

No. 774,975.

PATENTED NOV. 15, 1904.

W. P. BETTENDORF.
UNDERFRAME FOR CARS.
APPLICATION FILED AUG. 12, 1901.

NO MODEL.

3 SHEETS—SHEET 1.

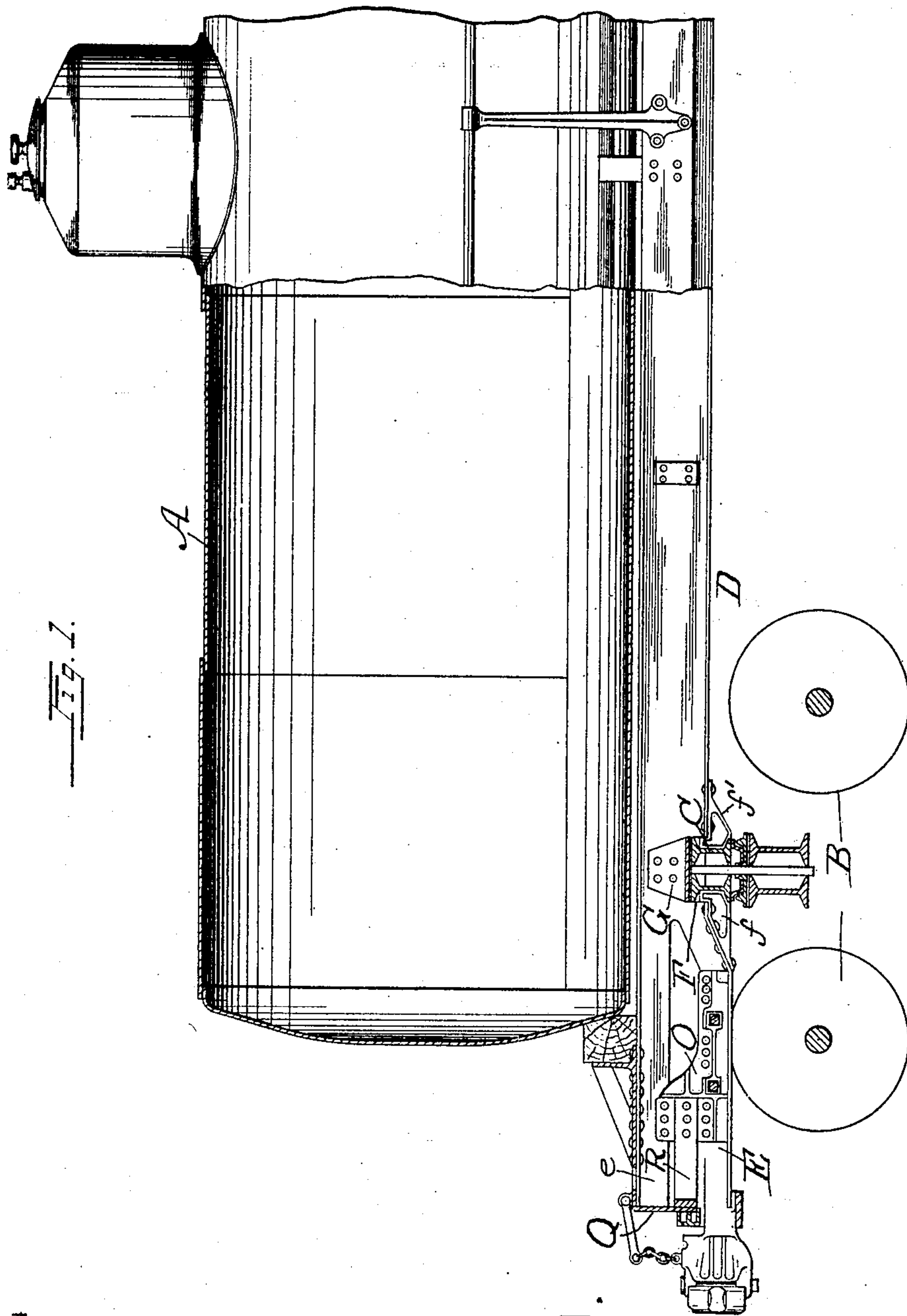


Fig. 1.

