

W. P. BETTENDORF.  
STEEL CAR CONSTRUCTION.  
APPLICATION FILED MAY 23, 1909

Patented Dec. 14, 1909.

3 SHEETS-SHEET 1.

942,997.

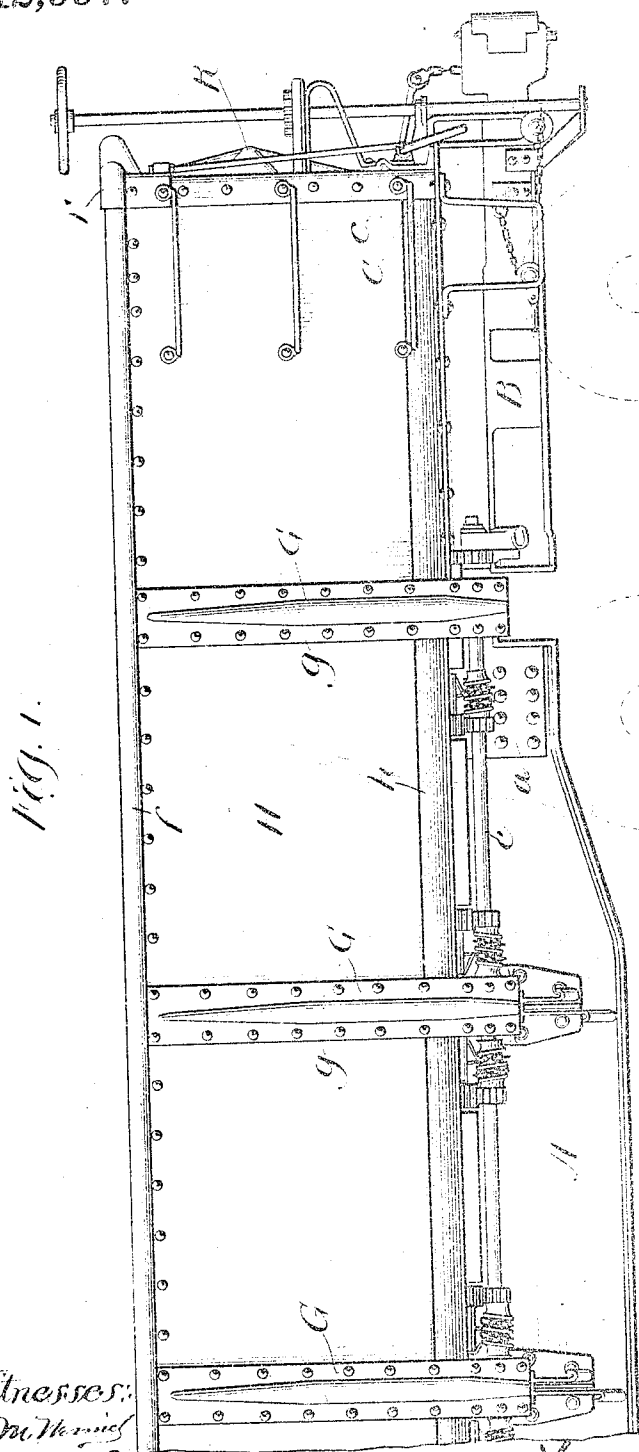


Fig. 1.

