

A. E. OSTRANDER.
CAR CONSTRUCTION.
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1,045,429.

Patented Nov. 26, 1912.

Fig. 1.

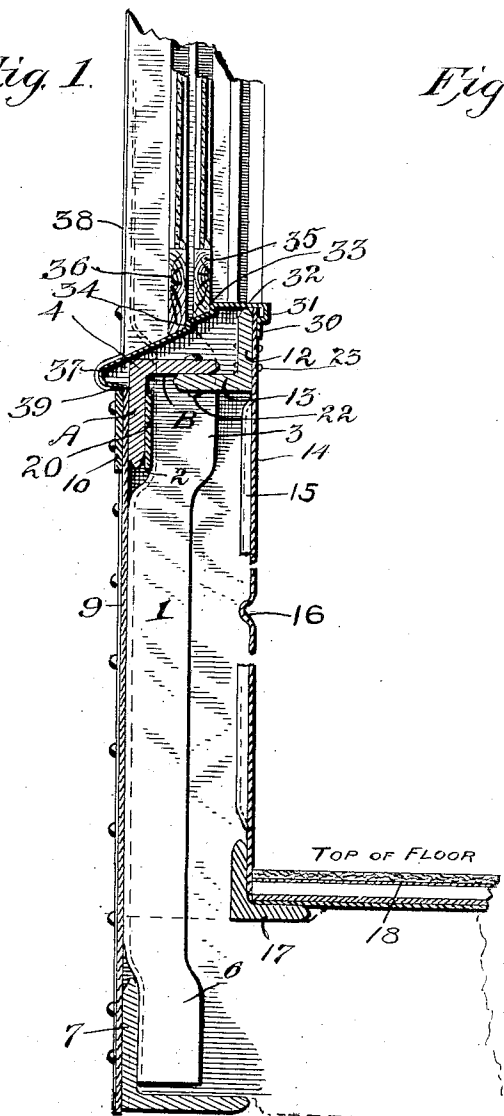


Fig. 3.

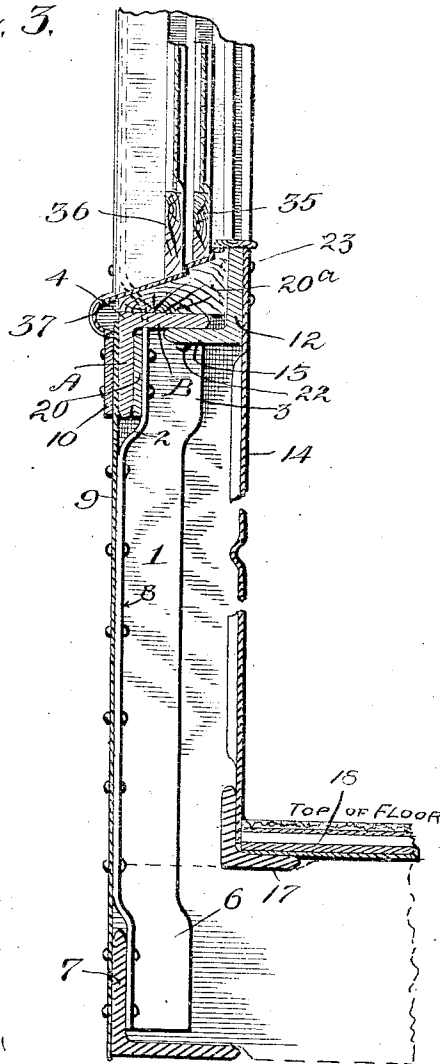
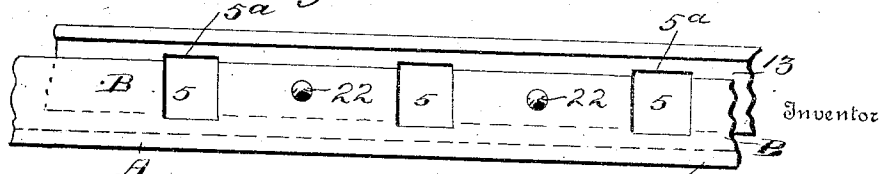


Fig. 2.



