

No. 670,960.

Patented Apr. 2, 1901.

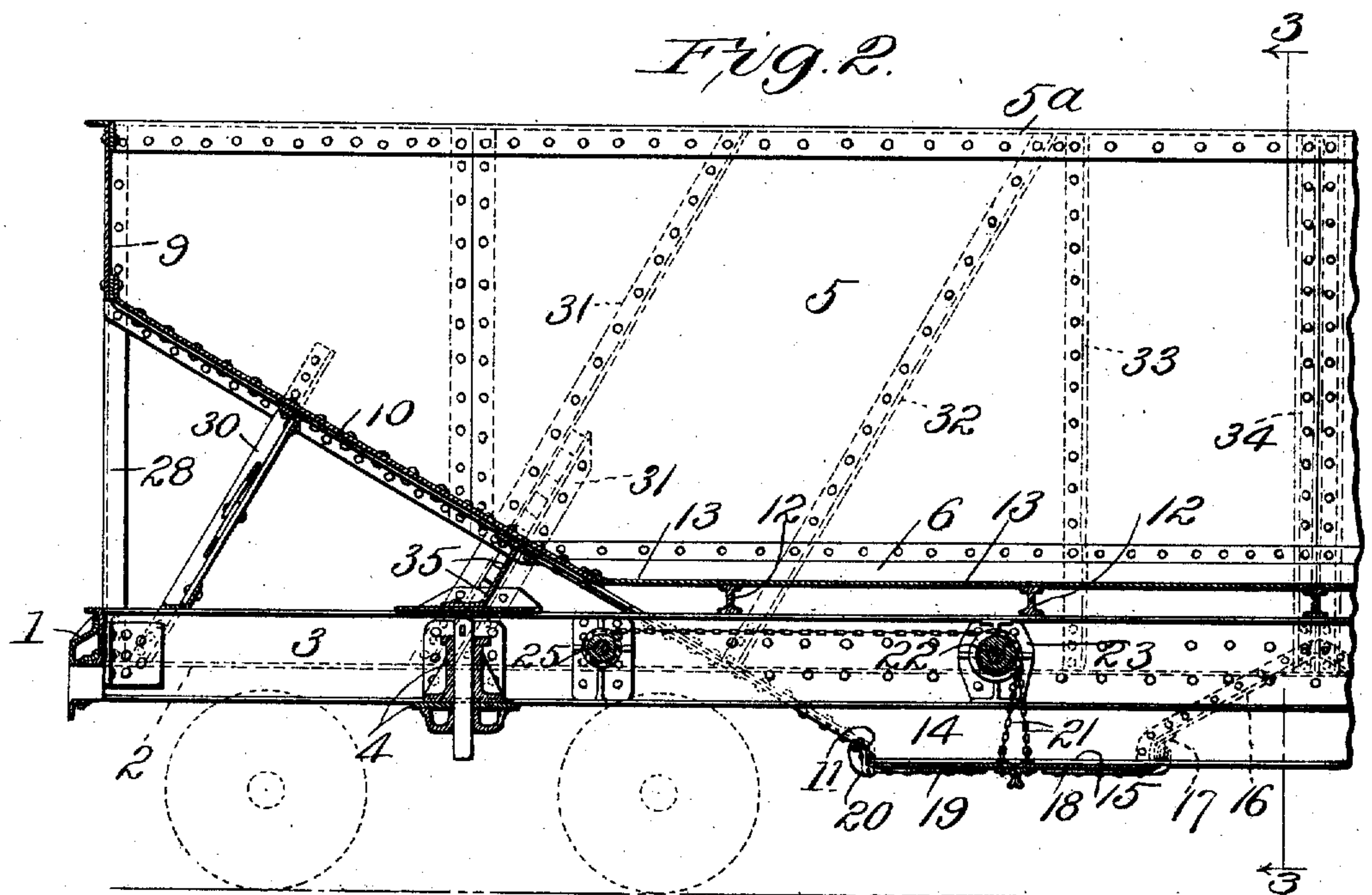
