Dec. 1, 1931. W. E. WINE 1,834,264

CROSS BEARER

Filed April 17, 1929 4 Sheets-Sheet 1

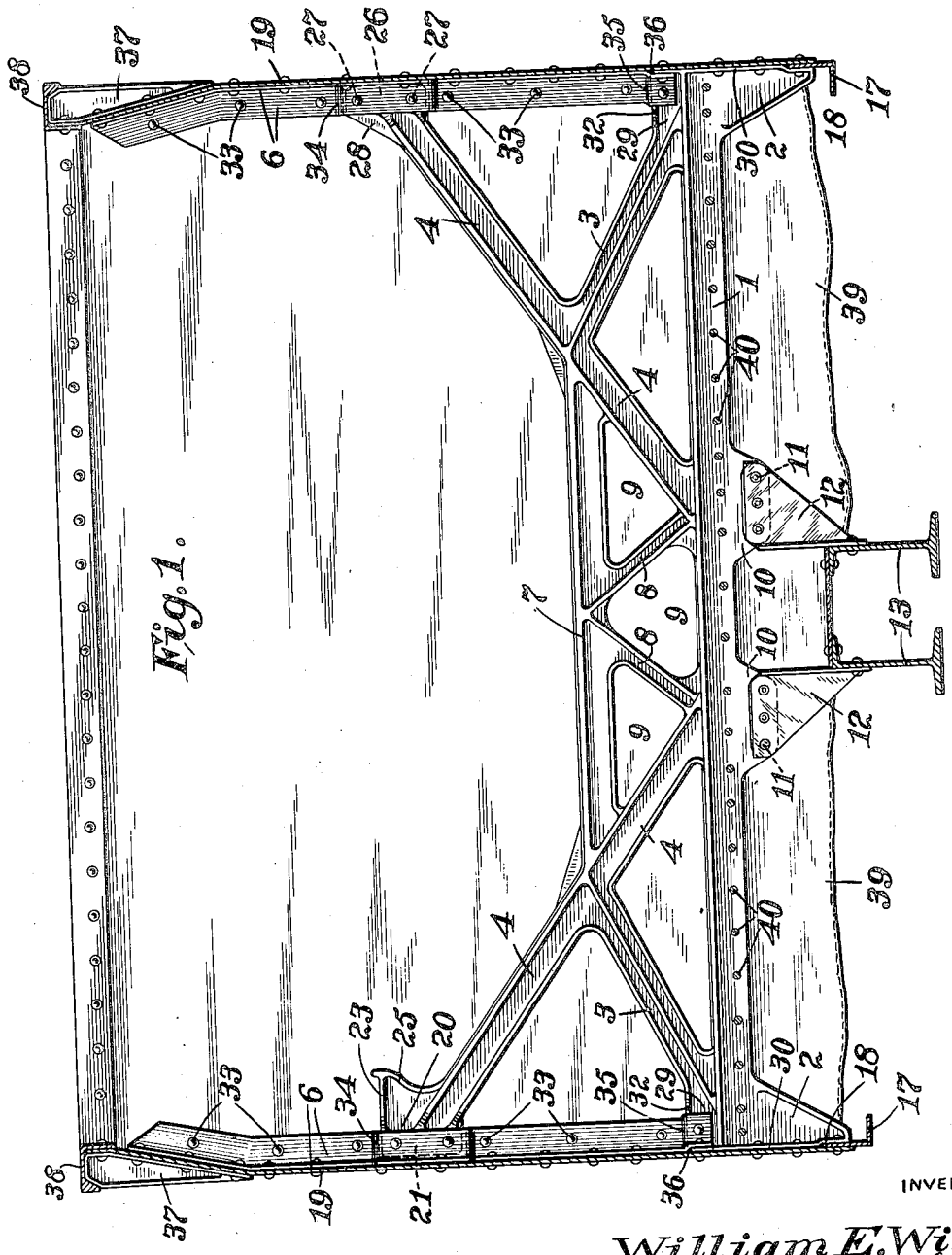


Fig. 1.

INVENTOR:
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CROSS BEARER

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Fig. 2.