Witnesses:  
On Motion

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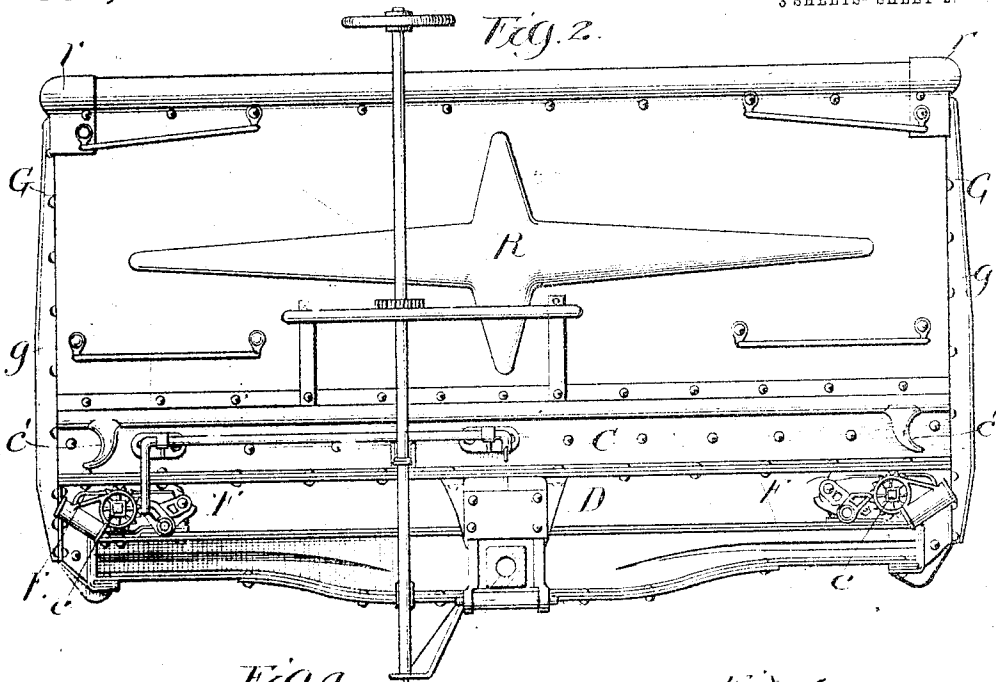


Fig. 4.

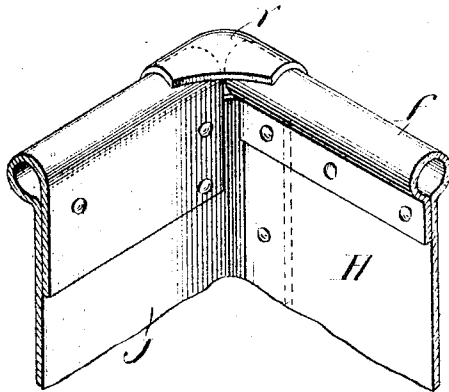


Fig. 5.

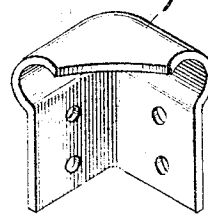
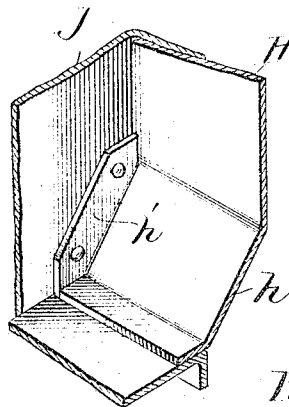


Fig. 6.