Witnesses

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CAR CONSTRUCTION.

1,045,429.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALLEN E. OSTRANDER, residing at Paterson, Passaic county, New Jersey, and being a citizen of the United States, have invented certain new and useful Improvements in Car Construction, 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, which illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof will occur to persons skilled in the art.

In said drawings: Figure 1 is a vertical sectional view of a car side showing the invention; Fig. 2 is a plan view of the upper angle members hereinafter referred to; Fig. 3 is a vertical sectional view of a modified construction.

The object of this invention is to provide a plate girder side construction as the wall of a passenger car, bridge or kindred structure, with relatively continuous roof or body supporting posts, with continuous compression member for said plate girder, with the posts projecting upwardly from or near the vicinity of the tension flange of said girder through the compression flange and above said compression flange to serve as a support for a superstructure, and also to provide an inner wall constituting a modified plate girder coöperating with the principal girder as a supporting means. The girder produced is a compound girder with outer and inner plate which is produced by means of the process hereinafter described, which process is new in the production of plate girders.

Referring to the parts, 1 indicates the vertical posts or risers which are long enough to extend from the vicinity of the bottom or tension flange of the principal member of the improved girder above the compression flange thereof and to the side plate or beyond said side plate, if desired, when used in car construction.

2 is a recess formed in the outer face of the posts 1 by bending inwardly the metal of said posts, thereby producing the bend or

projection 3 on the opposite side of said posts.

4 is an angle compression member which is continuous from end to end of the girder and is provided with vertical and horizontal flanges A—B, the flange A being imperforate except for the rivet holes required to take the necessary securing rivets and the flange B being provided with as many recesses 5 throughout its length as there are vertical posts 1 connected with the girder.

The lower end portions of the posts 1 are offset inwardly as shown at 6 at their bottom portions to accommodate the vertical flange of the tension angle 7. The horizontal flange of the angle 7 extends beneath the lower ends of the posts 1 as shown and the vertical legs of the angles 4 and 7 are riveted to the laterally extending flanges 8 of the posts 1. The web plate 9 of the outer girder constitutes the outer sheathing plate of the structure and is continuous from end to end and from approximately the bottom of the tension angle 7 to or near the top of the compression angle 4, as shown in the sectional views.

As the structure is designed primarily for use in connection with passenger cars the parts will be referred to as constituting parts of a steel passenger car construction, in which 1 are the body posts provided with the indented portions 2 in which rests the compression angle 4, which angle is provided with the recesses 5 adapted to span the body posts, while the vertical leg A of said angle is continuous from end to end of the car, a sheathing plate 9 being secured outside of the vertical flange A and a belt rail 10 extending from end to end of the car outside of said sheathing, the usual tension flange 7 being provided, as shown.

Extending continuously of the car on the inner side of the vertical posts is another angle 12 provided with vertical and horizontal flanges, the horizontal flanges 13 being provided with recesses 5^A registering with the body posts 1 and with the corresponding recesses of the horizontal leg B of the outer angle. Secured to the vertical leg of the angle 12 is an inner sheathing plate 14 which has vertically embossed ribs 15 and horizontally embossed ribs 16 provided therein and is secured at its lower end to the

inner tension angle 17, which serves as a support for the floor structure indicated generally by the reference numeral 18, although said floor structure is preferably a composite structure which is now common in passenger car construction. Resting on the horizontal flanges of the angle 7 are transversely extending members comprising parts of the floor structure of the car. Between the posts 1 and the vertical legs of the angle 4 is placed a filler member comprising a continuous strip 20 which extends from end to end of the car and, with the belt rail 10, serves to reinforce the compression member of the outer girder. It is evident that if angle members are substituted with heavier vertical flanges the filler strip 20 need not be used, but in the construction of a car where this construction is utilized the angle 4 is $5'' + 4'' + \frac{3}{4}''$. The strip 20 is $4'' + \frac{1}{8}''$ and the belt rail is $4\frac{1}{2}'' + \frac{3}{8}''$; the sheathing 9 being $\frac{3}{16}''$ in thickness, thus providing a considerable section of metal forming the compression member of the girder.

