J. O. NEIKIRK.

RAILWAY CAR.

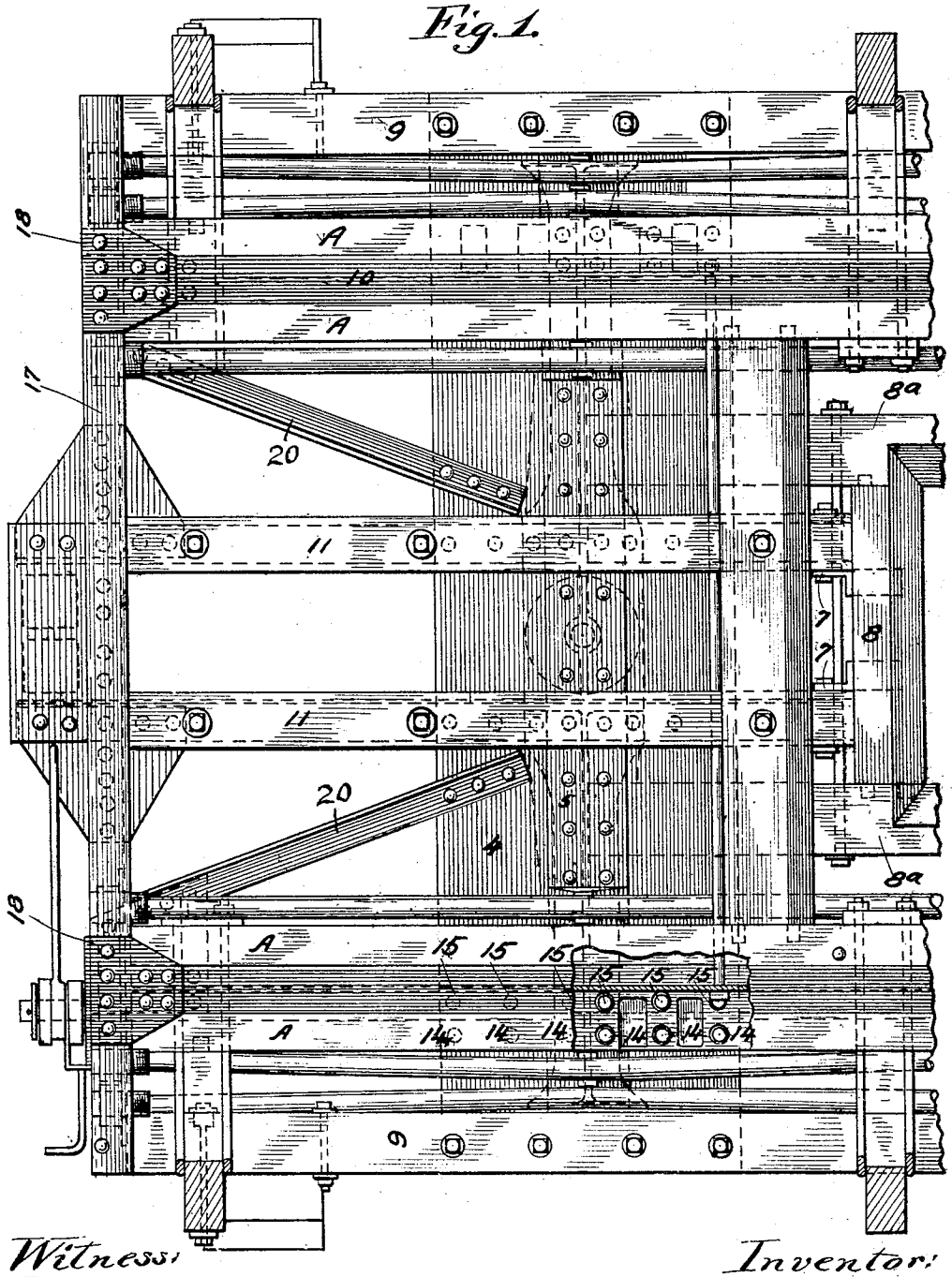
APPLICATION FILED APR. 26, 1916.

1,268,045.

Patented May 28, 1918.

4 SHEETS—SHEET 1.

Fig. 1.