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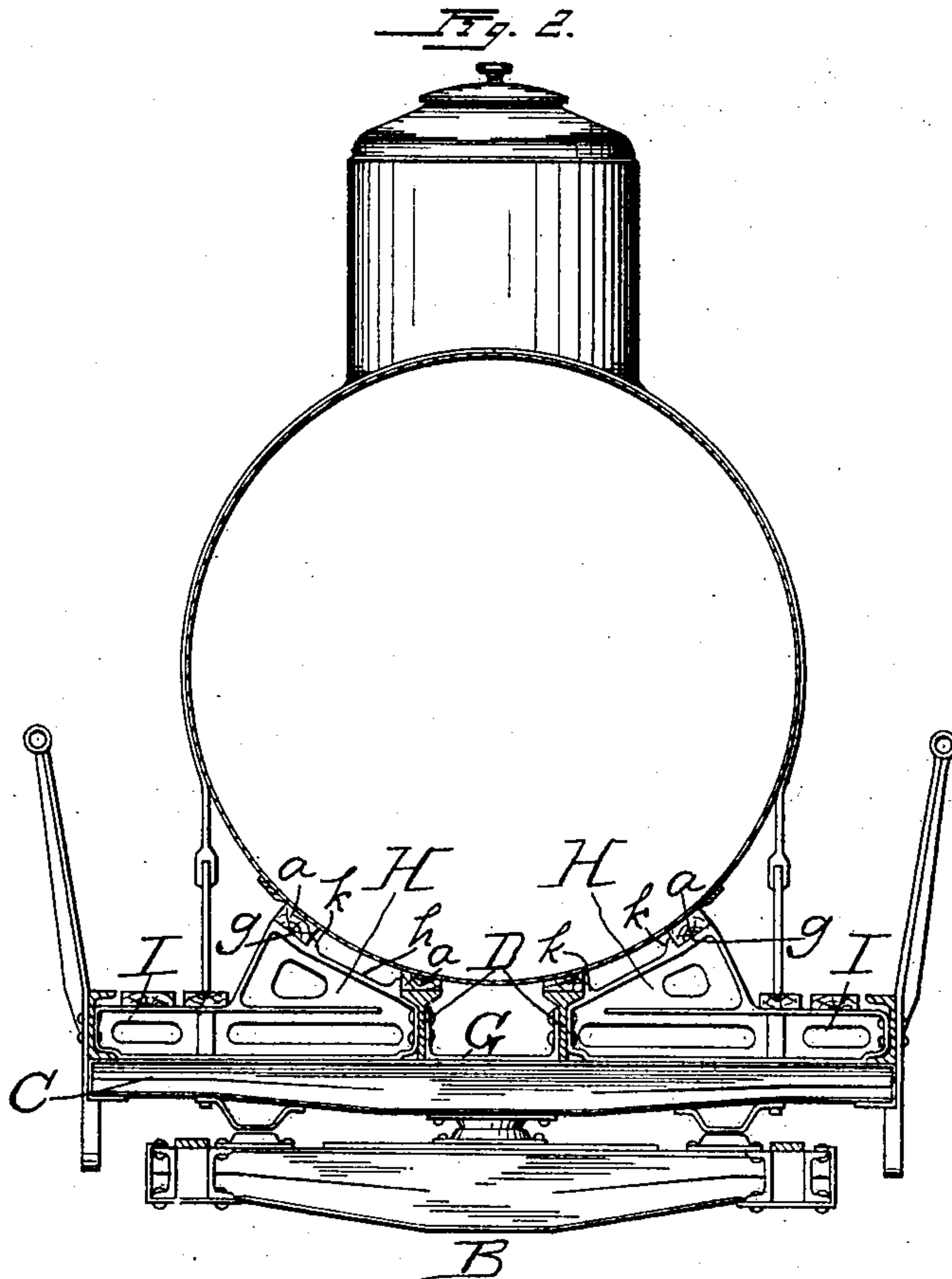
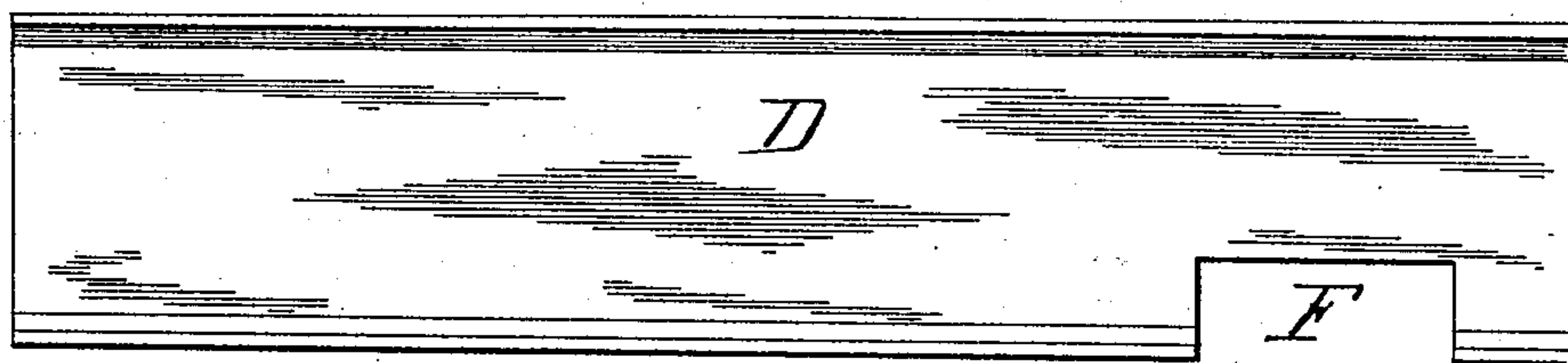


Fig. 4.