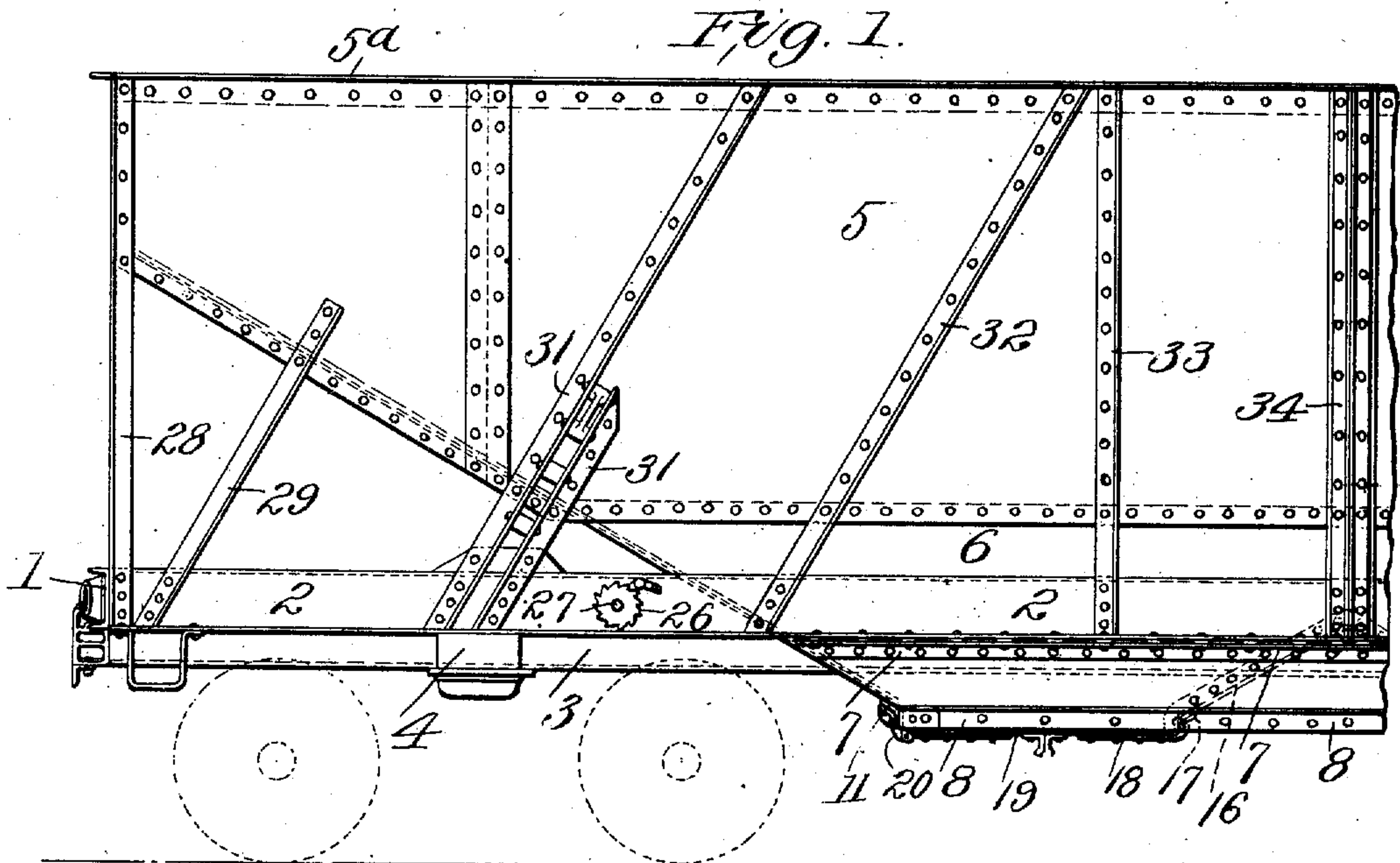
G. I. KING.