Witness:
C. C. Burnap

Inventor:
John O. Neikirk

By Sheridan, Wilkinson & Scott, Attys

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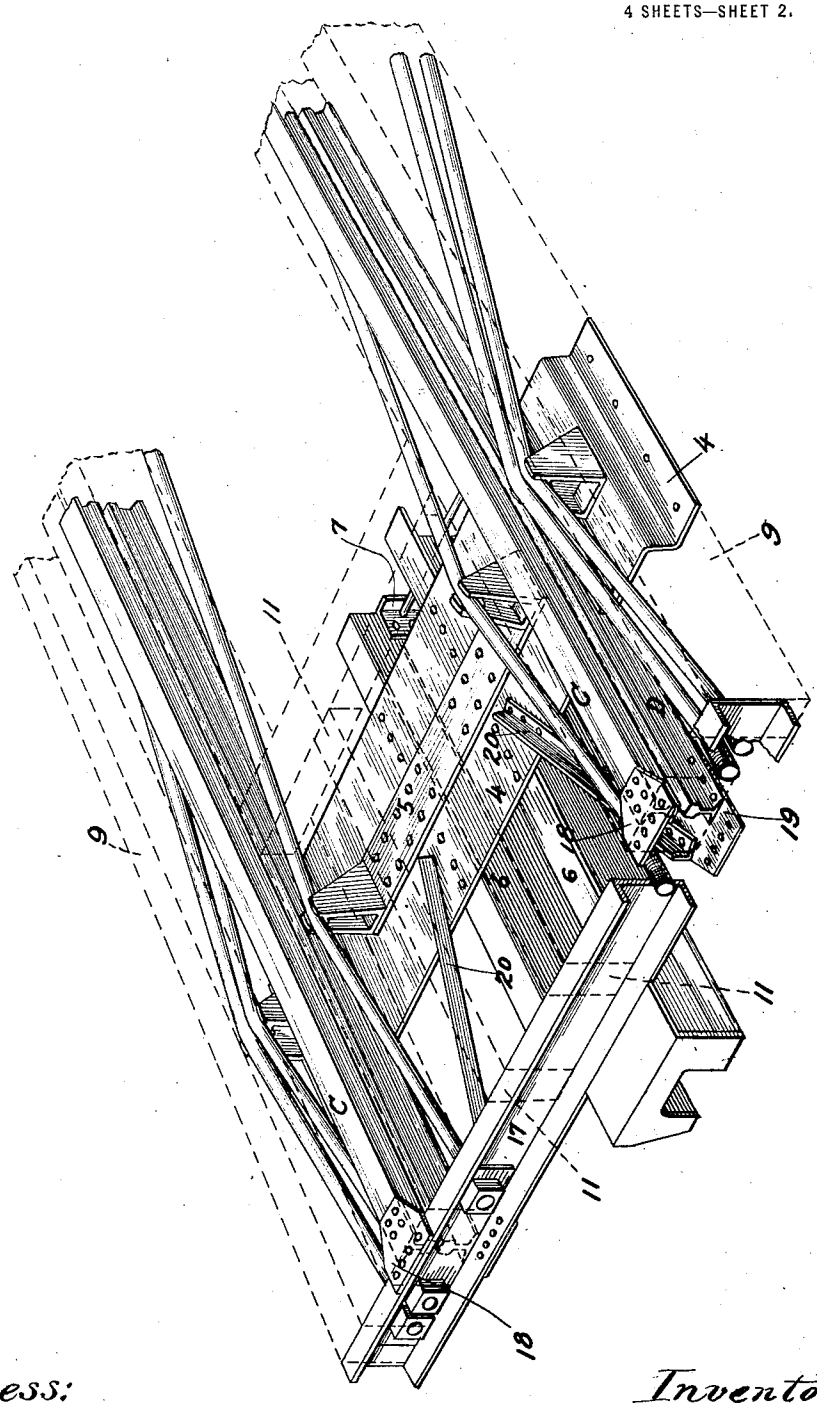

Fig. 2.