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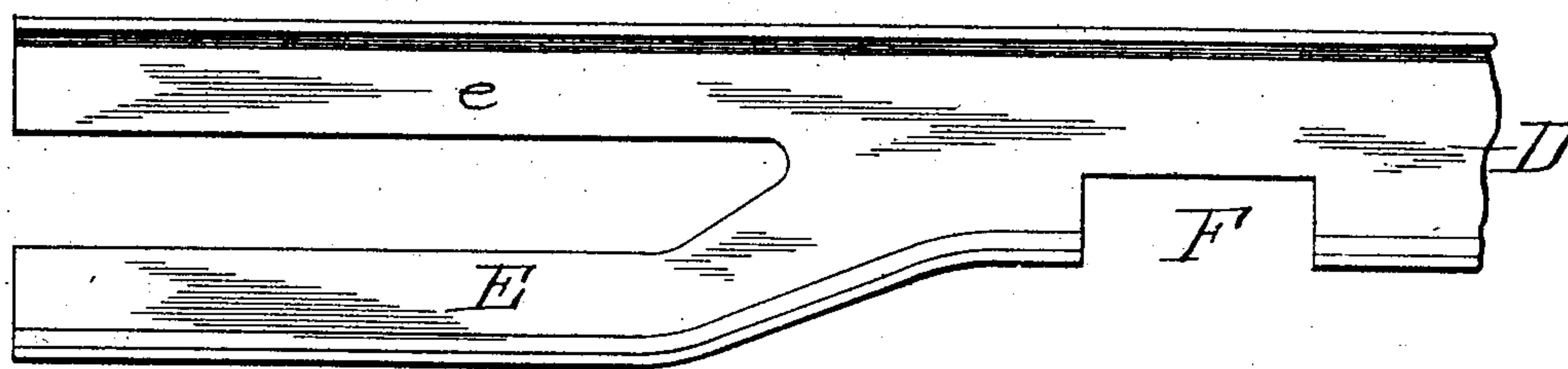
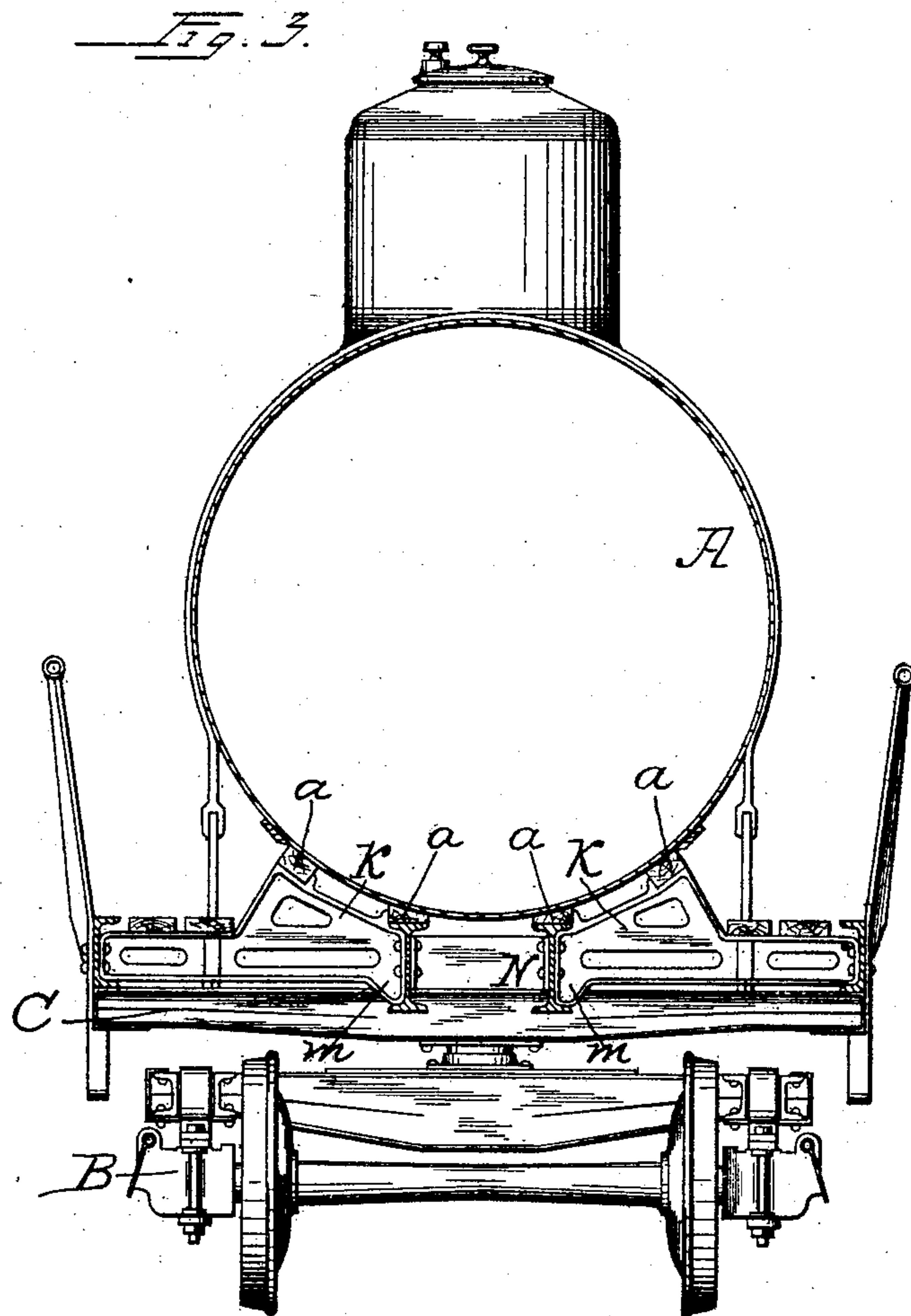
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3 SHEETS—SHEET 3.



