side and  
 65 in front of the door-openings when elevated, forming grain-doors for said openings and when in horizontal position serving as covers

for the top of the hoppers. These sections are formed of planking reinforced on the under side by transverse beams 3<sup>a</sup>, having one  
 70 side beveled, so that when the sections are in vertical position the beveled side of the beams will be uppermost, and thus prevent the grain from lodging thereon as the car is unloaded. The sections when in horizontal  
 75 position have their beams 3<sup>a</sup> rest on the flat portions 26<sup>a</sup> of the cross-beams 25 and 26, thus furnishing a firm support, as shown in Fig. 7. Said sections are hinged to the door-sill 56<sup>a</sup>, which forms a part of the framing of  
 80 the car. When the sections are serving as grain-doors, they are fastened in vertical position by gravity-hooks 37, which are secured to the sides of the car and are housed in openings 37<sup>a</sup>, cut in the sheathing 36<sup>a</sup>, so that  
 85 normally or until in operation they do not project beyond the face of the sheathing. As the sections overlap the door-openings for a considerable distance on each side thereof and as the form of hinges used permits the  
 90 face of the sections to lie snugly against the sheathing, there is no danger of small grain escaping through the long and close joint thus formed.

If it be desired to load the car above the  
 95 line of the upper edge of the grain-door and floor-sections 3, the supplemental doors 4 may be swung down into operative position. These doors have their planks run longitudinally and secured together by transverse or verti-  
 100 cal strips 60, the upper ends of which are secured by hinges 46 to the roof-supporting beams 66. One of the planks extends beyond the end strips 60, and the extended portions are adapted to be engaged by gravity-hooks  
 105 37<sup>b</sup>, secured to the posts at the side of the door-frame 58. In the outer end of one of the strips 60 is an eyebolt 38, which is engaged by a sliding bolt 38<sup>a</sup>, secured in the roof-support, when the door is raised, thus holding it out  
 110 of the way, but in readiness for use when wanted. To effect a grain-tight joint between the upper edge of the combined grain door and floor-section and the lower edge of the supplemental door, I nail to the lower edge  
 115 of the latter a strip of canvas 42, which projects downwardly and outwardly, so that it will overlies the edge of the section 3 when the latter and the door 4 are in operative positions.

The hopper proper is formed by the inclined plates 30 and 31 and sides 29 43 thereof, secured together in any suitable manner, and have their upper ends supported from the cross-beams 25 64. The mouth or doorway  
 125 of the hopper is closed by doors 5, which are hinged to a plate 27, secured to the under side of the beam 26. Pivoted on the outer side of the doors are links 6, which are pivoted together by a pin 7<sup>a</sup>, which passes through  
 130 a U-shaped yoke 7, to the ends of which are secured the lower ends of chains 8, the upper ends of which are fastened to a horizontal windlass-shaft 10, having bearings in hangers



55, secured to the under side of the beam 26. On one end of the shaft is keyed a hand-wheel 9 and a ratchet-wheel 47. Pivoted to the side of the hopper above the ratchet-wheel is a lever 48, having a handle 48<sup>a</sup> and on its lower edge at a point just over the ratchet-wheel a sharp lug 48<sup>b</sup>, adapted to engage the teeth of the ratchet-wheel when the lever is depressed, thus locking the wheel, and hence the shaft, against rotation. In order to lock the lever down, I provide a sliding latch 50, which works in perforated lugs 49<sup>b</sup> on a fixed plate 49, secured to the side of the hopper, and enters a suitable opening in the handle of the lever. The latch is provided with a grasping-piece 50<sup>a</sup>, which is turned upwardly to clear the lug 49<sup>a</sup> on the plate when it is desired to shoot the latch in either direction. Other devices of common form may be used to lock down the lever, in which a key-lock may be utilized, so that the parts may not be tampered with by unauthorized persons. As the chains 8 are unwound from the shaft 10 the inner ends of the links 6 drop down by gravity, thus pulling outwardly toward each other the doors 5 and allowing the contents of the hopper to pass downward by gravity, and thus empty the car. As the chains are wound on the shaft the movement of the links and doors is reversed and the hopper-mouths are closed and so held by the chain. The lower edges of the hopper-bottoms are preferably strengthened by channel-irons 32, which extend beyond the edges of the bottoms and underlie the lower edges of the hopper-doors, thus forming a close grain-tight joint therebetween.

It will be apparent that in an invention of this character, involving, as it does, a construction covering many parts, various changes may be made in details which will not alter the principles of construction and arrangement utilized, and for this reason I do not wish to be limited to the exact construction shown and described; but

What I claim, and desire to secure by Letters Patent, is—

1. In a car having a bottom formed in part of tilting sections, means for securing a tight joint between the outer edges of said sections and the sides of the car, said means consist-

ing of yieldingly-supported plates secured along the said edges of said sections, substantially as set forth.

2. In a car having a bottom formed in part of tilting sections, means for securing a tight joint between the outer edges of said sections and the sides of the car, said means secured to the said sections and consisting of yieldingly-supported plates overlying the edges of said sections and abutting against the side walls of the car, substantially as set forth.

3. In a car having a bottom formed in part of tilting sections, means for securing a tight joint between the edges of the sections and the sides of the car, consisting of slidable plates spring-supported on the tilting sections and abutting against the inner walls of the car, as set forth.

4. In a car having a bottom formed of movable sections, means for securing a tight joint between the edges of the sections and the walls of the car, consisting of angle-plates slidingly and yieldingly supported on the movable sections.

5. In a car having a fixed hopper, a bottom or floor formed of tilting sections adapted when moved to an inclined position to form hopper-bottoms extending from the hopper-doors to near the ends of the car, and of hinged sections adapted when in horizontal position to cover the fixed hopper, and when raised to form grain-doors, and means for effecting a tight joint between the edges of the tilting sections and the sides of the car, said means being secured to the edges of said tilting sections.

6. In a car, a floor composed of tilting sections and of hinged sections, means for effecting a grain-tight joint between the sides of the car and the edges of the tilting sections, and means for supporting the tilting sections in a horizontal position, said means being automatically operated by the lowering of the hinged sections, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HORACE S. GODFREY.

Witnesses:

F. BENJAMIN,  
WILTON B. JUDD.