

No. 741,250.

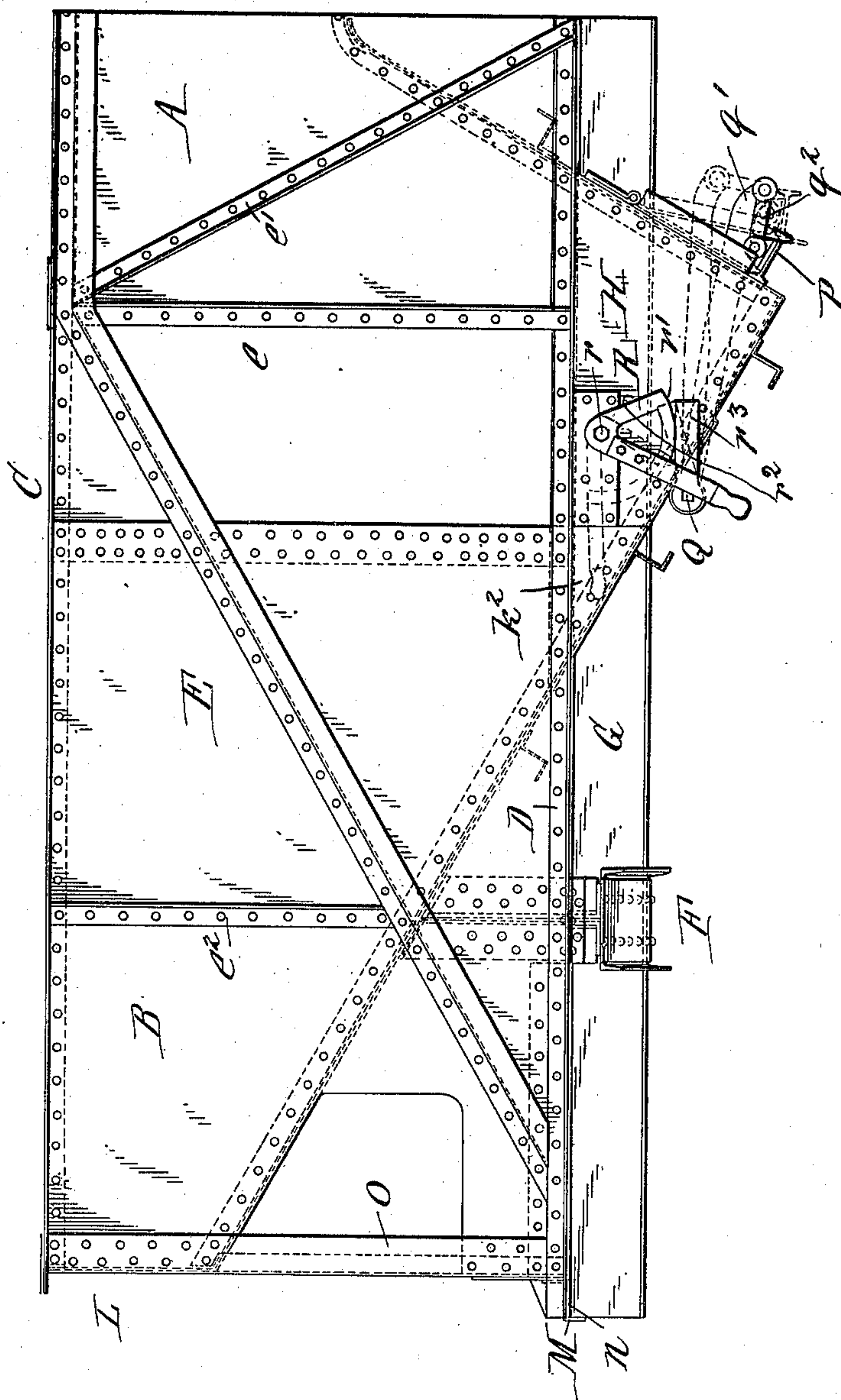
PATENTED OCT. 13, 1903.

H. R. KEITHLEY.
HOPPER BOTTOM FREIGHT CAR.

APPLICATION FILED JUNE 6, 1903.

NO MODEL.

6 SHEETS--SHEET 1.



Witnesses:
P. W. Runser
E. A. Volk

A. R. Keechley Inventor.
By Wilhelm H. Bonnes
Attorneys.

No. 741,250.