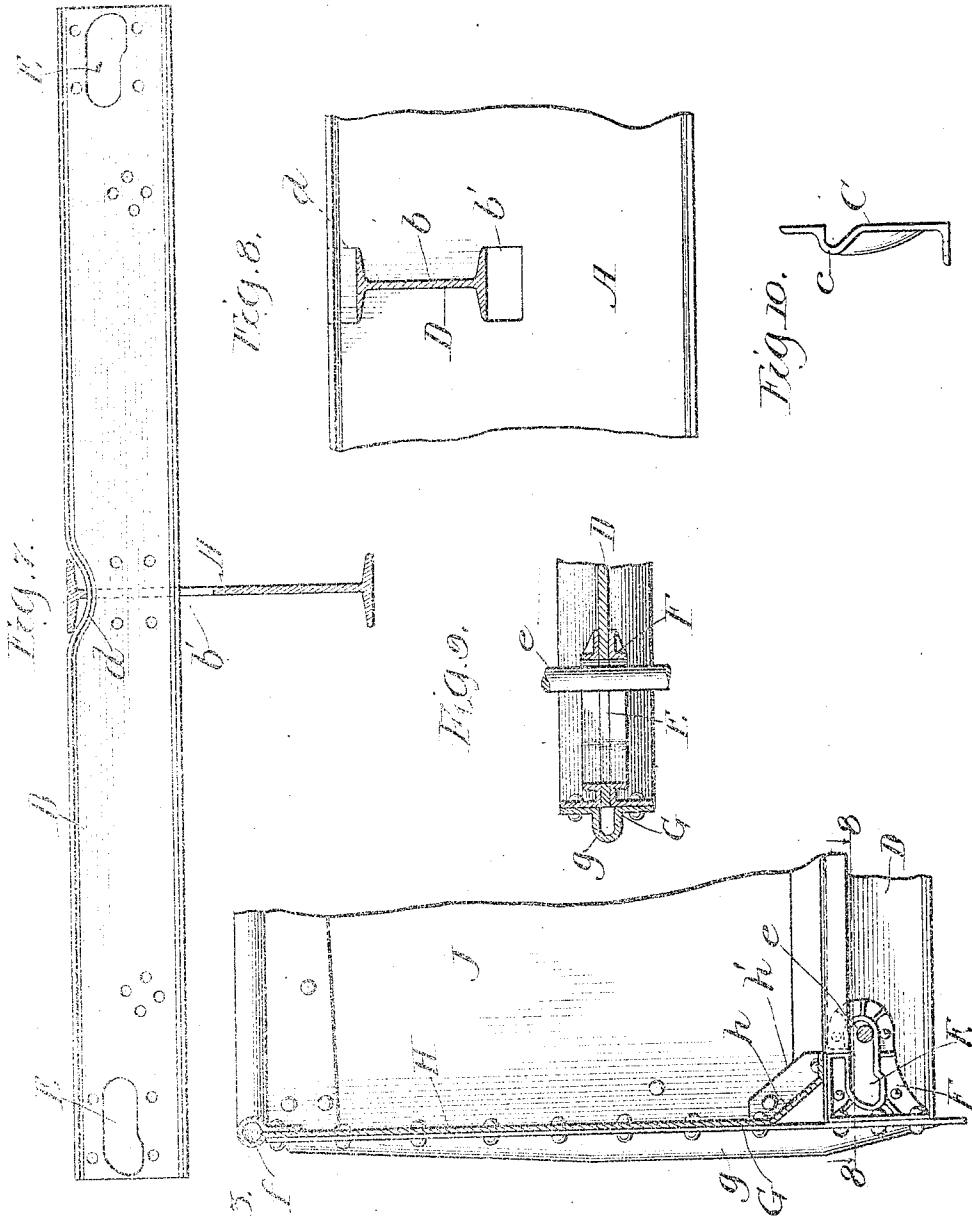
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# UNITED STATES PATENT OFFICE.

WILLIAM P. BETTENDORF, OF DAVENPORT, IOWA.

STEEL-CAR CONSTRUCTION.

942,997.

Specification of Letters Patent.

Patented Dec. 14, 1909.

Application filed May 23, 1908. Serial No. 434,670.

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 Steel-Car Construction, of which the following is a clear, full, and exact description.

My invention relates to the construction of metal cars and particularly to gondola or gondola dumping cars.

The principal objects of my invention are, first to construct a gondola car in which the sheet metal side-walls are made to take the place of the side-sills; second, to strengthen and stiffen the side and end-walls and posts by the peculiar formation given them; third, to provide needle-beams that extend, continuously, from side to side of the car and at the point where they pass through the center-sill are shaped so that their upper edges for the remainder of their lengths are practically on the same horizontal plane as the top of the center-sill, and fourth, to otherwise so construct the underframe and body as to make a strong, durable and economical car, substantially as hereinafter fully described, and as particularly pointed out in the claims.

In the drawings:—Figure 1 is a side elevation of one-half of a gondola dump-car embodying my improvements. Fig. 2 is an end view thereof. Fig. 3 is a vertical section through one side of the car-body. Figs. 4, 5 and 6 are perspective views of fragmentary parts and details of the walls of the body of the car. Fig. 7 is a detail view showing a side view of one of the needle-beams removed from the body of the car. Fig. 8 is a fragmentary view of the portion of the center-sill through which the needle-beam extends. Fig. 9 is a horizontal section taken on dotted line 8—8, Fig. 3. Fig. 10 is an end view of the end-sill of the underframe of the car.

