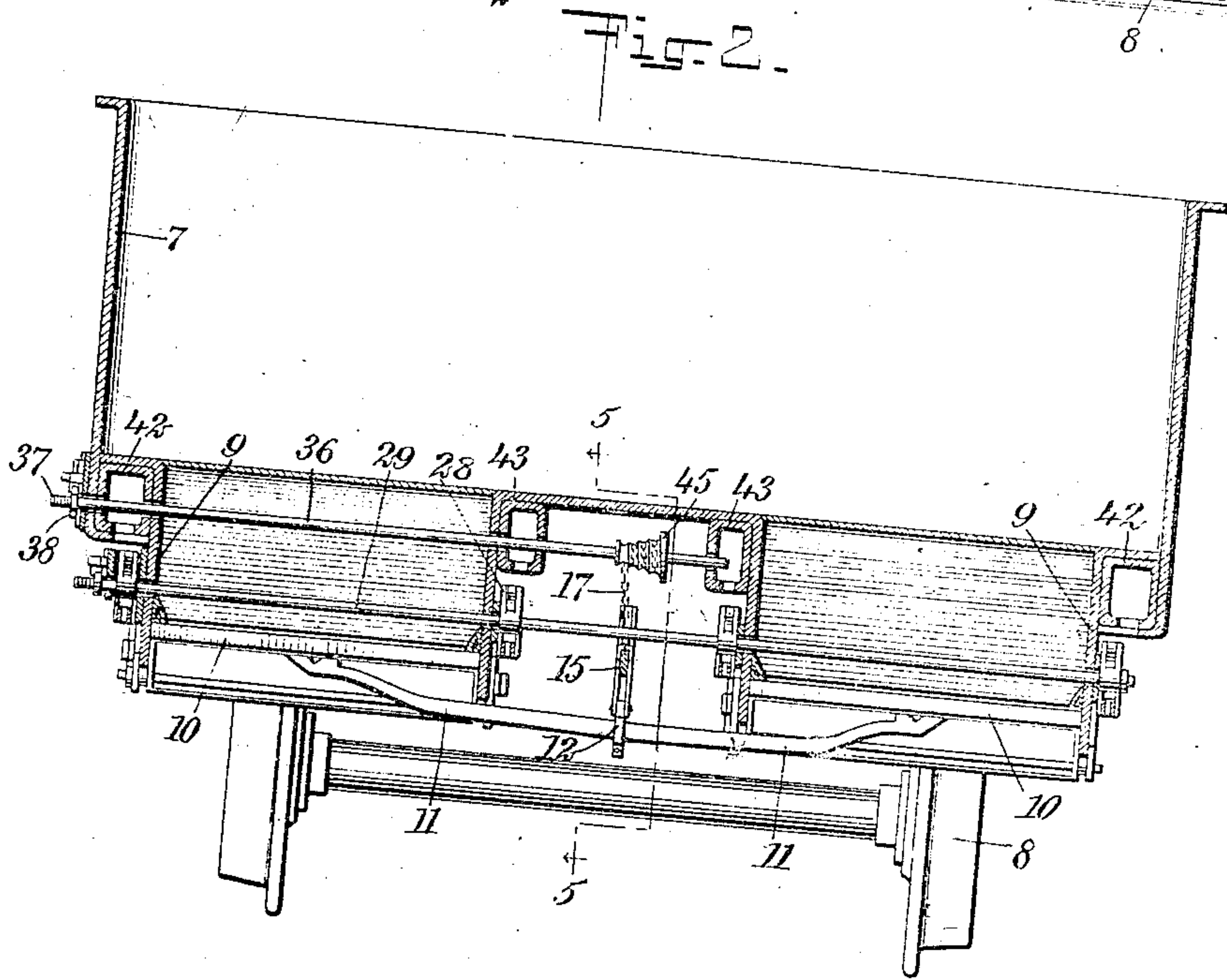