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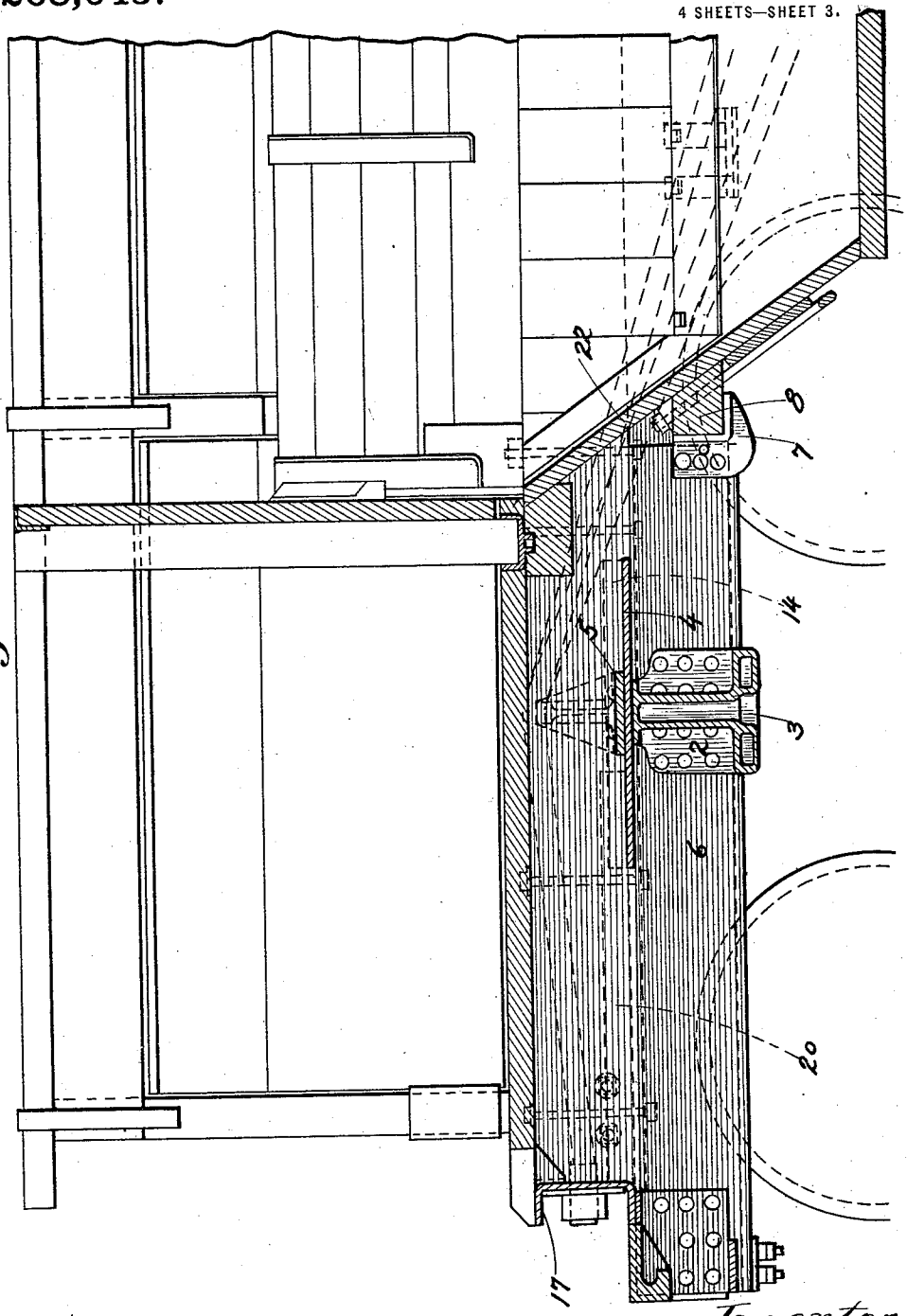

Fig. 3.