The underframe of the car to which my improvements are applied is of the usual rectangular shape and comprises a single center-sill A, consisting of an I-beam which, as shown in the drawings, extends from one bolster to the other, and has its ends reduced in height, and riveted or otherwise connected to the rear attaching-plates *a* of the cast metal parallel extensions B, which latter arch over the bolster and have the end-sills C of the car attached to their opposite ends.

The ends-sills C consist of or are made from rolled channel-beams, which have their upper flanges bent upward, as shown in Fig. 10 of the drawings, so as to bring the upper surfaces of said flange in the same vertical plane as the back of the channel, and so as to produce an outward bulge of the web immediately below said flange and form an enlarged longitudinal bead *c* that extends the entire length of the sill. Near each end of the end-sills the web, below the bead *c*, is embossed, as at *c'*, to form a curved seat for the end of a push-pole, and thus dispense with the usual push-pole plate.

The single I-beam center-sill A is provided with openings *b*, *b'*, that are located equal distances apart, immediately below the upper flange of the same, and corresponds in contours and dimensions to the I-beam needle-beams D, except that the height of the lower portion of the opening *b'* through which the lower flange of said needle-beam extends, is increased to correspond to the distance the top edge of the needle-beam opening is below the top edge of the center-sill. At the center of length of the needle-beams the upper flange thereof is bent downward so as to form a dip, *d*, the depth of which corresponds to the distance between the top of the opening *b* and the top of the center-sill. Thus when the parts of the underframe of the car are assembled, and the needle-beam is passed transversely through said openings *b* until the downwardly bent flange of the dip, *d*, engages the wider upper end of opening *b*, the engagement of the upper flange of the needle-beam with the upper widened end of the said opening, will raise said needle-beam until the upper surface of its upper flange is in the same horizontal plane as the upper surface of the upper flange of the single center-sill, and its lower flange is brought flush against the shoulders made by increasing the height of the lower end of the openings, *b*, substantially as shown in Fig. 7 of the drawings. This dip *d* may be made either by up-setting a portion of the web of the needle-beam immediately under the flange by a powerful hydraulic press, or by suitably cutting out the web of the needle-beam immediately under the central portion of the upper flange thereof, and then bending the upper flange downward.

The outer edges of the needle-beams are

provided with comparatively short longitudinally elongated openings E, the ends of which next the ends of the needle-beams are extended downward slightly. These openings have a shaft *e* extended through them parallel with the side of the car, which is adapted to roll laterally on its own axis from one end to the other thereof. The edges of these openings are reinforced by castings F, the openings in which are flanged to correspond to openings E, and the outer ends of which extend to the adjacent ends of the needle-beams and increased in height to correspond to and fill in between the upper and lower flanges of said beam, and are flanged laterally, substantially as shown in Figs. 3 and 9 of the drawings. The lower end of sheet metal posts G lie flat against the ends of the needle-beams, and are riveted to the flanges of castings F, and from thence extend up to near the top of the side-walls of the car, and are embossed to provide longitudinal vertical ridges *g*, which taper at their ends, and are designed to greatly stiffen and strengthen the posts.

The side-walls H each, preferably, consist of a single plate of sheet metal extending from end to end of the car, and are of such height as it is desired the body of the car should have. The lower portion *h* of these side-walls are bent inward at a suitable angle, and the lower edges thereof flanged horizontally and riveted to the upper edges of the needle-beams and bolsters and are thus materially stiffened and at the same time brace the lower ends of the posts. The upper edge portions of said side-walls, above the tops of the posts, are bent or rolled upon the flat body of the same to form a tubular top edge *f*. The end-walls of the car-body are also each made of a single plate of sheet metal; their lower portions are riveted to the upper vertically bent flange of the end-sills, C, and their upper edges are bent or rolled similar to the upper edges of the side-walls to form a tubular top edge therefor. The ends of these end-walls below the tubular upper edges thereof are flanged in the direction of the length of the car, and lap over and are riveted to the ends of the side-walls in order to give further stability and rigidity to the corners of the car-body. The lower inclined portion of the side-walls are, at each end, provided with upturned flanges *h'* that lap against and are riveted to the lower corner portions of the end-walls, substantially as shown in Fig. 7 of the drawings. At the upper angles of the corners of the car-body the side and end-walls are connected by a three-sided metal cowl *r*, which covers over and connects the ends of the tubular upper edges thereof, substantially as shown in Fig. 4 of the drawings. The end-walls of the body are further strengthened and stiffened by a star-shaped embossment

R, whose central vertical points are, preferably, very much shorter than the horizontal points, substantially as shown.