DOUBLE HOPPER BOTTOM CAR.

(Application filed Jan. 7, 1901.)

(No Model.)

3 Sheets—Sheet 1.



Attest:
Wm. H. A.
A. S. Gray

Inventor:
George I. King
by Baker & Cornwall
Attys.

No. 670,960.

Patented Apr. 2, 1901.

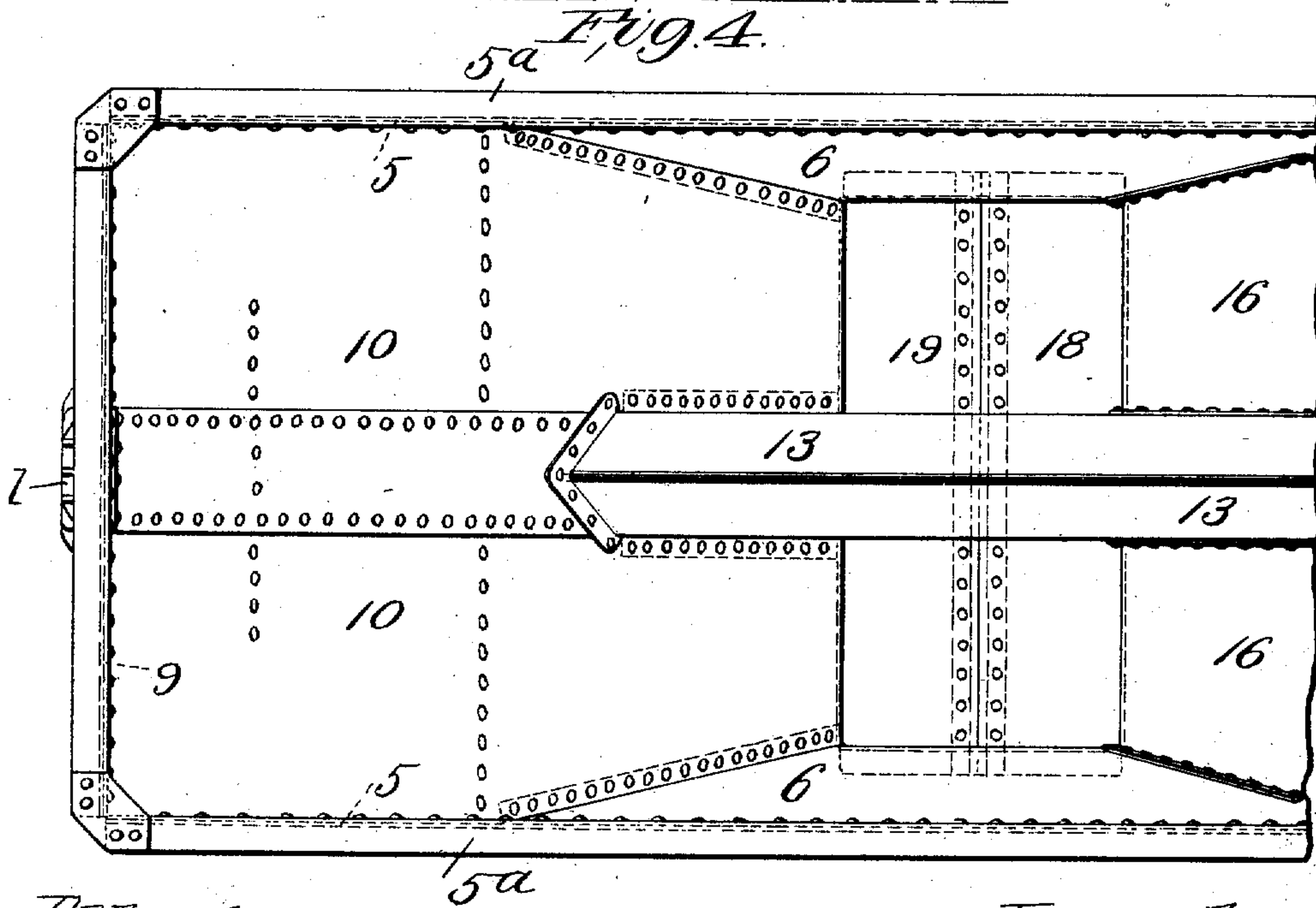
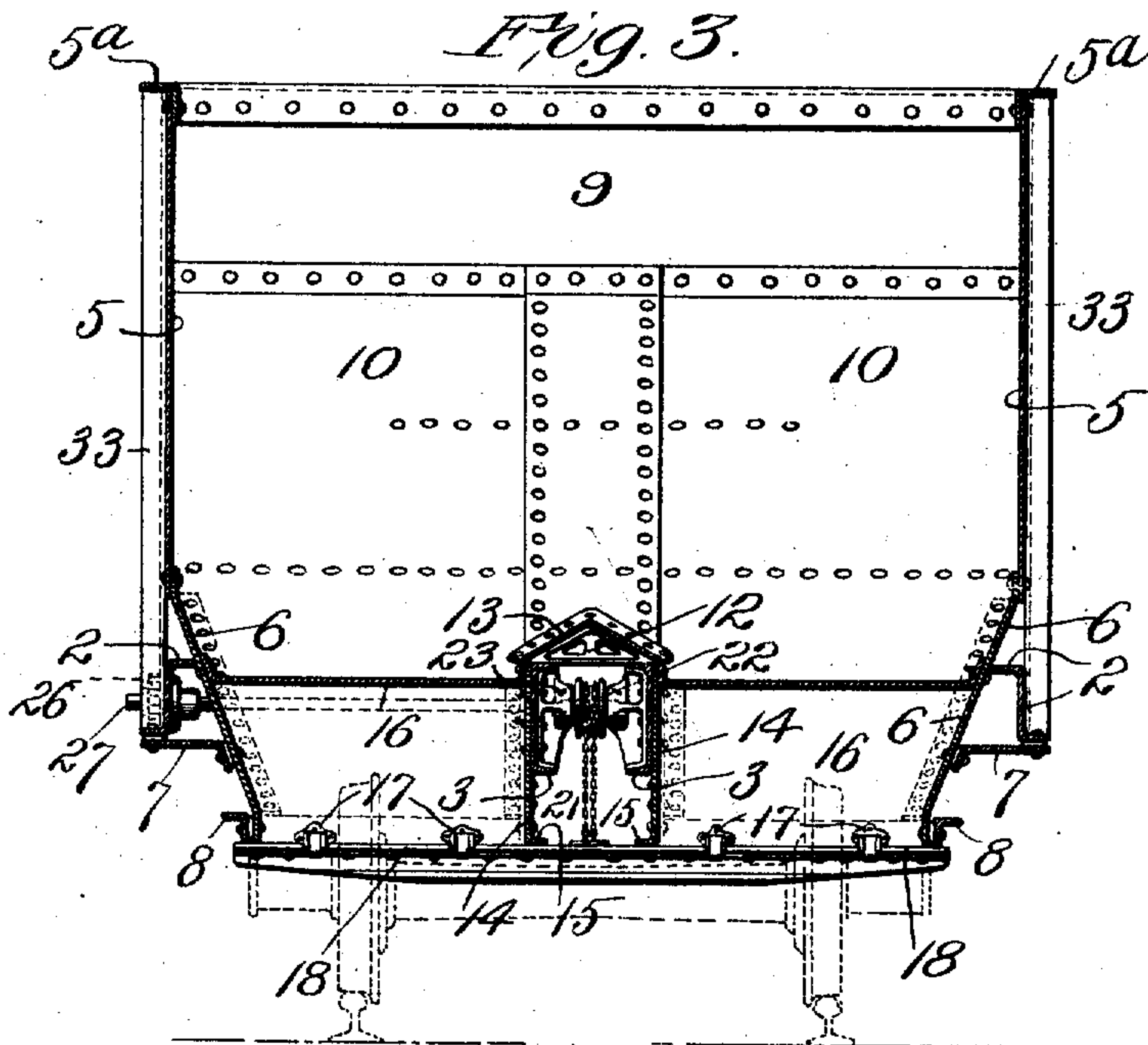
G. I. KING.