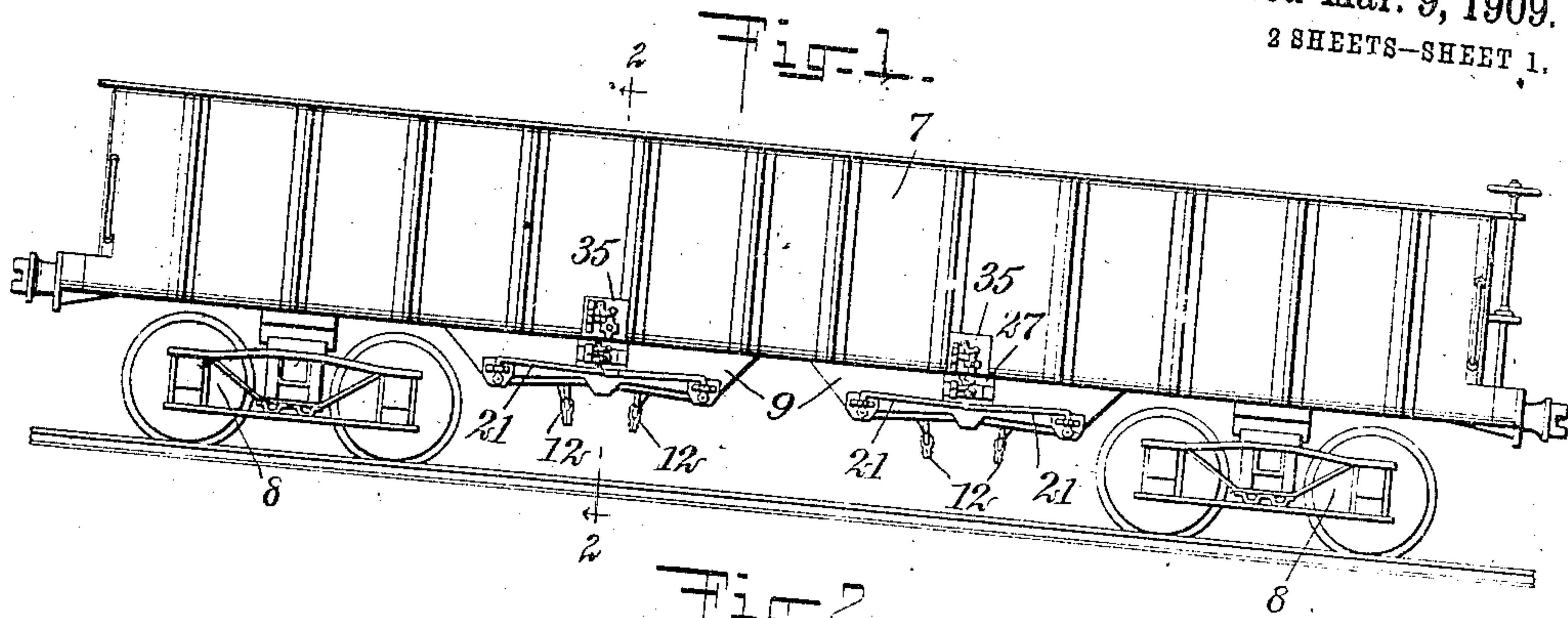