I prefer to cover over the center-sill from end to end of the car with a flat metal plate K, whose width exceeds the width of the flanges of the center-sill, as well as the parallel end-extensions thereof, and is held in place by being riveted to the bolsters and the needle-beams. I also prefer to floor over the ends of the car between the body bolsters and the end-sills, on each side of the center floor-plate just alluded to, by rectangular floor-plates *k*, *k*, the edges of which come under the lower horizontal flanged edge of the lower inclined portion of the side-walls and are riveted thereto, and to the bolsters, and the overhanging edge of the central floor-plate. Between the bolsters the floor of the car consists of drop-doors—one between the bolster and the nearest needle-beam, and between each pair of needle-beams on each side of the center-sill—but I do not desire to be considered as claiming, that the drop-doors (the inner edges of which are hinged to the edges of the center floor-plate), nor the rolling shafts *e*, nor the mechanism for operating said shafts, nor the means shown for raising and lowering said doors, as any part of my invention, except the novel construction of the ends of the needle-beams, as all of these features are fully set forth in Letters Patent granted to C. A. Lindstrom and J. S. Streib, May 30, 1905, for car door mechanism, No. 761,348.

What I claim as new is:—

1. In a car a center-sill comprising a flanged metal beam, metal needle-beams extending from side to side of the car through the web connecting the flanges of said center-sill, posts suitably secured to the ends of said beams, and sheet metal side-walls connected to said posts.

2. A car comprising a single I-beam center-sill, metal needle beams extending from one side of the car through the web of said center-sill, posts suitably secured to the ends of said beams, and sheet metal side-walls connected to said posts.

3. In a car a center-sill comprising a flanged metal beam, metal needle-beams extending from side to side of the car through the web connecting the flanges of said center-sill, posts suitably secured to the ends of said beams, and sheet metal side-walls connected to said posts the lower edges of which are inclined inward.

4. A car comprising a center-sill, metal needle-beams extending from side to side of the car through said center-sill, posts suitably secured to the ends of said beams, and sheet metal side-walls connected to said posts the upper edges of which are rolled back upon the body thereof.

5. A car comprising a center-sill, metal

needle-beams extending from side to side of the car through said center-sill, posts suitably secured to the ends of said beams, and sheet metal side-walls connected to said posts the lower edges of which are inclined inward and the upper edges rolled into a tubular shape.

6. A car comprising a center-sill, metal needle-beams extending from side to side of the car through said center-sill, posts suitably secured to the ends of said beams, and sheet metal side-walls connected to said posts the longitudinal edges of which are bent in transverse directions.

7. In a car a center-sill comprising a flanged metal beam, metal needle-beams extending from side to side of the car through the web connecting the flanges of said center-sill, posts having embossed longitudinal ridges suitably secured to the ends of said beams, and sheet metal side-walls connected to said posts.

8. A car comprising a suitable center-sill, and end-sills consisting of a channel-beam the upper flange of which is bent so that its upper side is in the same vertical plane as the back of the beam.

9. A car comprising a suitable center-sill, and end-sills consisting of a channel-beam the upper flange of which is bent so that its upper side is in the same vertical plane as the back of the beam and which have integral curved push-pole seats embossed on the webs thereof near each end.

10. A car comprising a suitable center-sill, metal needle-beams, extending from side to side of the car through said center-sill, end-sills, sheet metal side-walls, posts to which said side-walls are secured and which are connected to the ends of said needle-beams; and end-walls connected to said end-sills, said side and end-walls having their upper edges bent laterally and means connecting the end edges thereof.