DOUBLE HOPPER BOTTOM CAR.

(Application filed Jan. 7, 1901.)

(No Model.)

3 Sheets—Sheet 2.



Attest:
Wm. H. Scott
A. S. Gray.

Inventor:
George I. King.
by *Bakewell & Cornwall*
Attys.

No. 670,960.

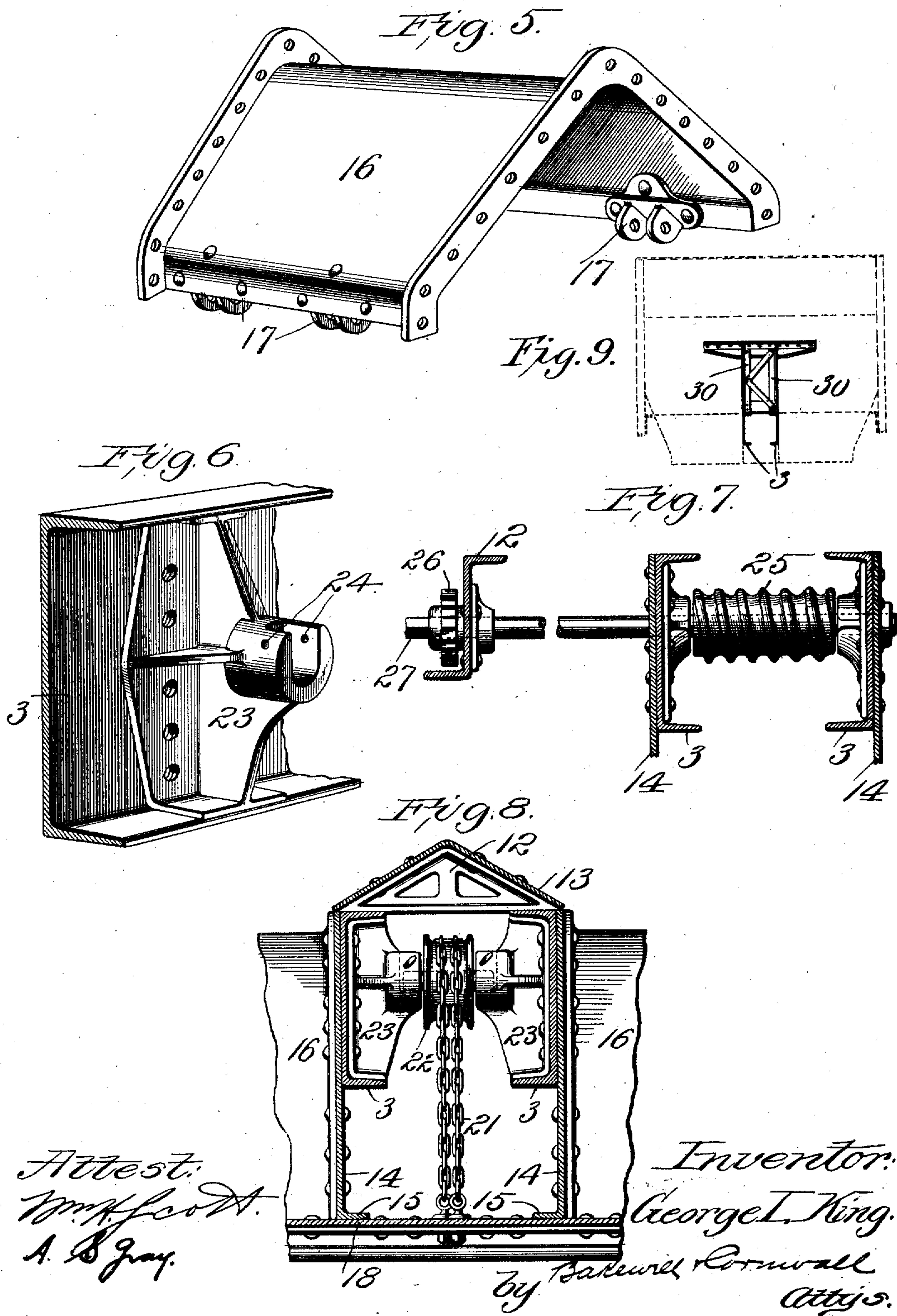
Patented Apr. 2, 1901.

G. I. KING.
DOUBLE HOPPER BOTTOM CAR.

(Application filed Jan. 7, 1901.)

3 Sheets—Sheet 3.

(No Model.)



UNITED STATES PATENT OFFICE.

GEORGE I. KING, OF DETROIT, MICHIGAN, ASSIGNOR TO THE AMERICAN
CAR & FOUNDRY COMPANY, OF ST. LOUIS, MISSOURI.

DOUBLE-HOPPER-BOTTOM CAR.