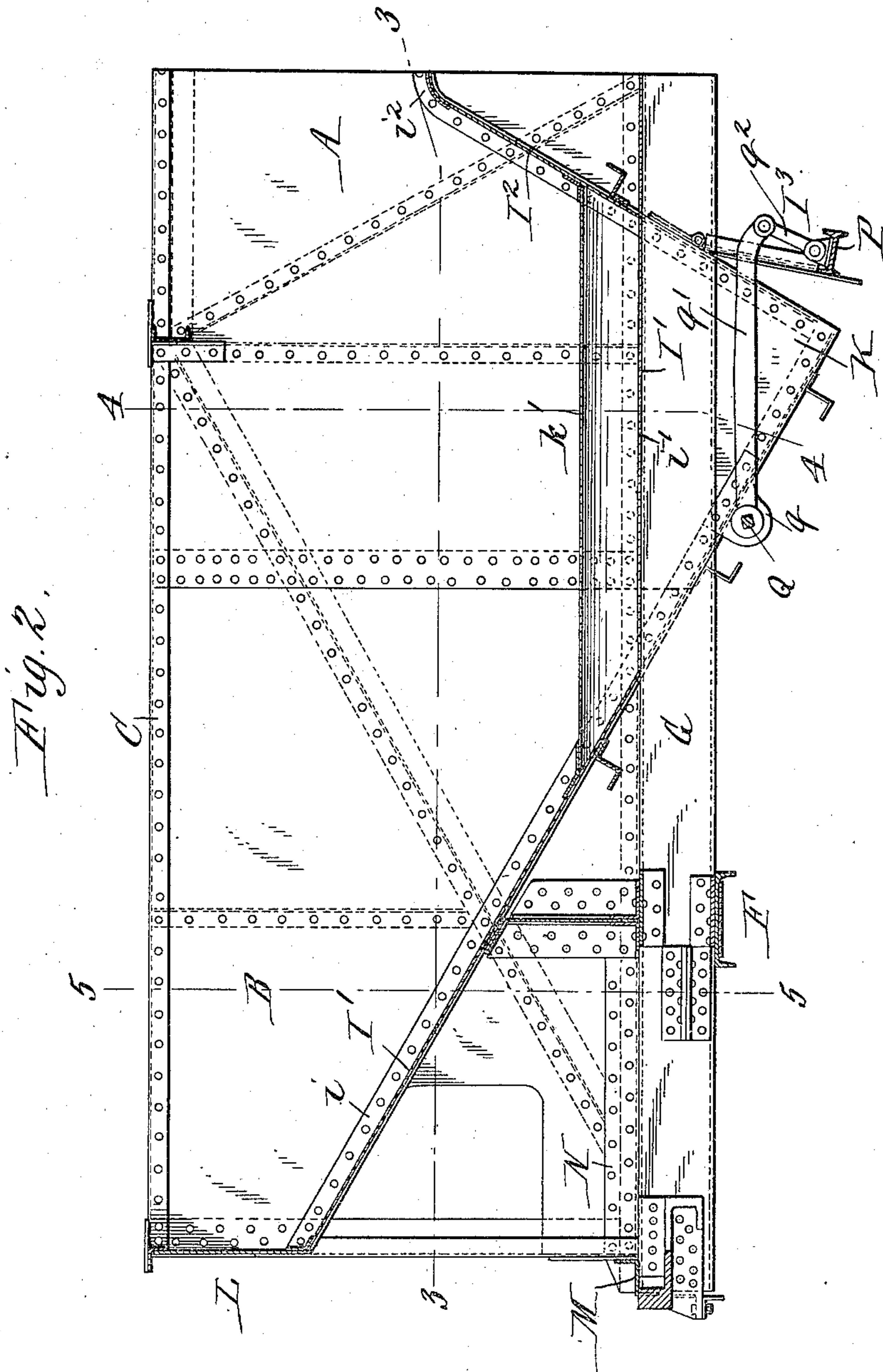
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5 SHEETS—SHEET 2.



Witnesses:
R. W. Pinner
E. A. Volk.

H. R. Keithley Inventor.
By Wilhelm Pinner
Attorneys.

No. 741,250.