Witnesses:

S. E. Thomason.

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UNITED STATES PATENT OFFICE.

WILLIAM P. BETTENDORF, OF DAVENPORT, IOWA.

UNDERFRAME FOR CARS.

SPECIFICATION forming part of Letters Patent No. 774,975, dated November 15, 1904.

Application filed August 12, 1901. Serial No. 71,759. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. BETTENDORF, a citizen of the United States, and a resident of Davenport, in the county of Scott and State of Iowa, have invented certain new and useful Improvements in Underframes for Railway-Cars, of which the following is a full, clear, and exact specification.

Heretofore the prevailing construction of the underframes for railway-cars required the center sills to either pass through the body-bolsters or to have the ends of the central portion thereof terminate at and be fastened to the sides of the bolster or to be passed over the bolsters by reducing the height of the beam usually employed for this purpose between the flanges thereof.

The object of my invention is to provide center sills extending from end to end of the car over the body-bolsters comprising flanged beams the height or distance between the flanges of which is the same throughout their lengths, except where it may be necessary to make allowance for the different heights of underframes of the cars of different design and make in order to maintain the regulation height of the draw-bar or coupling above the rails which the prevailing rules governing car construction in this country require.

In the drawings, Figure 1 is a view, partially in longitudinal section and partially in elevation, of one-half of a tank-car embodying the features of the invention. Fig. 2 is a cross-sectional view of the car, taken about at the plane of the body-bolster. Fig. 3 is a cross-sectional view taken at a point near the center of length of the car. Fig. 4 is an enlarged detail of an end portion of one of the center sills adapted to engage the bolster of a truck of medium height. Fig. 5 is a similar view of an end portion of one of the center sills adapted for use with a high truck.

In the drawings, A represents a cylindrical tank of any suitable dimensions, which, as shown, is carried by an underframe designed specially for this purpose. This underframe is provided, like all other railway-cars in this country, with body-bolsters located near its ends, and these body-bolsters are connected to and supported upon the bolsters of the truck B

in the usual manner. The body-bolster C may be of any suitable construction; but considering their greater load-sustaining ability I much prefer to make them according to the construction set forth in Letters Patent granted to me March 7, 1899, No. 620,561, and February 28, 1899, No. 620,269.

The underframe employed in connection with my improvements is preferably made of metal, although, if desired, it could, with the exception of the center sills, the bolsters, and the saddle-frames of the tank, be made of wood, at least to a great extent. The general design and construction of this underframe is patterned after that described and shown in Letters Patent of the United States granted to me May 23, 1899, No. 625,534. The principal features of my invention comprise the center sills of the underframe, the saddle-frames, and connections of said sills.