SPECIFICATION forming part of Letters Patent No. 670,960, dated April 2, 1901.

Application filed January 7, 1901. Serial No. 42,373. (No model.)

To all whom it may concern:

Be it known that I, GEORGE I. KING, a citizen of the United States, residing at the city of Detroit, in the county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Double-Hopper-Bottom Cars, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevational view of one end of my improved double-hopper-bottom car. Fig. 2 is a vertical sectional view through the same. Fig. 3 is a vertical cross-sectional view taken about the center of the car. Fig. 4 is a top plan view. Fig. 5 is a detail view of the cross-ridge. Fig. 6 is a detail view illustrating the manner of mounting the sheave-bracket on the center sill. Fig. 7 is a detail view illustrating the winding-drum and its associate parts. Fig. 8 is a detail cross-sectional view showing a portion of the door-operating mechanism; and Fig. 9 is a diagrammatic end elevational view, on a reduced scale, showing the braces which assist in supporting the body portion of the car on the frame.

This invention relates to a new and useful improvement in double-hopper-bottom cars of that type wherein the framing and body are composed largely, if not entirely, of metal.

One object of my present invention is to construct a car of the character described with a comparatively favorable ratio of dead-weight to revenue-freight and having a large capacity, (say one hundred thousand pounds or more,) the distance from rail to top of sides when the car is empty not exceeding, say, ten feet two inches.

Another object is to arrange the mechanism for operating the doors which control the exit for the load in such position as to be free from and outside of the load contained in the car, so that the operation of said mechanism will not be interfered with and prevent corrosion and freezing of the chain.

With these objects in view the invention consists in the construction, arrangement, and combination of the several parts, all as

will hereinafter be described and afterward pointed out in the claims.

In the drawings, 1 indicates the end sill; 2, the side sills, which are preferably Z-shaped in section, the bottom flanges being presented outwardly and the top flanges being presented inwardly; 3, the center sills, in the form of channels with their flanges presented inwardly, and 4 the bolster carrying the usual center and side bearings.

5 indicates the side plates of the car, which side plates serve as plate-girders, the top or compression flange of which is an angle 5^a, arranged at the upper edge of the side sheet, while the bottom or tension flange is made up in part by inclined hopper-sheet 6, with its bottom angle. This hopper-sheet is secured at its upper edge to the lower edge of the side sheet, which side sheet does not extend down to the side sill, and in order to laterally brace the side hopper-sheet the top flange of the side sill extends inwardly to the side hopper-sheet 6, as shown in Fig. 3.

7 indicates a strengthening-plate riveted to the bottom flange of the side sill and extending inwardly to the side hopper-sheet, to which it is secured through the medium of suitable rivets passing through a downturned flange at the inner end of the strengthening-plate. I prefer to secure the downturned flanges of the strengthening-plates 7 to the inclined hopper-sheets 6 by rivets which pass through washers 7^a, interposed therebetween, the purpose of which being to allow rain-water which might otherwise lodge at this point to pass therefrom, and thus prevent rusting of the joint. The lower edges of the side hopper-sheets are provided with vertically-disposed walls immediately above the door-openings, said lower edges being reinforced and strengthened by angles 8, as shown in Fig. 3.

9 indicates the end wall of the car, to the lower edge of which is secured the inclined floor-sheets 10, said floor-sheets being flanged downwardly at their sides for a portion of their length and riveted to the lower inclined edges of the side walls of the car. The floor-sheets 10 extend down to the door-opening, being reinforced at their lower edges by an-

gles 11, as shown in Fig. 2. The side hopper-sheets are preferably flanged inwardly along their inclined edges, so as to receive the floor-sheets 10 and provide convenient means of riveting the sheets to the side hopper-sheets.

The center sills 3 where they pass through the lower portion of the body of the car carry suitable castings or A-shaped frames 12 for supporting a hood-sheet 13, which hood-sheet prevents the contents of the car from passing between the center sills.

14 indicates what I will designate as the "center" hopper-sheets, which are riveted to the outer faces of the center sills, said sheets extending down below said sills and being provided with inturned flanges 15, against which the hopper-doors are designed to close. (See Fig. 8.)