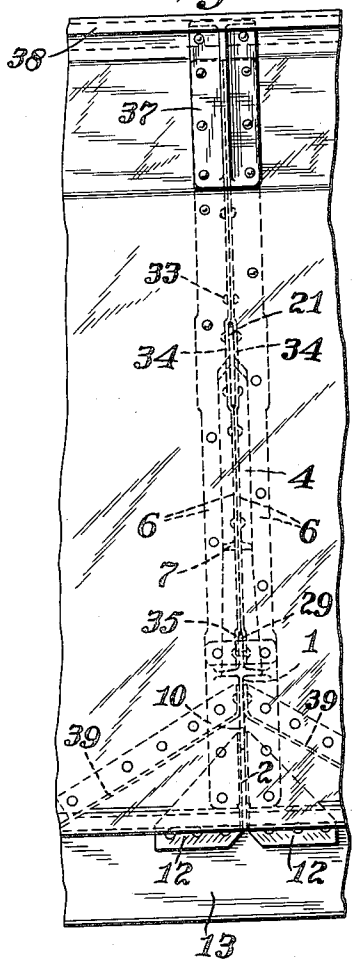


Fig. 3.

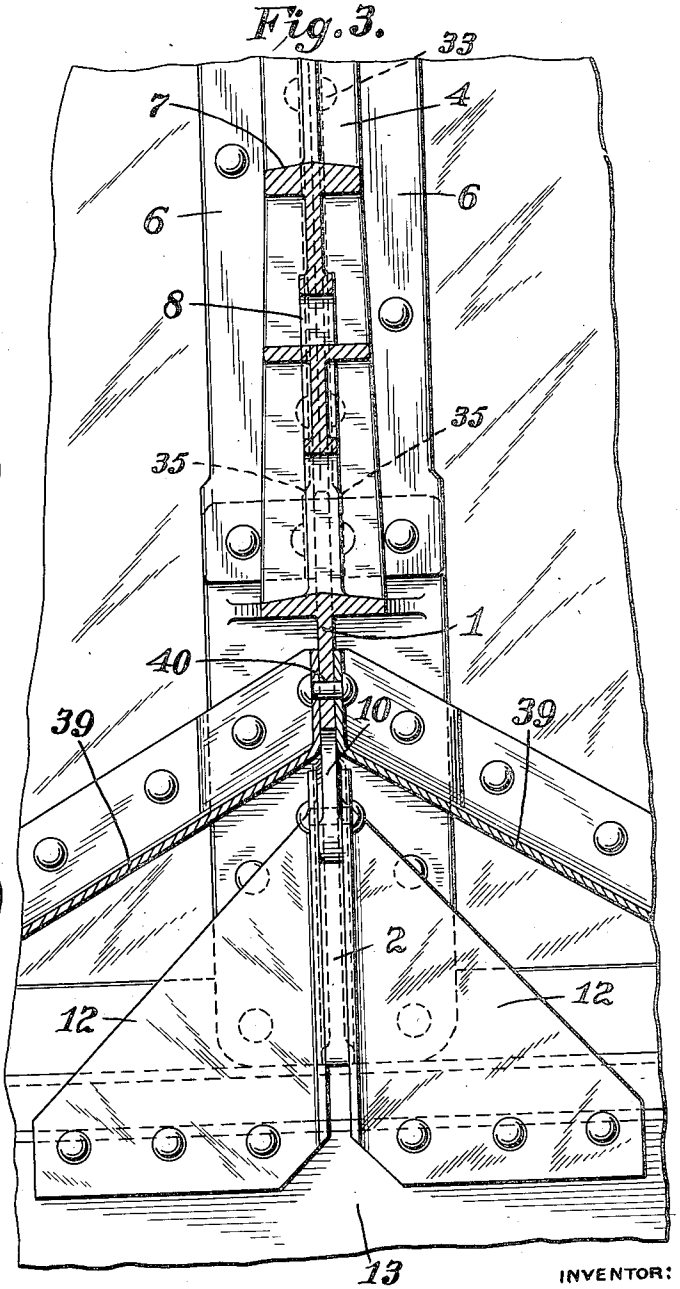


Fig. 12.