The center sills D D consist of metal beams, preferably I-beams, as shown in the drawings, which extend over and are supported upon the body-bolsters C and are not reduced in height between their upper and lower flanges from one end of the car to the other. In order, however, to accommodate the center sills to cars adapted to carry heavy loads and to cars whose underframes are of such an elevation above the rails that the draft-rigging has to be secured in a plane below the plane of the upper edge of the body-bolster in order to obtain the construction required by the Master Car-Builders' rules, I cut away a portion of the lower flange of the I-beam where it arches over the said bolster to form the recess F, and if this does not provide the desired drop I slit the ends of the I-beam center sills to produce two branches E e and bend the lower branch, E, downward a sufficient distance so that when the draft-rigging is secured in place the center of the coupling will be the regulation distance above the rails. When the latter construction of the center sills is adopted, they are provided on either side of the recess F with braces f f', which consist of metal frames having flanged edges that are respectively riveted or otherwise suitably secured to the lower face of the lower flanges of the inclined portion of the

branch E and to the lower face of the lower flange of the center sill on the opposite side of the body-bolster, as shown. These braces extend from their place of fastening on the center sill to the bolster, against the adjacent sides of which their ends are adapted to abut, and rest and bear down upon the upper face of the adjacent lower flange of the beams of which said body-bolster is composed. In this way the strain on the edge of the recess F, resting on and arching over the bolster, is relieved, and consequent danger of weakness developing at this point is avoided. The portion of the center sill above this recessed portion is reinforced, however, by the vertical ends of the U-shaped plate G. This plate is placed between and has its ends riveted to the beams comprising said center sills, so that its horizontal portion will rest on the body-bolster, and at the same time furnish a bearing for the head of the king-bolt.

The tank H rests directly on the wooden shoes *a a a*, substantially as shown, and these shoes consist of suitable timbers extending parallel to each other the full length of the tank at approximately equal distances apart. The two center shoes *a* rest upon the upper face of the upper flanges of the center sills, but the outer two rest in seats *g g*, formed in the inclined upper edge of the saddle-frames H H near the apices thereof. These saddle-frames are preferably made integrant with the cross-beams I, resting and supported on the body-bolsters between the center sills and the side sills of the underframe, and the portions thereof nearest the side sills form a support for the floor of the car on each side of the tank. Their inner portions forming the said saddle-frames extend up in an inclined direction toward the tank substantially at right angles to the edge of the saddle-frame, having parallel relation to the side of the tank. This edge *h* of the saddle-frame has near its upper and lower ends upwardly-projecting lugs *h h*, the upper one of which forms the seat for the outer shoe *a* and the lower ones of which bear against the edge of the adjacent upper flange of the center sill and projects above said flange to assist in maintaining the inner shoes *a* in position. The inner end of the saddle-frame, which aligns with the cross-beam I portion, abuts against and is riveted to the web of the center sill opposite plate G. This assists in anchoring said saddle-frame in position and makes of it and the cross-beam, of which it is a part, a spacing element to separate and hold the center sills and outer sills in their relative positions.

At suitable intervals between the body-bolsters the tank H is supported by combined saddle-frames and cross-beams K, which are, except in one particular, similar in design and dimensions to the saddle-frame and cross-beam H I hereinbefore described. The one point of difference possessed by frames K consists of

a foot *m*, which is made to project from the inner lower corner of the same. This foot rests upon the upper face of the lower flange of the adjacent center sill, whereby the strain produced by the tank and its contents is imparted to the center sill in such manner as to avoid the possible shearing of the rivets connecting said center sills and saddle-frames together. While such a construction is not considered essential, I prefer to connect the center-sill beams at points alining with and between the saddle-frames with spacing-plates N. This not only reinforces the said center sills, but secures a transverse rigidity of the underframe structure, which is very desirable.

Another novel feature of my invention consists in securing the draft-rigging direct to the ends of the center sills extending over the bolsters. I am aware that this has been done where the center sills extend through the bolsters or where sections of said sills extend only from the bolsters; but my invention contemplates the securing of the draft-rigging direct to the end of the sills of cars in which the bolsters are not so constructed as to permit the sills to pass through them. This I accomplish where, as shown in Fig. 1 of the drawings, the ends of the center sills are bifurcated, and the lower branch thus formed is dropped by connecting the two branches with a metal frame O, between the extended lower portions of which the body of the coupling is suitably secured. The forward part of frames O is preferably in a plane between the two branches E *e*, connected to the end sill Q of the car by a U-shaped brace R. The legs of this brace are secured to the vertical sides of frames O, and the bend or portion thereof connecting these legs is secured to the inner surface of the end sill, and it operates to brace the portion of the end sills above the coupling against the buffing strain of colliding cars and transmits such strain to the center sills.

It is not considered necessary to enter into a description of the construction of the draft-rigging and its connections to the underframe, as any of the numerous draft riggings may be employed according to the style of the coupler used. I therefore desire to be considered as including all draft-rigging as contemplated within the scope of my invention.

I claim as my invention—

1. In an underframe for cars, center sills comprising each an I-beam of uniform depth, extending from end to end of the car over the body-bolsters, portions of the lower flange and adjacent web removed to arch over said bolsters.

2. In an underframe for cars, center sills comprising each a metal single beam extending from end to end of the frame over the body-bolsters, the portions of said beams beyond the body-bolster being bifurcated and

the lower branch thereof extending below the lower plane of the beam proper.