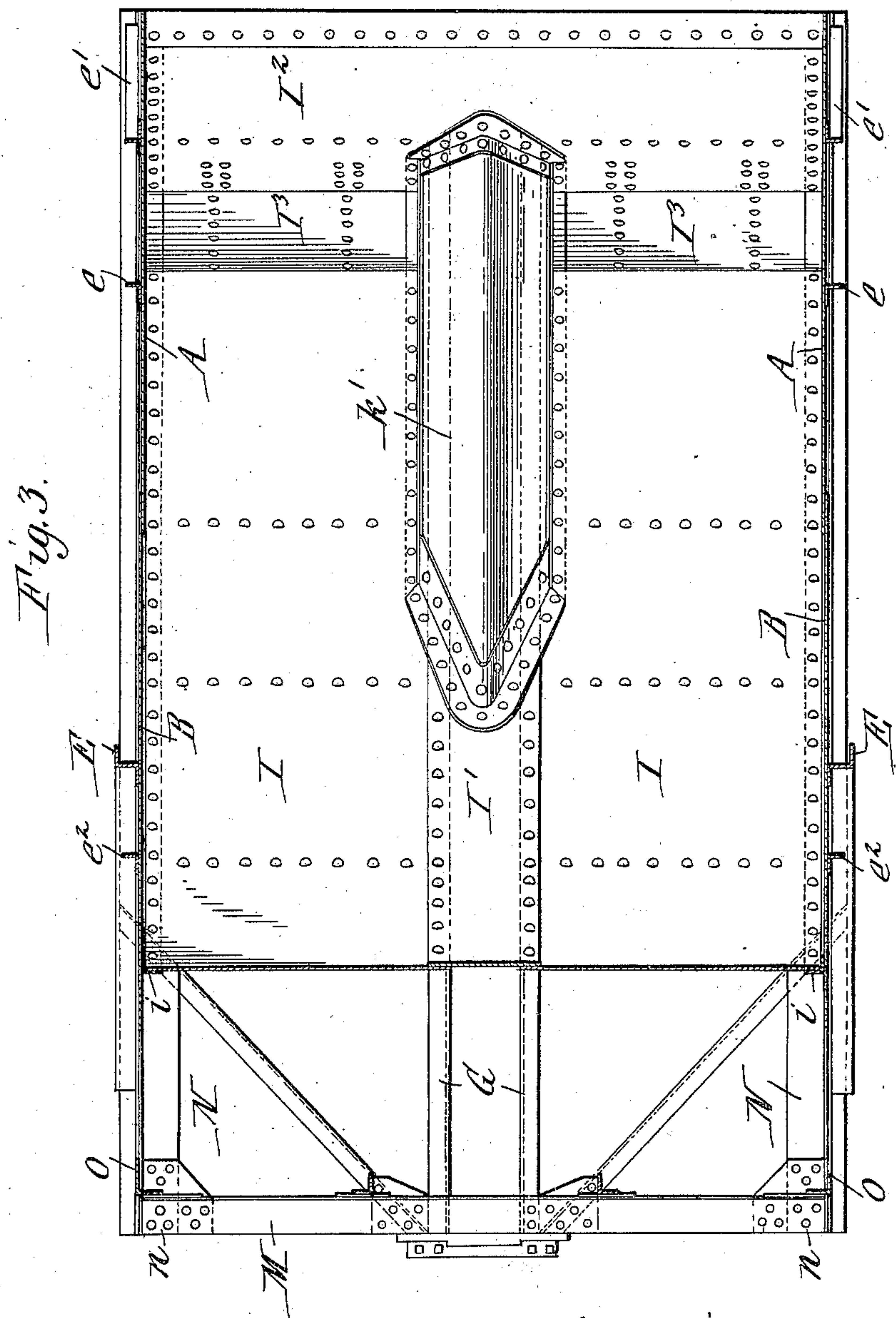
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5 SHEETS—SHEET 3.



Witnesses:
R. W. Runner
E. A. Volk.

H. R. Keithley Inventor.
By Wilhelm Runner
Attorneys.

No. 741,250.