In building the car the angles 4 and 7 with the filler strip 20, sheathing 9 and belt rail 10 are bolted up to the laterally extending flanges 8 of the posts 1, after which these parts are secured by machine driven rivets. The angle 12 is then placed in position overlapping the horizontal flange B of the angle 4 and secured in position by vertical rivets 22, the inner sheathing 14 not yet having been applied. After the angle 12 is thus secured in position the sheathing 14 with its connected tension angle 17 is placed in position and secured by rivets 23 to the vertical leg of the angle 12, the gap between the horizontal legs of the flanges 7 and 17 being filled by the underframe and connected parts in the car. One of the advantages of this method of connecting up the several members of the lower portion of the body structure is that a considerable section of metal is obtained without having angular flanges extending beyond the outer face of the sheathing or within the body of the car, notwithstanding which there is no occasion for using hand driven rivets in a car constructed as shown, thus economy of manufacture is secured with a car of maximum carrying capacity of great strength.

In the preferred construction the window sills comprise a single thickness of pressed metal provided with a vertical flange 30 secured to the upper portion of the sheathing 14 and the vertical leg of the angle 12, above which this pressing extends inwardly and upwardly at 31 to the level of the inner window sill 32, which extends thence outwardly and is provided with the two steps 33 and 34 for the inner and outer sashes 35 and 36, the metal of this pressing being continued outwardly to form the bead or molding 37 and thence inwardly against the upper edge por-

tion of the sheathing 9 while with the overlapped pier cover 38 said metal is brazed or welded to the said belt rail 10 throughout its length, thus forming a neat and watertight joint along the belt rail.

What I claim is:

1. In a plate girder construction, uprights, a plurality of recessed upper flanged members spanning said uprights, a plurality of web plates, one of which is connected with said uprights and one of which is spaced away from said uprights.
2. In a plate girder construction, an upper flanged member formed of overlapping angular members provided with coincident recesses, posts projecting through said recesses, web plates on two sides of said posts, a lower flanged member connected with one of said plates and spaced away from said posts.
3. In a plate girder construction, an upper flanged member formed of overlapping angular members provided with coincident recesses, posts projecting through said recesses, web plates on two sides of said posts, one of which is connected with said posts and one of which is spaced away from said posts.
4. In a plate girder construction, the combination comprising a plate girder side in which there are two web plates of different depths, posts between and spaced from one of said plates and a compound upper flanged member connected to said plates through which said posts extend.
5. In a car construction, a plate girder side wall with inwardly extending lower flange and recessed upper flange, posts extending through recesses in said upper flange, and a supplemental inner plate girder connected with the first mentioned girder and spaced from said posts.
6. In a car construction, a side wall comprising relatively parallel plate girders of different depth with separately formed upper flanged members meeting and connected between the webs of said girders, posts extending through said upper flanged members and spaced from one of said webs.
7. In a car wall construction, a relatively deep plate girder and a relatively shallow plate girder, separated lower flange members therefor, connected upper flange members therefor, posts connected with one of the girder web plates and spaced from the other web plate and projecting through said upper flanges.
8. In a car wall construction, a relatively deep plate girder and a relatively shallow plate girder, separated lower flange members therefor, connected upper flange members therefor, posts connected with the deeper one of the girder web plates and spaced from the other web plate and projecting through said upper flanges.
9. In a girder wall construction, relatively

parallel plate girders of different depths having connected upper flange members and separated lower flange members, posts between and spaced from one of said plate girder webs, cross bearers between said lower flanges and a flooring resting on one of said lower flanges.

10. In a plate girder wall construction, the combination comprising a plurality of upper flange members, lower flange members and web plates, posts between said web plates, the upper flange members overlapping and being connected, cross bearers resting between said lower flange members and a flooring resting on the uppermost of said lower flange members and spaced from said posts.

11. In a plate girder wall construction, the combination comprising a plurality of upper flange members, lower flange members and web plates, the upper flange members overlapping and being connected, cross bearers resting between said lower flange members and a window sill inclosing the upper edges of said girders.