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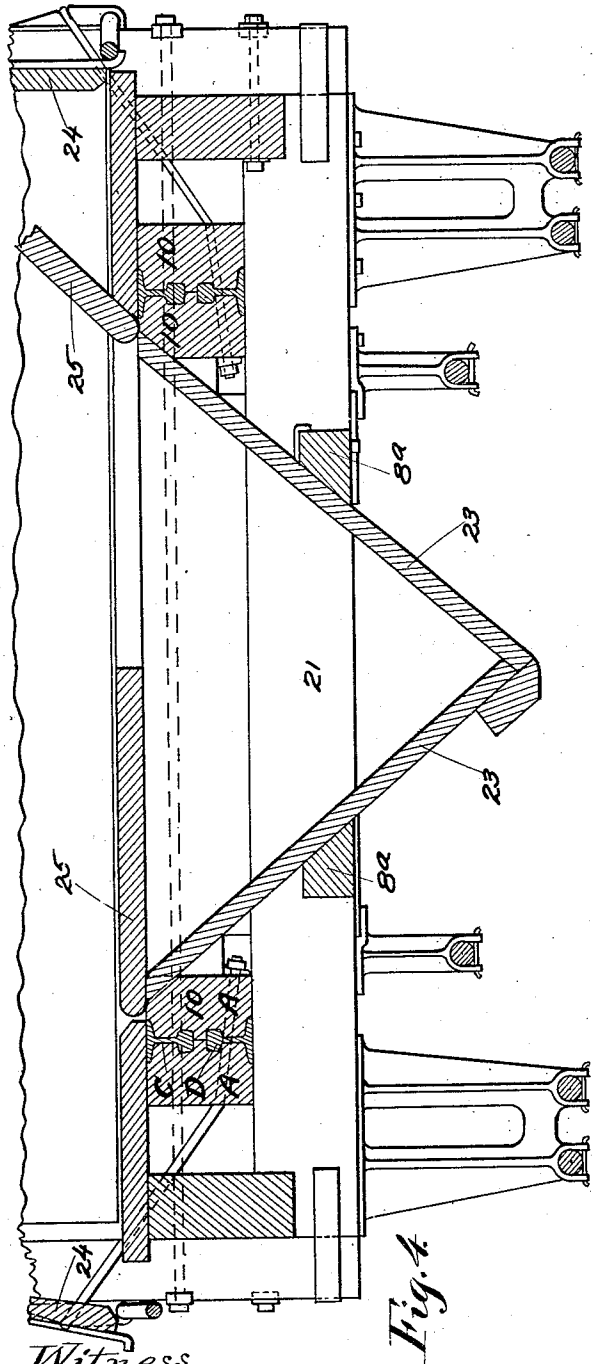

Fig. 4.

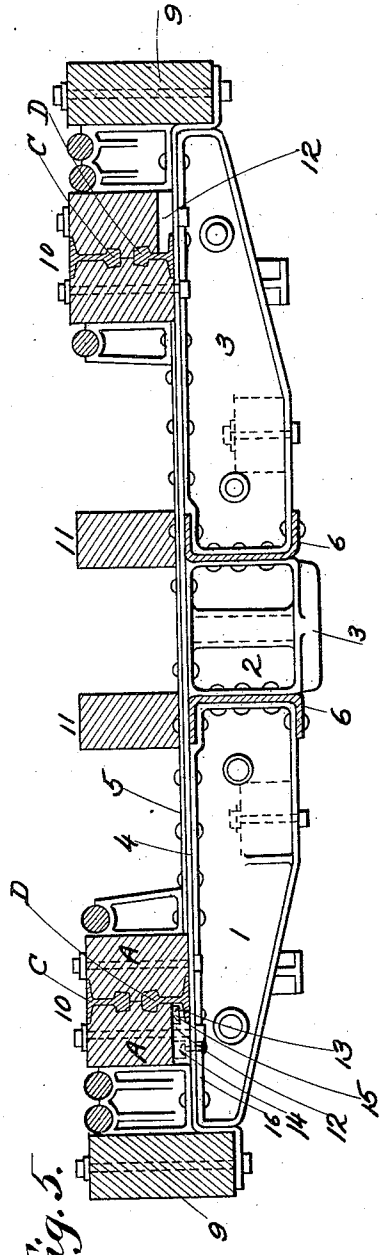

Fig. 5.

Witness

C. Burrap

Inventor:

John O. Neikirk

By Sheridan, Wilkinson & Scott, Attys

UNITED STATES PATENT OFFICE.

JOHN O. NEIKIRK, OF LOMBARD, ILLINOIS.

RAILWAY-CAR.

1,268,045. Specification of Letters Patent. Patented May 28, 1918.

Application filed April 26, 1916. Serial No. 93,662.

To all whom it may concern:

Be it known that I, JOHN O. NEIKIRK, a citizen of the United States, residing at Lombard, in the county of Dupage and State of Illinois, have invented certain new and useful Improvements in Railway-Cars, of which the following is a specification,

My invention relates to an improvement in the underframe of railway cars. The object and nature of the invention is set forth in the following description and the accompanying drawings, in which—

Figure 1 is a plan view of the end portion of the underframe of a railway car.

Fig. 2 is a perspective view of the part of the car shown in Fig. 1.