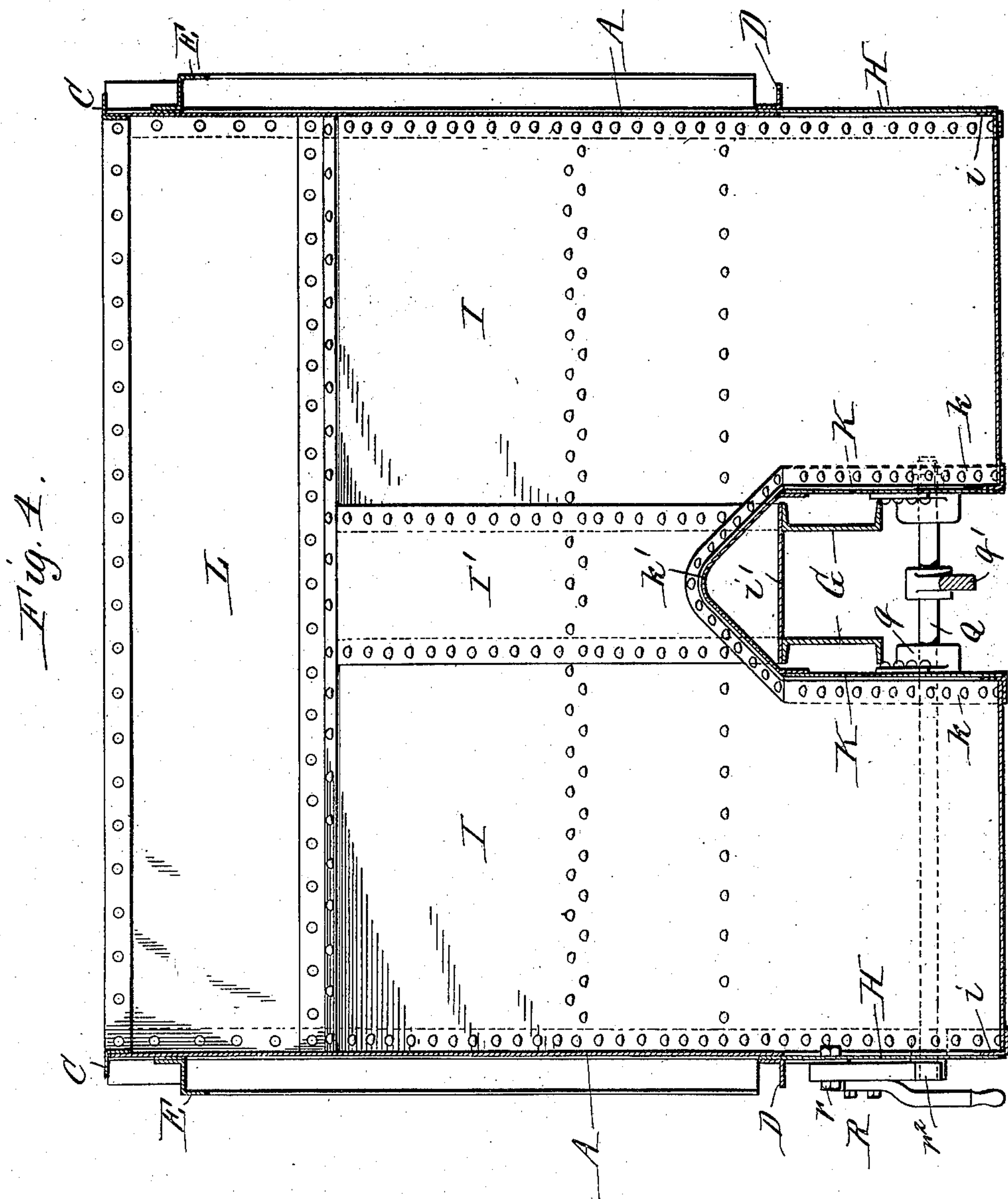
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6 SHEETS--SHEET 4.



Witnesses.
R. W. Punsen
E. A. Volk.

A. R. Keithley Inventor.
By Wilhelm M. Houser
Attorneys.

No. 741,250.