12. In a plate girder wall construction, the combination comprising a plurality of upper flange members, lower flange members and web plates, the upper flange members overlapping and being connected, cross bearers resting between said lower flange members and body posts between the web plates and spaced away from one of said web plates.

13. In a car wall construction: posts, a plurality of members spanning said posts and connected thereto, a member spanning said posts and spaced therefrom and web plates fixed to said spanning members.

14. In a car wall construction: posts, a plurality of members spanning said posts and connected thereto, a member spanning said posts and spaced therefrom and a web plate connecting said spanning members.

15. In a plate girder construction formed of overlapping angular compression members; an angular tension member, a web plate extending from the compression members to the tension member, posts extending from said compression members to said tension member and fixed to said web plate and a second web plate spaced away from said posts.

16. In a car wall construction: a plate girder comprising a pair of separately formed compression members and a tension member, an upstanding flange on one of said compression members, a web plate engaging said flange and said tension member, a second tension member, and a web plate engaging said other compression member and said second tension member.

17. In a car wall construction: a plate girder comprising a pair of separately formed compression members and a tension

member, an upstanding flange on one of said compression members, a web plate engaging said flange and said tension member, a depending flange formed on the other of said compression members, a second tension member, a web plate engaging said other compression member and said second tension member and posts between said web plates.

18. In a car wall construction: a plate girder comprising a compression member and a tension member, an upstanding flange on said compression member, a web plate engaging said flange and said tension member, a second tension member, a web plate engaging said compression member and said second tension member, posts between said web plates and extending through said compression member.

19. In a car wall construction: a plate girder comprising a compression member and a tension member, an upstanding flange on said compression member, a web plate engaging said flange and said tension member, a second tension member, a web plate engaging said compression member and said second tension member, and posts between said web plates and spaced from one of said plates.

20. In a car wall construction: a compression member, oppositely disposed flanges on said member, a tension member, a pair of web plates, and posts between said web plates and parts of said flanges.

21. In a car wall construction: a compression member, oppositely disposed flanges on said member, a tension member, a pair of web plates, posts extending from said tension member to said compression member and between the flanges thereof.

22. In a car wall construction including side posts, a built-up compression member formed with oppositely disposed flanges, a tension member comprising a pair of web plates, the said posts extending between the oppositely disposed flanges of the compression member and the web plates of the tension member, and having a window sill above said compression member inclosing the web plates of the tension member.

23. In a car wall construction: a built up compression member of substantially Z-cross-section, a plurality of tension members, web plates connected to the opposite flanges of the compression member and to said tension members and posts extending through said compression member.

24. In a car wall construction: a built up compression member of substantially Z-cross-section, a plurality of tension members, web plates connected to the opposite flanges of the compression member and to said tension members, posts extending through said compression member and a window sill above said compression member.