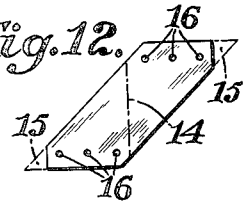
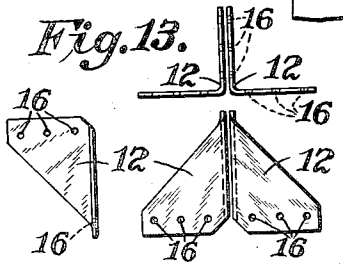


Fig. 13.



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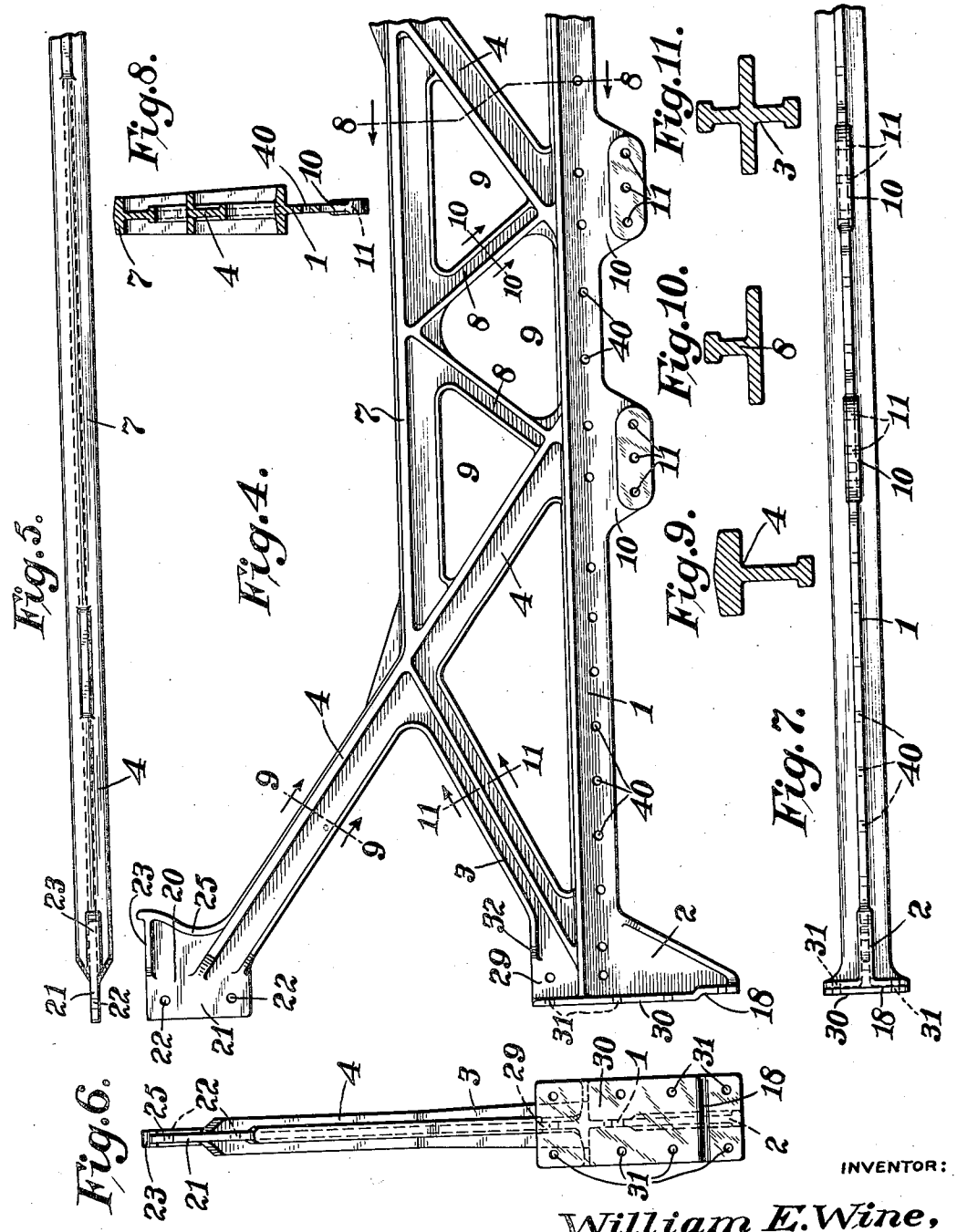
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Dec. 1, 1931. W. E. WINE 1,834,264