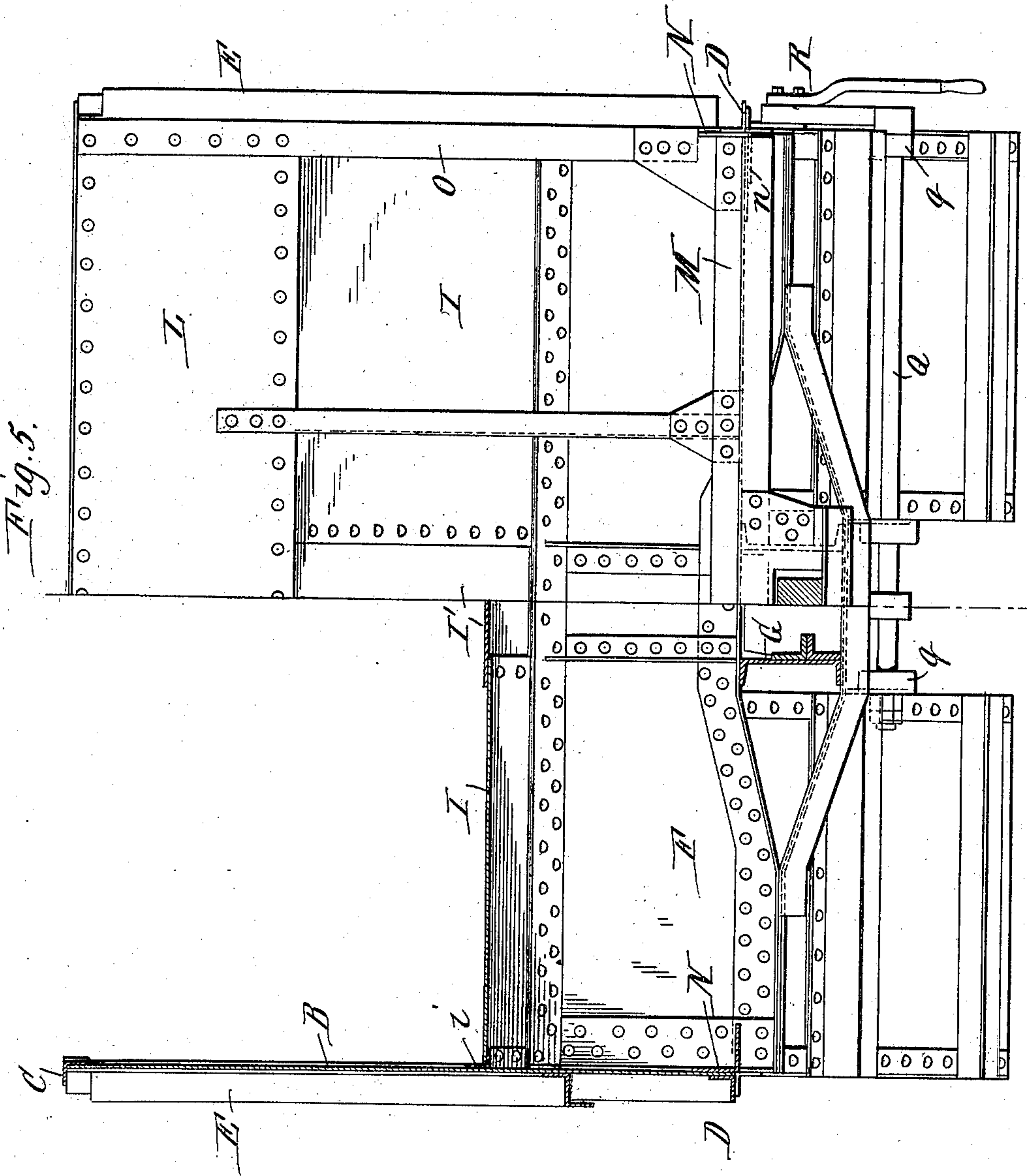
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NO MODEL.

5 SHEETS—SHEET 5.



Witnesses:
R. W. Runyon
E. A. Volk

H. R. Keithley Inventor.
By Wilhelm Horned
Attorneys

UNITED STATES PATENT OFFICE.

HERBERT R. KEITHLEY, OF CHICAGO, ILLINOIS.

HOPPER-BOTTOM FREIGHT-CAR.

SPECIFICATION forming part of Letters Patent No. 741,250, dated October 13, 1903.

Application filed June 6, 1903. Serial No. 160,386. (No model.)

To all whom it may concern:

Be it known that I, HERBERT R. KEITHLEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Hopper-Bottom Freight-Cars, of which the following is a specification.

This invention relates to a steel hopper-bottom car built up of plates and commercial rolled shapes, and more particularly to a car of the type shown in United States Letters Patent No. 703,659, granted to me July 1, 1902.

The object of the present invention is to improve the car disclosed in said patent in certain respects, which will appear from the following description and claims.

In the accompanying drawings, consisting of five sheets, Figure 1 is a side elevation of one-half of a car embodying the invention. Fig. 2 is a central longitudinal section thereof. Fig. 3 is a horizontal section thereof in line 3 3, Fig. 2. Fig. 4 is a transverse vertical section, on an enlarged scale, in line 4 4, Fig. 2. Fig. 5 is a view on an enlarged scale, one half in end elevation and one half in transverse section, in line 5 5, Fig. 2.