Fig. 3 is a longitudinal central section of the end part of the car.

Fig. 4 is a cross section of the car adjacent the center thereof; and

Fig. 5 is a cross section of the car underframe adjacent the bolster.

My invention has been designed primarily for application to cars having a central hopper extending longitudinally of the car between the bolsters; but in its broad aspect the invention is not restricted to cars of that type. Hopper cars of the type referred to are illustrated and described in my prior Patents, Nos. 1,098,748 and 1,112,644, granted June 2, 1914, and October 6, 1914, respectively, and in Patent No. 761,674, granted to H. S. Hart and O. W. Meissner June 7, 1904, and No. 820,046, granted to E. S. Hart May 8, 1906. The cars described in the Hart & Meissner and Hart patents referred to have underframes constructed of wood, and in the structures of the other two patents the underframes are constructed of steel.

In railway cars of all types it is necessary that the longitudinal members of the underframe support not only the vertical load, due to the weight of the car and contents, but that these members should also sustain the pulling and buffing stresses. In the construction of cars of the type above referred to provided with longitudinal central hoppers, the center sill, upon which reliance is usually placed to sustain the buffing and pulling stresses, is omitted, by reason of the fact that it is necessary to leave the center of the hopper unobstructed. In such cars, therefore, it is necessary to transmit the pulling and buffing stresses from the draft sills—which, of course, must lie at the longitudinal center of the car—to longitudinal members sufficiently remote from the car center to provide the necessary width for the hopper.

Formerly the size of cars ordinarily used and the weights which they were designed to carry were not as great as at present, and satisfactory results were obtained by constructing the longitudinal members of the underframes of wooden beams, as shown in the Hart & Meissner and Hart patents above referred to. With the increasing size of cars, and the increasing weight of the loads carried, difficulties were encountered in the use of wooden sills, and in recent years it has become customary to construct such cars with steel underframes, as shown in my two patents above mentioned.

While the use of steel in such cars has resulted in the provision of an abundance of strength to resist the stresses incident to service, the cost of the cars has been greatly increased, and at times the cost of steel has reached such points as to interfere seriously with the construction of such cars.

I have found that longitudinal car sills of wood possess an abundance of strength to carry the vertical load due to the weight of the car and contents, and that it is failure properly to carry the pulling and buffing stresses that has rendered wooden underframes inefficient when employed in cars of large capacity. In cars constructed with steel longitudinal sills the amount of steel employed is vastly in excess of that necessary to take care of the pulling and buffing stresses, such excess being necessary to carry efficiently the vertical load. The object of my invention is to construct a car in which wood is employed to carry the vertical load, and steel to receive the pulling and buffing stresses, this combination of material making it possible to use a comparatively small amount of the expensive material, steel, and to substitute the cheaper material, wood, for steel as the material for carrying the vertical load.

While the car illustrated in the drawings is of the central longitudinal hopper type, it will be apparent that my invention in its broader aspect may be equally useful in cars of other forms.

The bolster of the car illustrated in the drawings is best shown in Fig. 5, and comprises three castings, 1, 2, and 3, secured together by the top plate 4, which extends

from one side of the car to the other, and by the plate 5 which reinforces the top of the central part of the bolster. The draft sills 6 pass between the central casting 2 and the outer castings 1 and 3, and consist of channel irons riveted to the adjoining parts of the bolster. The center casting 2 of the bolster is formed integrally with the center bearing 3, as shown in Figs. 3 and 5. Each of the bolster castings 1, 2, and 3 is flanged around its periphery to afford the necessary strength, and to afford means of connection by rivets with the coacting parts of the car frame. The draft sills extend continuously from the end of the car through the bolster to a point adjacent the end of the hopper, as shown in Fig. 3. At their inner ends the draft sills are provided with hangers 7 riveted thereto, which hangers serve to support the central part of the transverse members 8, which members at their ends are supported upon the side frame members 8^a of the hopper.

The longitudinal members of the car consist of wooden side sills 9, which rest upon and are supported by outward extensions of the cover plate 4 of the bolster, and intermediate longitudinal sills 10 resting upon the bolsters between the side sills and the longitudinal center of the car. The longitudinal members 11 are simply floor beams resting upon the bolster and extending from the end sill to the end of the hopper for the purpose of supporting the floor of the car adjacent the end thereof.