CROSS BEARER

Filed April 17, 1929 4 Sheets-Sheet 3



INVENTOR:

William E. Wine,

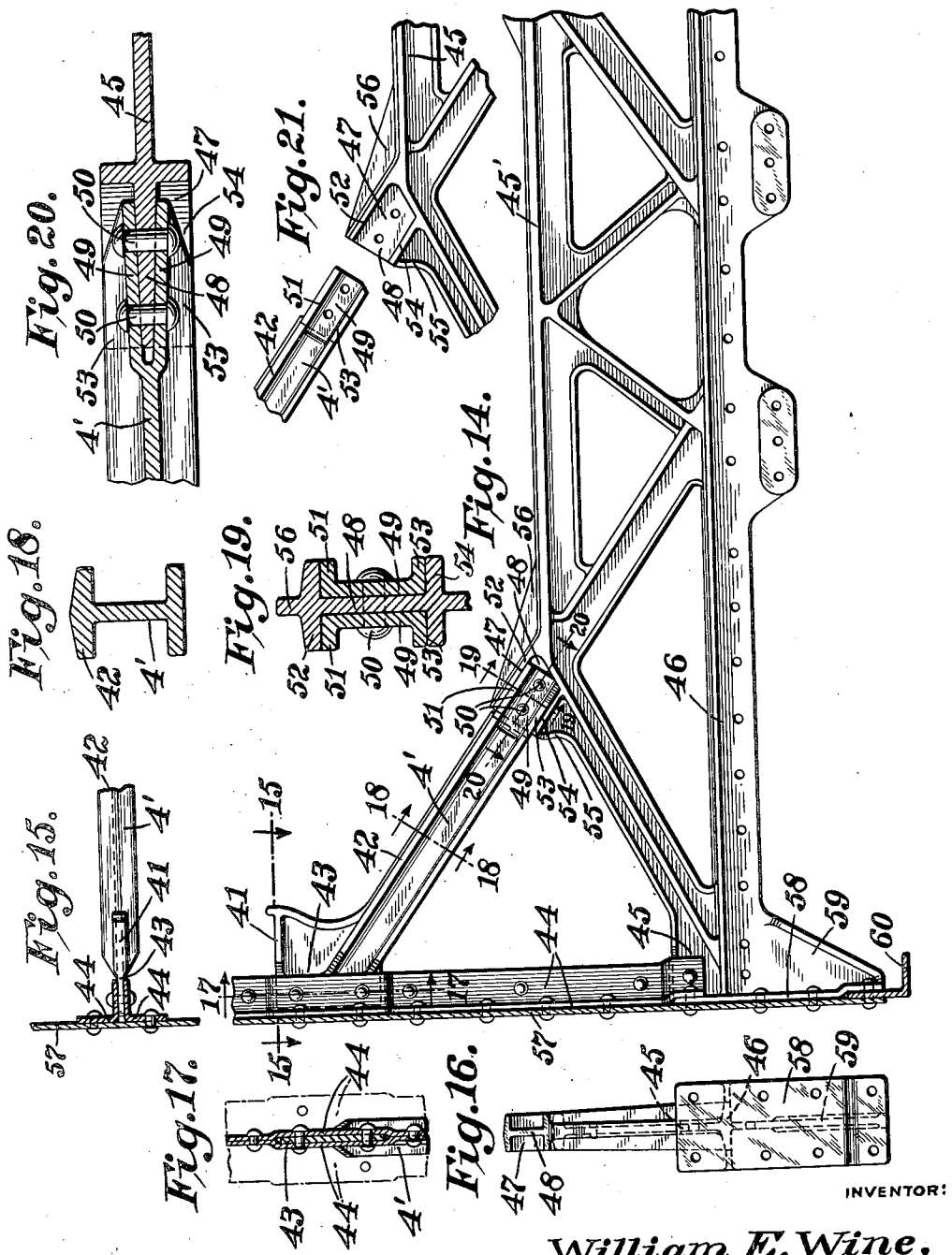
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Dec. 1, 1931. W. E. WINE 1,834,264

CROSS BEARER

Filed April 17, 1929 4 Sheets-Sheet 4



INVENTOR:

William E. Wine,

BY Parker Cook

ATTORNEY.