Like letters of reference refer to like parts in the several figures.

Briefly stated, the car comprises, like the car of my said patent, bolsters and center sills arranged in their usual relation, sides in the form of deep-trussed plate-girders, which are secured to the bolsters and constitute the main supports between the bolsters for the weight of the car and its load, side hopper-plates secured to and depending below the lower flanges of the plate-girder sides, and inclined end and intermediate hopper-bottom plates which connect the plate-girder sides and side hopper-plates.

Each plate-girder side of the car consists of a vertical central web-plate A, vertical end web-plates B, and upper and lower flanges or chords C and D, preferably formed by angle-bars riveted to the web-plates. The angle-bar forming the lower flange is arranged outside of the web-plates with its horizontal flange projecting outwardly. The central web-plate A is arranged in a vertical plane inside of the plane of the end web-plates B, with its ends overlapping and riveted to the vertical inner ends of the end web-plates,

thus leaving a space between the central web-plate and the lower flange-angle D for the reception of the hopper side plates, as hereinafter described. The car side is also preferably provided with a truss-chord E, struts or ties *e*, diagonal braces *e'*, and web-stiffeners *e''*, riveted to the web-plates, as explained in my said patent. In order to better stiffen the side against lateral bulging or deflection, the upper truss-chord is formed by a Z-bar arranged with its web horizontal and its inner vertical flange riveted to the web-plates. Suitable filler-plates are preferably arranged between the upper flange of the girder and the end web-plates B and between the truss-chord E and the central web-plate A to avoid bending of the flange-angle and truss-chord laterally.

F represents one of the bolsters, which are arranged in the usual relation and are secured at their ends to the plate-girder sides of the car, and G represents the center sills, which extend from end to end of the car, passing through the bolsters and between the depending side portions of the hopper. The bolsters and center sills are preferably constructed as fully shown and described in my application for United States Letters Patent for a hopper-bottom car, Serial No. 135,997, filed December 20, 1902.

H represents the outside upright walls of the hopper, which are formed by vertical plates extending below the lower flange of the sides and having their upper horizontal edges located between and riveted to the central web-plates and lower flange-angles D of the car-sides.

The bottom of the car has end and intermediate inclined portions. The end inclined portions are formed by longitudinal side and central bottom plates I I', which are riveted together at their longitudinal meeting edges. The side bottom plates I extend down on opposite sides of the center sills and are secured at their outer edges to the web-plates of the girder sides and upright outside hopper-plates by angle-bars *i* or in any other usual manner. The central bottom plate I' extends from end to end of the car, having a central horizontal portion *i''*, which rests on and is riveted to the upper flanges of the center sills, forming a cover and connecting-plate

for the latter and serving to securely connect the center sills to the bottom of the car. The intermediate inclined portions of the bottom are formed by inclined plates I^2 , which converge upwardly toward the center of the car, and hopper-doors I^3 , hinged at their upper edges to the lower edges of the intermediate plates I^2 . The latter extend from side to side of the car and are secured to the side-girder web-plates and outside upright hopper-plates by angle-bars i^2 or otherwise. The intermediate plates I^2 are slotted at their lower ends for the passage of the center sills.

K represents inner upright hopper-plates arranged at opposite sides of the center sills and preferably secured to the inclined side and intermediate bottom plates I and I^2 by angle-bars k . The inner upright hopper-plates are connected at the upper ends by an arched plate k' over the center sills. The outer upright hopper side plates only extend to the inner ends of the end web-plates B of the car-sides, and the openings thus left at the outer sides of the hopper beneath the end web-plates B are closed by vertical triangular patch-plates k^2 , arranged inside of and riveted to the outer upright hopper side plates, lower flange-angles of the car-sides, and angles i , connecting the upright outer side and bottom plates of the hopper.

The vertical ends L of the car are formed in any usual or preferred manner.

Each end sill of the car consists of a Z -bar M , arranged with its web horizontal, its inner flange extending vertically upward, and its outer flange extending vertically downward. The end portions of the web of the end sill rest upon the projecting ends n of the horizontal flanges of angle-bars N , Figs. 3 and 5, which are arranged inside of the end web-plates of the car-sides, with their vertical flanges riveted to said web-plates and the lower flange-angles of the sides. The angle-bars N extend from the end sill to the bolster and afford a very strong and rigid connection for the end sill.