16 indicates a sheet bent to form a cross-ridge, said sheet having flanges at its side edges for attachment to the side and center hopper-sheets. (See Figs. 4 and 5.) The inclined walls of this sheet are preferably at such an angle as to prevent lodgment of the contents of the car thereon when the car is being unloaded. The extremities of these inclined walls are preferably bent downwardly, and secured by suitable rivets or otherwise to the inner faces of the legs of these ridge-sheets are hinge-lugs 17, in which the doors 18 are mounted. These doors 18 preferably extend transversely the car, their companions 19, which open in an opposite direction or swing outwardly, being mounted in hinge-lugs 20, riveted to the angles 11 and to the lower edges of the inclined floor-sheets 10.

The free edges of the doors 18 and 19 are provided with eyes or other devices for the attachment of chains 21, said chains merging into one and passing over a sheave 22, mounted in suitable brackets 23, riveted to the inner faces of the center sills. (See Fig. 6.) These brackets 23 are preferably provided with sockets open at one side—the upper—so that the spindle of the sheave can be dropped in from above, after which the cotter-pin may be passed through openings 24 to prevent the displacement of the sheave-pin. The door-operating chain passing over the sheave 22 has one end secured to a winding-drum 25, (see Fig. 7,) which is mounted in suitable brackets riveted to the center sills. The shaft of this drum extends to one side of the car, preferably passing through the center sills and side sill, and contains the usual ratchet-wheel 26 on its end and the squared shank 27 for the reception of a wrench by which the winding-drum may be rotated. By this construction it will be seen that the winding-drum, the sheave, the chain over which the sheave passes, and the location of the point of attachment of said chain to the hopper-doors are all within the lines of the center sills and are consequently protected against interference from the load. Thus it makes no difference whether the contents of the car

be frozen—the door-operating mechanism is always free to move. It will be understood that this door-operating mechanism is duplicated at the other end of the car and each mechanism is independently operable.

28 indicates vertical corner-posts riveted to the end sill and side sills and to the ends of the body portion of the car, and 29 indicates inclined supports secured to the side wall of the car, in the transverse planes of which are the inclined floor-supports in the form of angles 30. (See Fig. 2.)

31 indicates inclined stiffening-braces riveted to the side sheets, their lower ends projecting below the side sheets and being secured to the side sill opposite the end of the body-bolster. 32 indicates inclined stiffeners in the form of angles which are riveted to the side sheet and whose lower ends extend below the lower edges of said side sheets and are attached to the side sills. 33 indicates vertical posts in the form of angles secured to the side sheet and to the side sill. 34 indicates similar posts in the form of angles arranged back to back, if desirable, which posts 34 occupy positions at about the center of the car. One of the functions of these inclined stiffening-braces and vertical posts is to strengthen the side sheets of the car and prevent said side sheets from bulging when containing a loose load. These inclined stiffeners and vertical posts also serve as connections between the side sheet and side sill.

Reference has been made herein to a side sheet serving as a plate-girder, and I will state that in such capacity said side walls carry their proportion of the load. The supports for these plate-girders are primarily the body-bolsters 4, to which body-bolsters are secured the inclined stiffening-braces 31, said stiffening-braces in addition to stiffening the side sheets against lateral bulging also efficiently resisting the shearing forces formed in said plate-girders. These inclined stiffening-braces carry the floor-beams 35 for supporting the floor-sheets, said floor-beams being supported at points intermediate their ends either by a continuous web rising from the body-bolster, lattice-bars, or in any other suitable manner.

One of the features of this invention is the arrangement of a side wall in the form of a plate-girder, which plate-girders carry a considerable portion of the load and are supported through the instrumentality of the inclined stiffening-braces, the floor-beams, and the floor-supports directly over the body-bolsters. These plate-girders are not directly connected to the side sills, their tension-flanges consisting of the plates 7 and the angles 8, riveted to the side hopper-sheets. Of course the side sills add to the strength of the tension-flanges of the plate-girders, but are not relied upon wholly for this purpose, they being connected to the side sheet indirectly—as, for instance, the inclined posts 32 and the vertical posts 33 and 34 on one side and to the

stiffening-plates 7 and the side hopper-sheets 6 on the other.