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APPLICATION FILED MAR. 4, 1908.

Patented Mar. 9, 1909.  
2 SHEETS—SHEET 1.



WITNESSES  
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INVENTOR  
*Francis W. Bradley*  
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ATTORNEYS

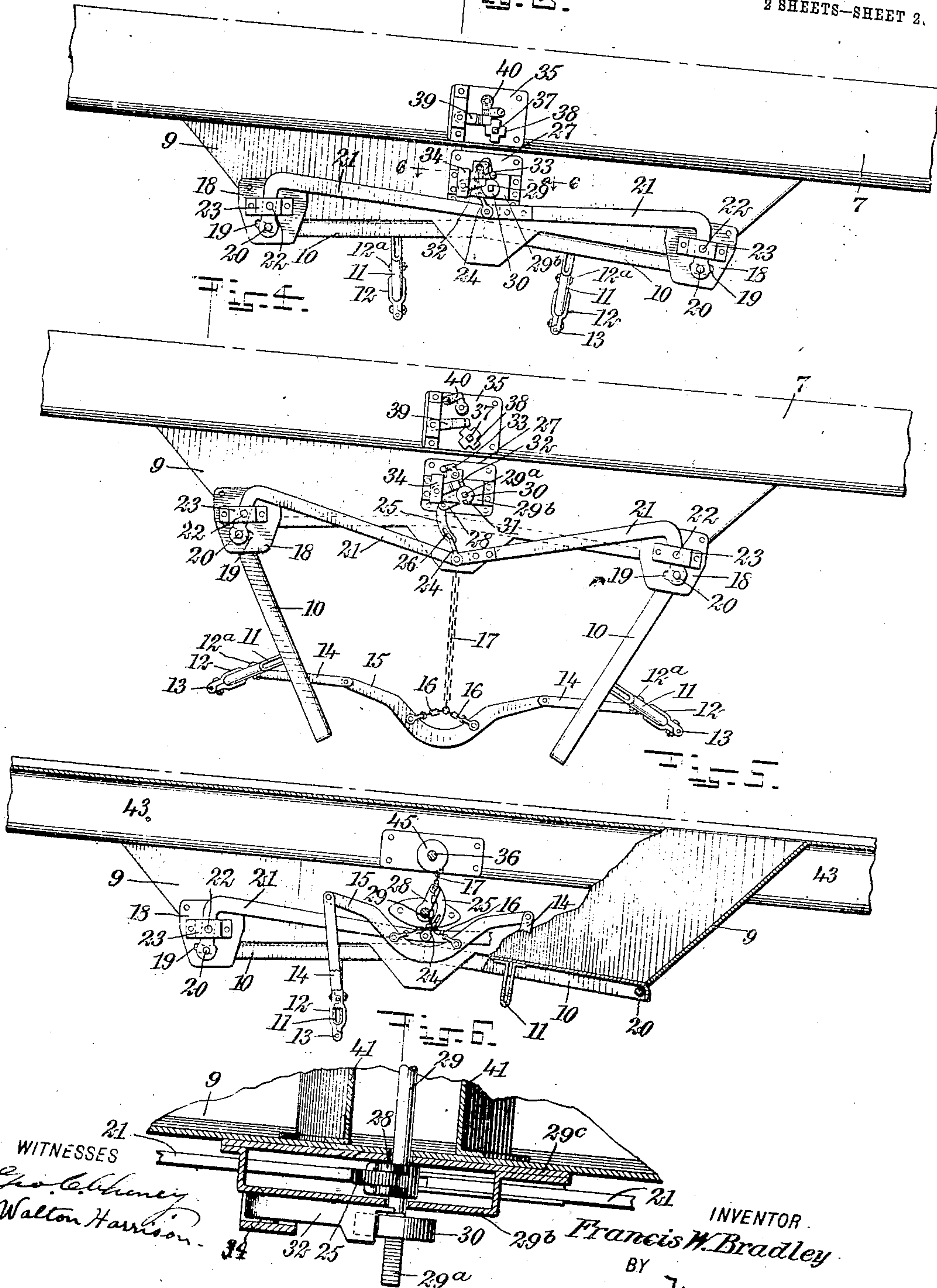
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2 SHEETS—SHEET 2.

Fig. 2.



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# UNITED STATES PATENT OFFICE.

FRANCIS W. BRADLEY, OF McKEES ROCKS, PENNSYLVANIA.

## DROP-DOOR STRUCTURE FOR CARS.

No. 914,786.

Specification of Letters Patent.

Patented March 9, 1909.

Application filed March 4, 1908. Serial No. 419,181.

*To all whom it may concern:*

Be it known that I, FRANCIS W. BRADLEY, a citizen of the United States, and a resident of McKees Rocks, in the county of Allegheny and State of Pennsylvania, have invented a new and Improved Drop-Door Structure for Cars, of which the following is a full, clear, and exact description.