25. In a car wall construction, a pair of separately formed flanged compression members disposed each with one of its flanges lapping a flange on the other, the remaining flanges of said members being disposed to project in opposite directions, and web plates engaging said last mentioned flanges.
26. In a car wall construction, a pair of separately formed flanged compression members, a window sill engaging a flange of one of said members and contacting with a flange of the other of said members, and a web plate fixed to one of said flanges.
27. In a car wall construction, a pair of separately formed flanged compression members each with one of its flanges disposed horizontally and its other flange disposed vertically, a window sill resting upon the horizontal flange of one of said members and contacting with a vertical flange of said other member, and a web plate fixed to one of said flanges.
28. In a car wall construction, a pair of separately formed flanged compression members disposed each with one of its flanges lapping a flange on the other, the remaining flanges of said members being disposed to project in opposite directions, posts extending between said last mentioned flanges, and a web plate engaging said posts.
29. In a car wall construction, a pair of separately formed flanged compression members disposed each with one of its flanges lapping a flange on the other, the remaining flanges of said members being disposed to project in opposite directions, a window sill engaging one of said lapping flanges and contacting with one of said oppositely disposed flanges, posts extending between said oppositely disposed flanges, and a web plate engaging said posts.
30. In a car wall construction, a pair of separately formed flanged compression members each with one of its flanges disposed horizontally and its other flange disposed vertically, a window sill resting upon the horizontal flange of one of said members and contacting with the vertical flange of said other member, posts extending between said vertical flanges, and a web plate fixed to one of said flanges.
31. A car wall construction comprising a web plate, a plurality of separately formed and recessed compression members attached thereto, and posts extending through said recesses.
32. A car wall construction comprising a plate girder with bottom chord, and a top chord formed of a plurality of recessed flanged members, and posts extending through said recesses.
33. A car wall construction comprising a plate girder, a web plate, a bottom chord and a top chord secured to the web plate, said top chord comprising a plurality of recessed and separately formed compression members and posts extending between parts of said compression members.
34. In a car wall construction, the combination comprising a series of body posts, and a plate girder fixed to said posts, said girder comprising a pair of separately formed compression members and said posts extending above and below said compression members and being formed each with a recess for receiving both of said compression members.
35. In a car wall construction, the combination comprising a series of body posts, and a plate girder fixed to said posts, said girder comprising a pair of separately formed compression members and said posts being formed each with a recess for receiving both of said compression members.
36. In a car wall construction, the combination comprising a series of body posts, and a pair of plate girders disposed upon opposite sides of said posts, said girders comprising each a separately formed compression member, said posts extending above and below said compression members, and each of said posts being formed with a recess adapted to receive one of said compression members.
37. In a car wall construction, the combination comprising a series of body posts and a pair of plate girders disposed upon opposite sides of said posts, said girders comprising each a separately formed flanged compression member, said posts extending above and below said compression members, and each of said posts being formed with a recess adapted to receive a flange of one of said compression members.
38. In a car wall construction, the combination comprising a series of body posts and a pair of plate girders disposed upon opposite sides of said posts, said girders comprising each a flanged compression member, said posts extending above and below said compression members, each of said posts being formed with a recess adapted to receive a flange of one of said compression members, and a flange of said other compression member being spaced away from said posts.
39. In a car wall, the combination comprising a series of recessed body posts and a pair of plate girders one upon each side of said posts, said girders comprising separately formed over-lapping compression members and a stiffening bar, the said bar and one compression member lying within the recesses of said posts.
40. In a car wall, the combination comprising a series of body posts recessed in their outer sides and a pair of plate girders one on each side of said posts, said girders comprising separately formed over-lapping compression members and a stiffening bar,

the said bar and one compression member lying within the recesses of said posts.

41. In a car wall, the combination comprising a series of recessed body posts and a pair of plate girders of different depths one on each side of said posts, said girders comprising separately formed over-lapping compression members and a stiffening bar, the said bar and the compression member of the deeper of said girders lying within the recesses of said posts.

42. In a car wall, the combination comprising recessed body posts and a pair of plate girders of different depth, a compression member comprising in one of said girders in the recess of said posts, a web plate fixed to said posts and to said compression member, laterally projecting flange portions formed on said compression member adapted to embrace opposite sides of posts, and a compression member comprised in said other girder, said last mentioned compression member being spaced from said posts and the said compression members being rigidly joined together intermediate of the posts.

43. In a car wall, the combination comprising recessed body posts and a pair of plate girders of different depth, a compression member comprised in one of said girders resting in the recess of said posts, a web plate fixed to said posts and to said compression member, laterally projecting flange portions formed on said compression member adapted to embrace opposite sides of said posts, a compression member comprised in said other girder and spaced from said posts, and laterally projecting flange portions formed on said last mentioned compression member adapted to embrace opposite sides of said posts and to be fixed to the flange portion of the first mentioned compression member intermediate of the said posts.

44. In a car wall, the combination comprising a series of recessed body posts and a pair of plate girders one on each side of said posts, said girders comprising separately formed over-lapping flanged compression members and an unflanged stiffening bar, the said bar and one compression member lying within the recesses of said posts.

45. In a car wall, the combination comprising a series of recessed body posts and a pair of plate girders of different depths one on each side of said posts, said girders comprising separately formed over-lapping flanged compression members and an unflanged stiffening bar, the said bar and the compression member of the deeper of said girders lying within the recesses of said posts.