It will be understood that the usual brake mechanism, draft-rigging, handholds, &c., are employed in connection with my improved car; but I have not deemed it necessary to show the same here, because they form no part of my present invention. It will also be noted that by stopping off the side sheets above the side sills a considerable saving of plate material is effected over what would ordinarily be used in such cases as well as through the elimination of numerous connection-plates that would be required at the junction of the inclined members 29 and 31 with the side sills 2.

I am aware that minor changes in the arrangement, construction, and combination of the several parts of my improved car can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a hopper-bottom car, the combination with the body portion having inclined floor-sheets at its ends, a cross-ridge arranged in the center of the car, hinge-lugs at the edges of said cross-ridge, and said inclined floor-sheets, and doors mounted in said lugs; substantially as described.

2. In a hopper-bottom car, the combination with the side walls, of side hopper-sheets, center hopper-sheets, and cross-ridges riveted to said hopper-sheets; substantially as described.

3. In a hopper-bottom car, the combination with the side walls, of inclined hopper-sheets secured thereto, center sills, center hopper-sheets attached to said center sills, and ridge-sheets 16 formed with flanges at their ends for attachment to the center and side hopper-sheets; substantially as described.

4. In a hopper-bottom car, the combination with the body portion, of the center sills passing therethrough, cross-ridges on each side of the center sills, inclined floor-sheets, hinge-lugs attached to the edges of said cross-ridges and said inclined floor-sheets, oppositely-swinging doors mounted in said hinge-lugs, door-operating mechanism between the center sills, and a power-shaft connected to said mechanism and extending to the side of the car; substantially as described.

5. In a hopper-bottom car, the combination with the body portion, of the center sills passing therethrough, cross-ridges on each side of the center sills, inclined floor-sheets, hinge-lugs attached to the edges of said cross-ridges and said inclined floor-sheets, oppositely-swinging doors mounted in said hinge-lugs, chains connected to the free edges of said doors between the center sills, and a winding-drum mounted between the center sills for said chain; substantially as described.

6. In a hopper-bottom car, the combination

with the side walls in the form of plate-girders, of side sills located below said side walls, inclined hopper-sheets attached to the lower edges of said side walls and extending below the side sills, and stiffening-plates attached to said side sills and to said side hopper-sheets; substantially as described.

7. In a hopper-bottom car, the combination with side walls in the form of plate-girders, of Z-shaped side sills, inclined hopper-sheets secured to the lower edges of the side walls and being braced by the inwardly-extending flanges of the side sills, posts connecting the side walls and said side sills, and strengthening-plates secured to the outwardly-presented flanges of said side sills and to said side hopper-sheets; substantially as described.

8. In a hopper-bottom car, the combination with the side walls in the form of plate-girders, of body-bolsters, inclined stiffening-braces attached to said side walls and to said body-bolsters, floor-beams supported by said inclined stiffening-braces, side sills extending from bolster to bolster, which side sills are located below the side walls of the car, and posts attached to the side walls, the lower ends of said posts being attached to the side sills; substantially as described.

9. In a hopper-bottom car, the combination with side walls, of inclined hopper-sheets secured thereto, center sills, center hopper-sheets secured to said center sills, end walls, floor-sheets, side sills, strengthening-plates 7, and washers or distance-pieces interposed between said strengthening-plates and said side hopper-sheets, whereby water which might tend to lodge on the strengthening-plates can escape over both edges of said plates; substantially as and for the purpose specified.

10. A hopper-bottom car consisting of a body portion having inclined hopper-sheets, of side sills, and the strengthening-plates 7, which strengthening-plates are secured to the side hopper-sheets by rivets which pass therethrough and through washers interposed between said strengthening-plates and said side hopper-sheets whereby water which might tend to lodge on the strengthening-plates can escape over both edges of said plates; substantially as described.

11. The combination with a hopper-bottom car, of a door therefor, center sills, brackets 23 secured to said center sills, which brackets are provided with sockets open at one side, a spindle carrying a sheave journaled in said sockets, means for preventing said spindle from raising out of said sockets, chains secured to the free end of said door, and passing over said sheave, and a winding-drum for said chain; substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 2d day of January, 1901.

GEORGE I. KING.

Witnesses:

WM. H. SCOTT,
A. S. GRAY.