11. A car comprising a suitable center-sill, metal needle-beams, extending from side to side of the car through said center-sill, end-sills, sheet metal side-walls, posts having longitudinal ridges embossed thereon to which said side-walls are secured and which are connected to the ends of said needle-beams, and end-walls connected to said end-sills, said side and end-walls having their upper edges bent laterally and means connecting the end edges thereof.

12. A car comprising a suitable center-sill, metal needle-beams, end-sills each consisting of a channel-beam having the upper flange bent upward and the lower portions of the end-walls connected to the inner vertical surface of said flange, sheet metal side-walls, posts having longitudinal ridges embossed thereon to which said side-walls are secured and which are connected to the ends of said needle-beams, and end-walls connect-

ed to said end-sills, said side and end-walls having their upper edges bent laterally and means connecting the end edges thereof.

13. A car comprising a suitable center-sill, metal needle-beams, end-sills each consisting of a channel-beam having the upper flange bent upward and the lower portions of the end-walls connected to the inner vertical surface of said flange, sheet metal side-walls, posts having longitudinal ridges embossed thereon to which said side-walls are secured and which are connected to the ends of said needle-beams, and end-walls connected to said end-sills, said side and end-walls having their upper edges bent into a tubular shape and means connecting the end edges thereof.

14. A car comprising a suitable center-sill, end-sills suitably secured to the ends of the same, sheet metal end-walls having their surfaces provided with suitable embossments that intersect each other, and sheet metal side-walls connecting said end-walls.

15. A car comprising a suitable center-sill, end-sills suitably connected to the same, sheet metal end-walls having their upper edges rolled into a tubular shape and having a star-shaped figure embossed in them, and sheet metal side-walls having their upper edges rolled into a tubular shape in continuation of the upper edges of said end-walls and connecting said end-walls.

16. A car comprising an I-beam center-sill, end-sills suitably connected to the same, sheet metal end-walls having their upper edges rolled into a tubular shape and having a star-shaped figure embossed in them, and sheet metal side-walls having their upper edges rolled into a tubular shape in continuation of the upper edges of said end-walls and connecting said end-walls.

17. A car comprising a suitable center-sill, end sills suitably connected to the ends thereof, sheet-metal end walls, sheet metal side-walls, said end-walls and side-walls having their upper edges rolled back against the body thereof and riveted thereto to form a tubular shape, and a cowl-shaped corner member connecting the tubular upper edges of said walls.

18. A car comprising a suitable center-sill, end-sills suitably connected to the ends thereof, and consisting of a channel-beam having the upper flange bent upward until the upper surface thereof is in the same vertical plane as the back of said channel, sheet metal end-walls having their upper edges rolled into a tubular shape, sheet metal side-walls having their upper edges rolled into a tubular shape, and a cowl-shaped corner member connecting the upper tubular edges of said walls.

19. A car comprising a suitable center-sill, end-sills suitably connected to the ends thereof, needle-beams consisting of I-beams