46. In a car wall, the combination comprising a series of body posts provided with recesses, a stiffening bar and a flanged mem-

ber resting in said recesses, a depending web plate connected with said bar and member and the said posts, and an auxiliary plate girder on the opposite side of said posts said auxiliary girder comprising a flanged member over-lapping said first flanged member and rigidly joined together intermediate of the posts.

47. In a car wall, the combination comprising a series of body posts provided with recesses, a stiffening bar and a flanged member resting in said recesses, a depending web plate connected with said bar and member and to said posts, and an auxiliary plate girder on the opposite side of said posts, said auxiliary girder comprising an oppositely disposed flanged member over-lapping said first flanged member and rigidly joined together intermediate of the posts.

48. In a car wall construction, posts, a plurality of separately formed stiffening members connected together and spanning said posts on the outer sides of said posts, a girder web plate between some of said stiffening members and depending therefrom, said web-plate being connected to said posts, a member spanning said posts and spaced therefrom on the inner side of said posts, a girder web-plate depending from said inner member, a flanged member connected with said inner web-plate, and a floor resting on said flanged member.

49. In a car wall construction, the upper flanged member formed of over-lapping separately formed angular members provided with coincident recesses, posts projecting through said recesses, web-plates on two sides of said posts, and recesses formed in said posts adapted to receive one of said angular members.

50. In a car wall construction, the combination comprising a plate girder in which there are two web-plates of different depths, posts between said plates, and a compound upper flanged member connected to said plates through which said posts extend, and recesses formed in said posts adapted to receive a flange of said flanged member.

51. In a car wall construction, a series of posts, a pair of plate girders disposed upon opposite sides of said posts, said plate girders comprising a top stiffening chord formed of two lapping members directly riveted together intermediate said posts and said posts being continuous through the stiffening chord.

52. In a car wall construction, a series of posts, a pair of plate girders comprising web plates disposed on opposite sides of said posts, overlapping bridging members secured to the upper edges of said web plates and embracing the said posts and rigidly secured together intermediate of said posts and a window sill inclosing the upper edges of said web plates.

53. In a car wall construction, a series of posts, a pair of plate girders comprising web plates disposed on opposite sides of said posts, overlapping separately formed bridging members attached to the upper edges of said web plates and embracing said posts, recesses formed in said posts for receiving one of the bridging members, and a window sill inclosing the upper edge of said web plates.
54. In a car wall construction, posts, a plate girder comprising a plurality of compression members embracing opposite sides of the said posts, and rigidly joined together intermediate thereof.
55. In a car wall construction, posts, a plate girder comprising a plurality of overlapping recessed compression members forming parts of said girder and embracing opposite sides of the said posts and rigidly joined together intermediate thereof.
56. In a car wall construction in combination with side posts, a plate girder including a plurality of compression members rigidly connected to the plate of said girder and provided with inturned recessed flanges adapted to embrace said posts, said flanges being rigidly connected intermediate of said posts.
57. In a car wall construction, the combination with side posts, a plate girder including a plurality of overlapping compression members rigidly connected to the plate of said girder and provided with recessed flanges adapted to embrace the side posts, said flanges being rigidly connected intermediate said posts.
58. In a car wall construction, posts, plate girders on opposite sides of said posts and compression members for said girders rigidly secured together intermediate thereof, the posts being extended through the compression members.
59. In a car wall construction, posts, a plate girder embracing one of the posts and secured thereto, and a plate girder on the opposite side of said post, embracing the post, and secured directly to the first girder intermediate of the posts.
60. In a car wall construction, posts, a compound plate girder comprising lapping compression flanges separately formed embracing the post on all sides and rigidly united between the posts.
61. In a car construction, posts, a compound girder, embracing inner and outer plate girders, inturned and out-turned flanges thereon rigidly secured together, and said flanges being provided with perforations for the side posts.
- In witnesses whereof I have hereunto set my hand in the presence of two witnesses.
- ALLEN EDWARD OSTRANDER.
- Witnesses:
F. H. GIBBS,
FRANK V. COOPER.