3. In an underframe for cars, center sills, consisting each of an I-beam extending from end to end of the frame over the body-bolsters, the portions of said beam beyond the body-bolsters being bifurcated and the lower arm of said forked portion extending below the lower plane of the beam proper, portions of the lower flange and web being removed to arch over said body-bolsters.

4. In an underframe for tank-cars, tank-saddles comprising oppositely-disposed transverse members secured at intervals along the car-frame between the side and center sills adapted to support the tank.

5. In an underframe for tank-cars, tank-saddles comprising ribbed and flanged transverse members oppositely disposed in pairs along the car-frame and secured between the side and center sills, said members abutting against the webs of said sills, and being adapted to receive the tank.

6. In an underframe for tank-cars, tank-saddles comprising ribbed and flanged transverse members oppositely disposed in pairs along the car-frame, secured between the side and center sills, and adapted to receive the tank and spacing-plates or bridges secured between the center sills in alinement with said saddles.

7. In an underframe for cars, center sills comprising I-beams extending from end to end of the frame over the body-bolsters, and the end portions of said beam beyond the body-bolsters being bifurcated and the lower arms of said forked portions extending below the main body of the beam, and means adapted to stand compression secured in alinement with said lower arms and the body-bolsters, whereby endwise thrust against said lower arms is communicated to the body-bolsters.

8. An underframe for tank-cars comprising side sills, center sills and end sills, said center sills comprising beams of market shape extending from end sill to end sill over the body-bolster, portions of the lower flanges and webs of said center sills being removed to form seats for the body-bolsters, tank-saddles comprising transverse members oppositely disposed in pairs at intervals along the frame and secured between the side and center sills, and spacing-plates or bridges between the center sills in alinement with the saddles.

9. An underframe for tank-cars, comprising side sills, center sills and end sills, said center sills comprising flanged beams extending from end sill to end sill over the body-bolsters, the end portions of said beams beyond the body-bolsters being bifurcated and the lower branches of said forked portions extending below the main body of the beam, tank-saddles secured at intervals between the center and side sills and spacing-plates or bridges

between said center sills in alinement with said saddles.

10. In an underframe for tank-cars, center sills each comprising a flanged beam extending from end to end of the frame over the body-bolster, having a portion of its lower flange and web removed where it arches over said bolsters and braces secured on the lower edges of said beams abutting against the webs of the body-bolsters and in compression between the lower flanges of said bolsters and the beam.

11. In an underframe for tank-cars having flanged side and center sills, tank-saddles comprising ribbed and flanged transverse members secured at intervals between the body-bolsters to said side and center sills, provided with feet resting on the lower flanges of the sills.

12. In an underframe for tank-cars center sills comprising each a flanged beam extending from end to end of the car, over the body-bolsters and unreduced in height between its flanges, portions of its lower flange and web being removed to form seats for said bolsters, the end portions of said beams beyond the body-bolsters being bifurcated and the lower arms of the portions so forked extending below the main body of the beam.

13. In an underframe for tank-cars a combined tank-saddle and cross-beam secured to and between the inner and outer sills and adapted to transmit the strain of its load.

14. In combination, an underframe for tank-cars, comprising side and center sills each consisting of flanged beams, a tank, and saddle-frames therefor, the ends of which are secured to adjacent center and side sills between the flanges thereof, so as to transmit its load directly to said sills and prevent shearing of the rivets or bolts.

15. An underframe for cars comprising center sills, body-bolsters, and metal frames to which the draft-rigging is connected, said sills consisting of metal beams that are continuous from end to end of the car and pass over the body-bolsters, said frame being attached direct to the web of that part of the center sills between said bolsters and the adjacent end of the car, and said last-mentioned part of the sills being connected direct to the lower part of said body-bolster in a plane below the plane of the lower edges of the center sill where it passes over the body-bolster.

16. An underframe for cars comprising center sills, body-bolsters, and metal frames to which the draft-rigging is connected which pass over the body-bolsters, said frame being attached direct to the web of that part of the center sills between said bolsters and the adjacent end of the car, and said last-mentioned part of the sills being connected direct to the lower part of said body-bolster in a plane below the plane of the lower edges of the center sill where it passes over the body-bolster.

17. An underframe for cars comprising center sills consisting of metal beams, which pass over the body-bolsters and have the end portions extending beyond said bolsters bifurcated, said body-bolsters and draft-rigging connected direct to said bifurcated end portions.

18. An underframe for cars comprising center sills, body-bolsters and frame to which the draft-rigging is connected, said sills each consisting of flanged metal beams which pass over the body-bolster and have the lower flange and part of the web thereof arching over said bolster displaced, said frames being connected directly to the web of the center sills between the body-bolsters and the end of the car adjacent thereto, and said last-mentioned portion of the sills being connected directly to the lower portion of the body-bolster in a plane below the plane of the lower edges of the center sill where it passes over the body-bolsters.