The side sills 9 and intermediate sills 10 extend continuously from one end of the car to the other, being secured at their ends to the end sills. The intermediate sills are composite in structure, being constructed partly of wood and partly of steel. It will be obvious that the manner of building up these members may be widely varied. In the construction illustrated, however, each of the intermediate sills consists of two wooden beams A, inclosing between them two sections of ordinary railroad rail C and D. The adjacent faces of the wooden beams A are recessed to form spaces of the section of the rails used, whereby the rails are closely surrounded by the wooden beams.

It will be obvious that various sections of steel may be used for the purpose, the precise section used being dependent upon the material available. Ordinary railway rails are especially suitable for the purpose, as they can always be obtained, and meet the requirements whether new or old.

In building up the composite sill referred to, the wood and steel are so proportioned that the wood possesses sufficient strength to sustain the vertical load, thus rendering it unnecessary to use more than enough steel to sustain the pulling and buffing stresses, and, owing to the great resistance of steel to tensile and compressive stresses, a comparatively small amount of steel is sufficient for the purpose. It is necessary, however, that means be adopted to cause the steel to act as a column when subjected to buffing stresses, that is, to prevent the steel members from bending or buckling. It is for this reason that I have constructed the composite sills 10 in such manner that the steel members are embedded in the wooden beams, the wooden beams thereby serving effectually to prevent the steel members from bending under buffing stresses. While the arrangement of the steel and wooden members of the composite sill herein illustrated is cheap and efficient, it will be apparent that other arrangements might be adapted whereby the wooden members of the sills would contribute the necessary support to the steel members to prevent them from bending under compressive stresses.

Inasmuch as the pulling and buffing stresses are transmitted to the car initially through the draft sills, it is necessary that effective means be provided for obtaining a secure connection between the steel members of the intermediate sills, which are designed to receive such stresses, and the draft sills. Inasmuch as the draft sills are not in alinement with the intermediate sills this connection is effected through the bolster, and for this reason the top plate of the bolster is made quite wide, extending beyond the bolster toward the center and end of the car, as clearly shown in Figs. 1, 2, and 3. The supplemental top plate 5 of the bolster is of only slightly greater width than the upper flange of the bolster castings 1, 2, and 3, and said plate extends only between the inner faces of the intermediate sills 10. These intermediate sills rest directly upon the wide top plate 4. With the steel members C and D arranged as in the construction illustrated in the drawings, the base flange of the rail D rests upon the top plate 4, and the extreme width of such top plate affords space for a large number of rivets to attach said rail to the top plate of the bolster. In order to render this attachment more secure, I employ castings 12 fitted into the lower faces of the outer wooden members A of the intermediate sills in such manner as to contact with the top plate 4 of the bolster and overlie the outer base flanges 13 of the rails D. These castings 12 preferably extend completely across the wide top plate 4, and are secured to the bolster by means of a row of rivets 14. Another row of rivets 15 passes through each of the castings 12, the rail flange 13, and the top plate 4 of the bolster. The rivets adjacent the center of the bolster may also pass through the flange 16 formed on the bolster casting.

The end sill of the car in the present instance is shown as a channel iron 17. As

clearly shown in Fig. 2 the upper rail section C is attached to the end sill through the medium of a gusset plate 18, which is riveted to the rail section C and to the upper flange of the end section 17. The lower rail section D is secured to the end sill through the medium of a gusset plate 19 riveted to the lower flange of the end sill and to said rail section. Additional connection between the bolster and the lower rail section is afforded by diagonal members 20, shown in the present instance as the angle irons, riveted to the bolster at their inner ends, and at their outer ends to the lower gusset plate 19, to which the lower rail sections D are also riveted as above described.

By the foregoing construction effective means are provided for transmitting the pulling and buffing stresses from the draft sills 6, 6 to the metallic members C and D and the intermediate sills 10. As the metallic parts of the intermediate sills are required to take merely the pulling and buffing stresses, and are not required to carry any of the vertical load, it will be apparent that comparatively light sections, such as the rail sections shown, are sufficient for the purpose, provided they be properly braced against bending, which function is accomplished by the lateral support afforded to the rail sections by the wooden members A, A of the intermediate sills.