The car is provided, as usual, with corner-posts O , connected at their lower ends to the end sills and lower flange-angles of the sides and at their upper ends to the vertical ends of the car.

The operating mechanism for the hopper-doors is preferably constructed as follows: The adjacent doors on opposite sides of the center sill are connected by a transverse flanged bar P , preferably an I -beam, riveted to the lower free ends of the doors. Q represents a rock-shaft, of which there are two, arranged transversely beneath the end inclined portions of the hopper. Each shaft is journaled in suitable bearings q on the center sills and outer portion of the hopper and is provided between the center sills with a long rock-arm q' , the free end of which extends beyond the adjacent hopper-doors when closed and is pivoted to one end of a link q^2 , which is pivoted at its other end to the transverse bar connect-

ing the two hopper-doors. R represents a door-operating lever which is pivoted on a stud or pin r , secured to the outside wall of the hopper. The lever is provided with a cam plate or portion having a curved face r' and an inclined face r^2 , adapted to engage a short rock-arm r^3 , secured to the adjacent end of the rock-shaft Q . When the lever is in the position shown in Fig. 1, the curved face of the cam engages the short rock-arm r^3 and holds the latter and the rock-shaft stationary, with the doors closed. When the lever is swung upwardly, as indicated by dotted lines in Fig. 1, the short rock-arm r^3 is released, and the doors swing open by reason of their weight. In the open position of the doors the short rock-arm r^3 bears against the inclined face of the cam, and when the latter is swung downwardly the inclined face of the cam forces the rock-arm r^3 down, turning the rock-shaft and closing the hopper-doors. After the inclined face of the cam turns the rock-arm down the curved face is moved into engagement with and holds the rock-arm from movement.

I claim as my invention—

1. In a car, the combination of a plate-girder side, comprising web-plates arranged in different vertical planes, with their meeting ends lapped, and a hopper side plate having its upper portion arranged in the plane of one of said web-plates and beside and secured to the other web-plate, substantially as set forth.

2. In a car, the combination of a plate-girder side comprising end web-plates, and a central web-plate connecting and arranged in a plane inside of the plane of said end web-plates, and a hopper side plate having its upper portion arranged in the plane of said end web-plates and secured to said central web-plate, substantially as set forth.

3. In a car, the combination of a plate-girder side comprising end web-plates, and a central web-plate connecting and arranged in a plane inside of the plane of said end web-plates, a flanged bar secured to said web-plates and constituting the lower chord of said plate-girder, said bar being spaced from said central web-plate, and a hopper side plate having its upper portion arranged between and secured to said central web-plate and said bar, substantially as set forth.

4. In a car, the combination of side plate-girders, bars secured to the lower portions of said girders and having inwardly-projecting horizontal flanges, and an end sill consisting of a Z -bar arranged with its web horizontal and resting on and secured to the ends of said horizontal flanges, substantially as set forth.

5. In a car, the combination of side plate-girders comprising webs, and lower chords arranged outside of said webs, angle-bars arranged inside of said webs and secured to the latter and to said lower chords, and an end sill consisting of a Z -bar arranged with its web horizontal and resting on and secured

to the end portions of the horizontal flanges of said angle-bars, substantially as set forth.

6. The combination with a hopper and its door, of means connected to said door, and a door-operating lever provided with a cam having a portion which engages said means to move the door and a portion which engages said means to lock the door in closed position, substantially as set forth.

7. The combination with a hopper and its door, of a rock-shaft connected to said door and provided with a rock-arm, a door-operating lever provided with a cam having a portion which engages said rock-arm to operate the door, and a portion which engages said rock-arm to lock the door in closed position, substantially as set forth.

8. The combination with a hopper having

doors arranged side by side, of a rock-shaft arranged transversely of said hopper, a rock-arm secured to said shaft between said doors, a link connecting the free end of said rock-arm to said doors, a door-operating lever arranged at the side of the hopper, a second rock-arm secured to said shaft adjacent to said lever, a cam connected to said lever and having a portion which engages said second rock-arm to move the doors, and a portion which engages said second rock-arm to lock the doors in closed position, substantially as set forth.

Witness my hand this 1st day of June, 1903.

HERBERT R. KEITHLEY.

Witnesses:

JNO. J. BONNER,

C. M. BENTLEY.