19. An underframe for cars comprising center sills consisting of flanged metal beams which pass over the body-bolsters, and have the lower flange and part of the web of the portion arching over said bolster displaced, and have the end portions thereof extending beyond said bolsters bifurcated, and draft-rigging connected direct to said bifurcated end portions.

20. An underframe for cars comprising center sills consisting of metal beams, which pass over the body-bolster and have the end portions extending beyond said bolsters bifurcated, said body-bolsters, frames connecting the bifurcated portions of said center sills and draft-rigging connected to said frames.

21. An underframe for cars comprising center sills consisting of metal beams which extend over the body-bolsters, said body-bolsters, end sills and a U-shaped metal frame connecting said end sills to the center sills.

22. An underframe for cars comprising center sills consisting of metal beams, which extend over the body-bolsters and have the end portions extending beyond said bolsters bifurcated, said body-bolsters, end sills, sill-frames connecting the bifurcated ends of said center sills and U-shaped frames connecting said end sills and sill-frames, as and for the purpose set forth.

23. In an underframe for cars, body-bolsters comprising parallel solid rolled shapes having upper and lower flanges, and center sills consisting each of a flanged beam extending from end to end of the frame over the body-bolster, unreduced in height between its flanges.

24. In an underframe for cars, body-bolsters comprising parallel I-beams and center sills consisting each of a flanged beam extending from end to end of the frame over the body-bolsters unreduced in height between its flanges.

25. A body-bolster, a sill comprising a

flanged beam passing over the body-bolster and having portions of its lower flange and web adjacent thereto displaced to arch over said bolster, and means secured to said sill in the vicinity of the displaced portion thereof and in touch with the top of said body-bolster.

26. A body-bolster, a sill comprising a flanged beam passing over the body-bolster and having portions of its lower flange and web adjacent thereto displaced to arch over the said bolster, and means arranged transversely to said sill in touch with said sill and bolster.

27. A body-bolster, a sill comprising a flanged beam passing over the body-bolster and having portions of its lower flange and web adjacent thereto displaced to arch over said bolster, and means arranged transversely to said sill in the vicinity of the displaced portion thereof and in touch with the same and the top of said body-bolster.

28. A body-bolster, a sill comprising a flanged beam passing over the body-bolster and having portions of its lower flange and web adjacent thereto displaced to arch over said bolster, and means for reinforcing the web of said sill in the vicinity of said bolster.

29. A body-bolster, a sill comprising a flanged beam passing over the body-bolster and having portions of its lower flange and web adjacent thereto displaced to arch over said bolster, and means for reinforcing the web of said sill above the displaced portion thereof.

30. In an underframe for cars, a body-bolster, a center sill comprising a flanged beam of uniform depth extending from end to end of the frame, and passing over the body-bolster and having portions of the flange and adjacent web displaced to arch over said body-bolster, and means secured to said sill in the vicinity of the displaced portion thereof and in touch with the same and the top of said body-bolster.

31. In an underframe for cars, a body-bolster, a center sill comprising a flanged beam of uniform depth extending from end to end of the frame, and passing over the body-bolster and having portions of the flange and adjacent web displaced to arch over said body-bolster, and means arranged transversely to said sill and in touch with both said sill and bolster.

32. In an underframe for cars, a body-bolster, center sills each comprising a flanged beam extending from end to end of the same and passing over the body-bolster and having portions of the flange and adjacent web displaced to arch over said bolster, and means arranged transversely to said sills in a plane above that of the displaced portion thereof which connects said center sills and rests upon said body-bolster.

33. In an underframe for cars, a body-bolster, a center sill comprising a flanged beam of uniform depth extending from end to end

of the frame, and passing over the body-bolster and having portions of the flange and adjacent web displaced to arch over said body-bolster, and means for reinforcing the web of said sill in the vicinity of said bolster.

34. In an underframe for cars, a body-bolster, a center sill comprising a flanged beam of uniform depth extending from end to end of the frame, and passing over the body-bolster and having portions of the flange and adjacent web displaced to arch over said body-bolster, and means for reinforcing the web of said sill above the displaced portion thereof.

35. A body-bolster, a sill comprising a flanged beam passing over the body-bolster and having portions of its lower flange and web adjacent thereto cut away to arch over said bolster, and means secured to said sill in the vicinity of the displaced portion thereof and in touch with the same and the top of said body-bolster.

36. A body-bolster, a sill comprising a flanged beam passing over the body-bolster and having portions of its lower flange and web adjacent thereto cut away to arch over the said bolster, and means arranged transversely to the sill and in touch with both said sill and bolster.