My invention relates to cars and analogous vehicles, my more particular object being to provide a car body with swinging doors, so constructed and operated that under certain conditions, when closed, the doors are by their own weight and by the weight of materials resting upon them, forced toward each other and thus prevented from opening, said doors being locked in this position to prevent their receding from each other in order to open, and also being locked independently of their pressure against each other.

My invention further relates to means whereby the doors can be so manipulated as to readily precipitate materials resting upon them, and also whereby the doors may be readily retracted to normal position.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of a complete car equipped with my improved drop doors and means for actuating the same; Fig. 2 is an enlarged vertical cross section upon the line 2—2 of Fig. 1, looking in the direction of the arrows and showing one of the upper shafts together with the spiral winch mounted thereupon and supporting depending chains and other parts for raising the doors into normal position, this view further showing one of the lower shafts and parts connected therewith for drawing the doors edgewise toward each other, in order to cause them to jam each other endwise and thus increase the difficulty of their opening accidentally; Fig. 3 is an enlarged fragmentary side elevation of the car, showing certain parts appearing in Fig. 1, including one pair of drop doors and mechanism for actuating the same, the doors in this instance being closed and occupying their normal positions; Fig. 4 is a side elevation similar to Fig. 3, but showing the doors as swung downward or open; Fig. 5 is a fragmentary vertical section upon the line 5—5 of Fig. 2, looking in the direction of the arrows, and showing certain

details relating to the locking mechanism for holding the doors in such position that their adjacent edges abut each other, so as to cause the doors to jam; and Fig. 6 is an enlarged fragmentary section upon the line 6—6 of Fig. 3, looking in the direction of the arrows, and showing certain details of one of the locking mechanisms.

The car body is shown at 7 and is mounted upon trucks 8.

At 9 are hoppers which depend below the car body.

Drop doors are shown at 10, and mounted rigidly upon them are arms 11, each having a substantially U-shaped cross section. Folding clamps 12, provided with hinges 13, are mounted upon these arms 11 and are provided with screw bolts 12<sup>a</sup> for purposes of adjustment. Links 14 are pivotally connected with the clamps 12 and are disposed in pairs, each pair being pivotally connected by a lifting bar 15. Chains 16 are connected with this bar and with a central lifting chain 17.

Brackets 18, 18, arranged in pairs, are mounted upon each hopper 9, the brackets being severally provided with slots 19 through which extend rods 20. Levers 21, also arranged in pairs, are pivotally mounted upon rods 22, the latter being supported in bearings 23. The levers 21 are pivotally connected together, and secured to them is a clevis 24 which engages a link 25 of arcuate form, which is provided with a slot 26 through which the clevis extends.

Brackets 27 are mounted upon the hoppers 9. Each link 25 is pivotally connected with an arm 28, the latter being mounted rigidly upon a shaft 29, this shaft being provided with an angular portion 29<sup>a</sup> whereby it may be turned by aid of a socket wrench or key. A disk 30 is mounted rigidly upon the shaft 29 and is provided with a notch 31. A pawl 32 rests loosely upon the disk 30 and is adapted to partially enter the notch 31 so as to prevent backward rotation of the shaft 29. Bearing plates 33 engage the shafts 29 and serve to support the same, said bearing plates having a backing plate 29<sup>c</sup>.

A weight 33, having substantially the form of an L, is pivotally mounted above each pawl 32 and may be turned by hand so as to lock this pawl rigidly within the notch 31. The pawl 32 is journaled within a bearing 31<sup>b</sup>.



ing 34. Bearing brackets 35 are secured firmly upon the car body 7, and rocking shafts 36 extend through these bearing brackets and are provided with angular ends 37 whereby they may be turned by aid of keys or wrenches. Mounted upon each angular end 37 is a toothed wheel 38, and engaging the same loosely is a pawl 39. Rocking weights 40, each having the form of an L-shaped arm, are journaled upon the brackets 35 which may be rocked by hand so as to press the pawls 39 into engagement with the toothed wheels 38, or to disengage the same, as desired.