In its general construction and arrangement the hopper car to which I have shown my invention applied is of a type in common use, and conforms generally to the arrangement shown in the patents hereinbefore referred to. The hopper 21 is provided with inclined ends 22 and inclined sides 23, as shown in Figs. 3 and 4, the ends of the hopper being located adjacent to and a short distance inside of the bolsters. As usual in cars of this type the car sides are made up of doors 24 hinged at their upper edges to provide for the removal of the contents of the car through the sides thereof by the action of a plow drawn longitudinally along the car floor, or vertically beneath the center of the car by opening the hopper bottom. The swinging leaves 25 are provided, these leaves being moved to the position shown at the right of Fig. 4 when the contents of the car are to be discharged through the hopper bottom, and to the position shown at the left of Fig. 4 when the contents of the car are to be removed through the sides by means of a plow or otherwise.

I claim:—

1. A car structure comprising longitudinal wooden sills adapted to support the vertical load, and longitudinal metallic members embraced by said wooden sills adapted to receive the pulling and buffing stresses.

2. A car structure comprising longitudinal wooden sills adapted to support the vertical load, and longitudinal metallic members embraced by said wooden sills adapted to receive the pulling and buffing stresses, said metallic members being braced against bending transversely of the car by said wooden sills.

3. A car structure comprising longitudinal wooden sills adapted to support the vertical load, and longitudinal metallic members adapted to receive the pulling and buffing stresses, said metallic members being embedded in said wooden sills to form a fabricated structure whereby said metallic members are restrained from bending.

4. A car structure comprising bolsters and longitudinal sills, said longitudinal sills consisting of wooden beams adapted to support the vertical load, and metallic members to receive the pulling and buffing stresses, said metallic members being embedded in said wooden beams and secured to said bolsters.

5. A car structure comprising bolsters end sills and longitudinal sills, said longitudinal sills consisting of wooden beams adapted to support the vertical load, and metallic members to receive the pulling and buffing stresses, said metallic members being embedded in said wooden beams and secured to said bolsters and end sills and extending from one end sill to the other.

6. A car structure comprising end sills, bolsters, side sills, and intermediate sills between said side sills and the longitudinal center of the car, said side and intermediate sills lying above and resting on said bolster, said intermediate sills consisting of wooden beams adapted to carry the vertical load, and metallic members to receive the pulling and buffing stresses, said metallic members being supported against bending by said beams.

7. A car structure comprising end sills, bolsters, side sills, and intermediate sills between said side sills and the longitudinal center of the car, said side and intermediate sills lying above and resting on said bolster, said intermediate sills consisting of wooden beams adapted to carry the vertical load, and metallic members to receive the pulling and buffing stresses, said metallic members being supported against bending by said beams, the metallic members adjacent said bolster being secured thereto.

8. A car structure comprising end sills, bolsters, side sills, and intermediate sills between said side sills and the longitudinal center of the car, said side and intermediate sills lying above and resting on said bolster, said intermediate sills consisting of wooden beams adapted to carry the vertical load, and metallic members to receive the pulling and buffing stresses, said metallic members being supported against bending by said beams, said metallic members being secured to said bolsters and end sills.

9. A car structure comprising bolsters,

end sills, side sills, intermediate sills between said side sills and the longitudinal center of the car, said side and intermediate sills lying above and resting on said bolster, draft sills lying substantially in the plane of said bolsters, said intermediate sills consisting of wooden beams adapted to carry the vertical load and metallic members to receive the pulling and buffing stresses, said metallic members being secured to said bolsters and to said end sills.

10. A car structure comprising bolsters having wide top plates to afford means for secure attachment to the overlying sills, side sills, intermediate sills between said side sills and the longitudinal center of the car, said side and intermediate sills lying above and resting on said bolster, draft sills lying substantially in the plane of said bolsters, said intermediate sills consisting of wooden beams adapted to carry the vertical load, and metallic members to receive the pulling and buffing stresses, said metallic members adjacent said bolster being secured to the top plate thereof.

11. A car structure comprising bolsters having wide top plates to afford means for secure attachment to the overlying sills, side sills, intermediate sills between said side sills and the longitudinal center of the car, said side and intermediate sills lying above and resting on said bolster, draft sills lying substantially in the plane of said bolsters, said intermediate sills consisting of wooden beams adapted to carry the vertical load, metallic members to receive the pulling and buffing stresses, and end sills, said metallic members being secured to the top plate of said bolsters and to said end sills.

In testimony whereof, I have subscribed my name.

JOHN O. NEIKIRK.