37. A body-bolster, a sill comprising a flanged beam passing over the body-bolster and having portions of its lower flange and web adjacent thereto cut away to arch over said bolster, and means arranged transversely to said sill in the vicinity of the cut-away portion thereof and in touch with the same and the top of said body-bolster.

38. A body-bolster, a sill comprising a flanged beam passing over the body-bolster and having portions of its lower flange and web adjacent thereto cut away to arch over said bolster, and means for reinforcing the web of said sill in the vicinity of said bolster.

39. A body-bolster, a sill comprising a flanged beam passing over the body-bolster and having portions of its lower flange and web adjacent thereto cut away to arch over said bolster, and means for reinforcing the web of said sill above the cut-away portion thereof.

40. In an underframe for cars, a body-bolster, a center sill comprising a flanged beam of uniform depth extending from end to end of the frame, and passing over the body-bolster and having portions of the flange and adjacent web cut away to arch over said body-bolster, and means secured to said sill in the vicinity of the cut-away portion thereof and in touch with the same and the top of said body-bolster.

41. In an underframe for cars, a body-bolster, a center sill comprising a flanged beam of uniform depth extending from end to end of the frame, and passing over the body-bolster and having portions of the flange and adjacent web cut away to arch over said body-

bolster, and means transverse to said sill and in touch with said sill and bolster.

42. In an underframe for cars, a body-bolster, center sills each comprising a flanged beam extending from end to end of the car and passing over said body-bolster, and having portions of the flange and adjacent web cut away to arch over said body-bolster, and means arranged transverse to said sills in a plane above that of the cut-away portion thereof which connects said center sills and rests upon said body-bolster.

43. In an underframe for cars, a body-bolster, a center sill comprising a flanged beam of uniform depth extending from end to end of the frame, and passing over the body-bolster and having portions of the flange and adjacent web cut away to arch over said body-bolster, and means for reinforcing the web of said sill in the vicinity of said bolster.

44. In an underframe for cars, a body-bolster, a center sill comprising a flanged beam of uniform depth extending from end to end of the frame, and passing over the body-bolster and having portions of the flange and adjacent web cut away to arch over said body-bolster, and means for reinforcing the web of said sill above the cut-away portion thereof.

45. An underframe for cars comprising a body-bolster, draft-rigging, a center sill consisting of a metal beam that is continuous from end to end of the car and passes over said body-bolster, portions of the lower flange and adjacent web of the sill being cut away to arch over the body-bolster, and said draft-rigging being attached direct to that part of said sill between the adjacent end thereof and said bolster in a plane below that of the lower edge of the center sill at a point where it passes over the body-bolster.

46. An underframe for cars comprising a body-bolster, draft-rigging, a sill consisting of metal beams that are continuous from end to end of the car and pass over the body-bolster and have the portion thereof over the body-bolster cut away, the lower portions of said body-bolster and said draft-rigging being attached direct to that part of said center sill between the adjacent end thereof and said bolster in a plane below that of the lower edge of the center sill at a point where it passes over the body-bolster.

47. An underframe for cars comprising a body-bolster, draft-rigging, a center sill consisting of a metal beam that is continuous from end to end of the car and passes over said body-bolster, portions of the lower flange and adjacent web of the sill being displaced to arch over the body-bolster, and said draft-rigging being attached direct to that part of said sill between the adjacent end thereof and said bolster, and means connecting said sill to said body-bolster in a plane below that of the lower edge of the center sill at a point where it passes over the body-bolster.

48. An underframe for cars comprising a body-bolster, draft-rigging, a sill consisting of metal beams that are continuous from end to end of the car and pass over the body-bolster and have the portion thereof over the body-bolster displaced, the lower portions of said body-bolster and said draft-rigging being attached direct to that part of said center sill between the adjacent end thereof and said bolster, and means connecting said sill to said body-bolster in a plane below that of the lower edge of the center sill at a point where it passes over the body-bolster.

49. An underframe for cars comprising a body-bolster, draft-rigging, a center sill consisting of a metal beam that is continuous from end to end of the car and passes over said body-bolster, portions of the lower flange and adjacent web of the sill being cut away to arch over the body-bolster, and said draft-rigging being attached direct to that part of said sill between the adjacent end thereof and said bol-

ster, and means connecting said sill to said body-bolster in a plane below that of the lower edge of the center sill at a point where it passes over the body-bolster. 25

50. An underframe for cars comprising a body-bolster, draft-rigging, a sill consisting of metal beams that are continuous from end to end of the car and pass over the body-bolster and have the portion thereof over the body-bolster cut away, the lower portions of said body-bolster and said draft-rigging being attached direct to that part of said center sill between the adjacent end thereof and said bolster, and means connecting said sill to said body-bolster in a plane below that of the lower edge of the center sill at a point where it passes over the body-bolster. 30 35

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