Plates 41 arranged in pairs, each pair having generally the form of an inverted V, are mounted within the car body and serve as partitions. Collar beams 42, 43, 44 are mounted upon the under side of the car body and serve as bearings for the shafts 36. These shafts are connected rigidly with spiral winches 45 upon which the chains 17 are partially wound, as will be understood from Fig. 2.

In the particular car shown there are four hoppers, there being two across the car and two lengthwise of the car. Each hopper has its own pair of doors, and several doors are thus operated by a single rocking shaft 36.

The operation of my device is as follows: Assume that the hoppers at one end of the car have been delivered of their contents, and that consequently in each hopper affected the doors 10 and other parts occupy the positions indicated in Fig. 4. The shafts 20 are now free to move slightly within the slots 19. In order to close the doors 10 the operator, by aid of an appropriate wrench or key, turns the angular end 37, thereby turning the shaft 36. The pawl 39 prevents backward rotation of the toothed wheel 33. The chains 17 are thus wound up (see Fig. 2) and the doors 10 are brought into their uppermost position, as indicated in Fig. 3.

The operator next turns the angular end 29 in a clockwise direction, according to Fig. 4. The arm 28 and link 25 are thus raised, the clevis 24 turning up the adjacent ends of the levers 21. The shafts 20 being free to move slightly within the slots 19, the doors 10 are now forced edge to edge toward each other with considerable pressure, so as to cause them to press upwardly, as indicated in Fig. 3, the pawl 32 engaging the notch 31 so as to prevent backward rotation of the disk 30. The rocking weight 33 is now turned so as to hold the pawl 32 firmly in position. This grips the levers 21 tightly in such position that they exert a constant pressure against the outer ends of the doors 10, so that the doors are utterly unable to open. The rocking weight 40 causing the pawl 39 to lock the wheel 38 against backward rotation, as above described, the doors are also firmly pressed upward by the tension of the chains

17, and inasmuch as the shaft 36 is now unable to relax the tension of the chains 17, the doors 10 are still more firmly held in closed position. It will thus be noted that the doors 10, when in normal position ready to receive the weight of a load, are locked firmly by two separate and distinct agencies. In order to discharge the load, the operator merely throws up first the rocking weight 33, which has ultimately the effect of relaxing the pressure of the levers 21. He next throws up the rocking weight 40, which results in slackening the tension of the chains 17. The doors 10 readily open by virtue of their own weight, together with the weight of any materials resting upon them.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. The combination of a receptacle provided with an open bottom, swinging doors for closing said bottom, mechanism controllable by a revoluble shaft for forcing said doors against said bottom in order to prevent said doors from opening, means for locking said mechanism so as to prevent said doors from opening accidentally, levers connected with said doors for forcing the same toward each other edge to edge and thus further preventing said doors from opening, and mechanism controllable at will for securing said levers in a predetermined position.

2. The combination of a receptacle provided with an open bottom, doors journaled upon opposite sides of said bottom and adapted to swing toward each other and with their adjacent edges in contact and in a higher plane than their remote edges for the purpose of closing said bottom, levers connected with said doors and adapted to force the latter toward each other so as to cause said doors to wedge together edge to edge in order to prevent said doors from opening, means controllable at will for actuating said levers, and mechanism for locking said levers in a predetermined position in order to prevent said doors from opening.

3. The combination of a car body provided with an open bottom, doors journaled upon opposite sides of said bottom and adapted to swing toward each other and with their adjacent edges in contact and in a higher plane than their remote edges for the purpose of closing said bottom, a number of separate levers connected with said doors, means controllable at will for actuating all of said levers so as to close a plurality of said doors, and mechanism for locking said levers in predetermined positions so as to prevent said doors from opening.

4. The combination of a car body provided with an open bottom, doors journaled upon said car body and adapted to swing, said doors being provided with edges adapted to rest against each other when said doors

are closed and in a higher plane than the remote edges, means for forcing said doors toward each other so as to cause the edge of one door to bind against the edge of another  
5 in order to prevent said doors from opening, and means for moving said doors apart in order to permit them to swing open.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANCIS W. BRADLEY.

Witnesses:

FRANK HEIRDNER,  
W. T. WILSON.