- extending from side to side of the car, and vertical posts having longitudinal ridges embossed thereon and having their lower portions attached to the ends of said needle-beams, sheet-metal end-walls having their upper edges rolled into a tubular shape, sheet metal side-walls having their upper edges rolled into a tubular shape, and a cowl-shaped corner member connecting the upper tubular edges of said walls.
20. A car comprising a suitable center-sill, end-sills suitably connected to the ends thereof, sheet metal end-walls having their upper edges rolled into a tubular shape, sheet metal side-walls having their upper edges rolled into a tubular shape and having their lower edges inclined inward, and a cowl-shaped corner member connecting the upper tubular edges of said walls.
21. A car comprising a suitable center-sill, end-sills suitably connected to the ends thereof, and consisting of a channel-beam having the upper flange bent upward until the upper surface thereof is in the same vertical plane as the back of said channel, sheet metal end-walls having their upper edges rolled into a tubular shape and having the lower edges thereof inclined inward, and a cowl-shaped corner member connecting the upper tubular edges of said walls.
22. A car comprising a suitable center-sill, end-sills suitably connected to the ends thereof, and consisting of channel-beams the upper flanges of which are bent upward until their upper surfaces are in the same vertical plane as the back of the channel, needle-beams consisting of I-beams extending from side to side of the car, and vertical posts having longitudinal ridges embossed thereon and having their lower portions attached to the ends of said needle-beams, sheet metal end-walls having their upper edges rolled into a tubular shape, sheet metal side-walls having their upper edges rolled into a tubular shape and having their lower edges inclined inward, and a cowl-shaped corner member connecting the upper tubular edges of said walls.
23. An underframe for cars comprising a suitable center-sill, end-sills, and needle-beams consisting of I-beams the upper flange of which is bent or dipped downward mediate its ends.
24. An underframe for cars comprising a single I-beam center-sill, end-sills and needle-beams consisting of I-beams extending continuously from side to side of the car and passing through suitable openings in the web of said center-sill and having their upper flanges dipped downward at the point where they pass through the center-sill.
25. An underframe for cars comprising a single I-beam center-sill, end-sills and needle-beams consisting of I-beams extending continuously from side to side of the car and passing through openings in the web of said center-sill and having their upper flanges dipped downward where they pass through the center-sill, the openings in the latter corresponding in contours to the normal height of the needle-beam but having the height of the lower wider part made higher than the thickness of the lower flanges of said beam.
26. An underframe for cars comprising a suitable metal center-sill, end-sills, and needle-beams consisting of I-beams which extend continuously from side to side of the car through the said center-sill and except where they pass through the center-sill have their upper flanged edges in the same plane as the upper edges of the center-sill.
27. A car body comprising a suitable center-sill, needle-beams consisting of a continuous I-beam extending through said center-sill, end-sills, posts the lower portion of which is secured to the ends of said posts, sheet metal side-walls the lower edges of which are inclined inward and secured to the upper flanges of said needle-beams and sheet metal end-walls.
28. A car body comprising a suitable center-sill, needle-beams consisting of a continuous I-beam extending through said center-sill, and having longitudinally elongated openings in the ends thereof, castings having corresponding openings therein secured to either side of the ends of said needle-beams and having lateral flanges in same transverse plane as the ends of the beams, posts riveted to said flanges, sheet metal side-walls secured to said posts and sheet metal end-walls.
29. A car-body comprising a suitable center-sill, needle-beams consisting of a continuous I-beam extending through said center-sill whose upper edges are in substantially the same horizontal plane as the top edge of said center-sill except where the beams pass through the same, end-sills, posts the lower portion of which is secured to the ends of said metal-beams, sheet metal side-walls, the lower edges of which are inclined inward and secured to the upper flanges of said needle-beams and sheet metal end-walls.
30. A car-body comprising a suitable center-sill, needle-beams consisting of a continuous I-beam extending through said center-sill whose upper edges are in substantially the same horizontal plane as the top edge of said center-sill except where the beams pass through the same, and having longitudinally elongated openings in the ends thereof, castings having corresponding openings therein secured to either side of the ends of said needle-beams and having lateral flanges in same transverse plane as the ends of the beams, posts riveted to said flanges, sheet metal side-walls secured to said posts and sheet metal end-walls.

31. A car-body comprising a suitable center-sill, needle-beams consisting of a continuous I-beam extending through said center-sill and having longitudinally elongated  
5 openings in the ends thereof, castings having corresponding openings therein secured to either side of the ends of said needle-beams and having lateral flanges in same transverse plane as the ends of the beams,  
10 posts riveted to said flanges, sheet metal side-walls secured to said posts and having their lower edges inclined inward and secured to said needle-beams and sheet-metal end-walls.

15 32. A car comprising a suitable underframe, posts secured to the sides thereof, and sheet-metal walls connected to said posts and having their upper edges rolled inward upon the body thereof.

33. A car comprising a suitable under- 20 frame, posts secured to the sides thereof, and sheet-metal walls connected to said posts and having their upper edges rolled and their lower edges inclined.

34. A car comprising an underframe, 25 posts secured to the sides thereof, and sheet-metal walls connected to said posts and having their upper edges rolled back upon the body thereof and their lower edges inclined  
30 inward.

In testimony whereof I have hereunto set my hand and seal this 7th day of April, A. D., 1908.

WILLIAM P. BETTENDORF. [L. s.]

Witnesses:

J. S. THOMPSON,  
E. K. LUNDY.