Patented Dec. 1, 1931

1,834,264

UNITED STATES PATENT OFFICE

WILLIAM E. WINE, OF TOLEDO, OHIO

CROSS BEARER

Application filed April 17, 1929. Serial No. 355,841.

My invention relates to new and useful improvements in cross bearers, and is of the same general type as the cross bearer shown in application, Serial No. 267,040, filed April 13, 1928, another filed June 4, 1928, Serial No. 282,782, and is also a companion to an application just filed by me on March 21, 1929, Serial No. 348,862.

The present application, however, is for a cross bearer wherein the side stakes are positioned on the inside of the car rather than on the outside as shown in the companion case, No. 348,862, just above referred to.

This application also differs from the companion case in that the lower member of the cross bearer has its ends constructed in an entirely different way.

An object of the invention is to provide a cross bearer wherein the same may be readily placed in a freight car and rigidly secured to the center and side sills.

Still another object of the invention is to provide a cross bearer wherein the upwardly extending arms may be integral, as shown in the preferred form, or may be separate pieces and bolted or riveted in place, as shown in the modification.

Still another object of the invention is to provide a cross bearer wherein the lower member is provided with integral downwardly extending projections or feet at its outer ends which are to be secured to the side sheets and side sill.

Still another object of the invention is to provide a cross bearer wherein the outer ends of the lower member also have upwardly extending flanges that merge with the diagonals of the cross bearer just over the projecting feet at the ends of the cross bearer, which flanges are riveted to the bottom of the side stake, as will be shortly explained.

Still another object of the invention is to provide a cross bearer that may be formed as a unitary structure or may have the upwardly extending arms cast separately and then riveted in position.

From the founder's standpoint, it is somewhat easier to cast the cross bearer without these long upwardly projecting arms and then make another mold to just cast the arms.

In other words, by using one mold for the cross bearer and another mold for the arms, the molds and casting operations are somewhat simplified.

The present invention, therefore, shows the preferred form, where the entire structure is integral, and a modified form, which is easier to construct from the founder's standpoint.

Still another object of the invention is to provide a cross bearer that will act as a truss to rigidly brace the sides and tie the sides, center sill, side sills and side sheets together.

Still another object of the invention is to provide a cross bearer wherein, if the arms are made as separate pieces, they are so constructed that they will be very rigid when attached and will not buckle or become loose or detached in service.

With these and other objects in view, the invention consists in certain new and novel arrangements and combination of parts, as will be hereinafter more fully described and pointed out in the claims.

Referring now to the drawings showing a preferred and modified form,

Fig. 1 is a fragmentary cross section of a freight car showing the side sheets, side stakes, center and side sills and the cross bearer in position;

Fig. 2 is a fragmentary end view of the cross bearer and viewed from the outer side of the car;

Fig. 3 is an enlarged sectional view of the cross bearer taken from the inside of the car, fragmentary portions being shown of the slope sheets, side sheets, and center sill;

Fig. 4 is a fragmentary elevation of the cross bearer showing the same before being placed in a car;

Fig. 5 is a fragmentary top plan view of the cross bearer;

Fig. 6 is an end view of the same;

Fig. 7 is a fragmentary bottom plan view of the cross bearer;

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 4;

Fig. 9 is a sectional view taken on the line 9—9 of Fig. 4;

Fig. 10 is a sectional view taken on the line 10—10 of Fig. 4;

Fig. 11 is a sectional view taken on the line 11—11 of Fig. 4;

Fig. 12 is a development of a bracket before the same is bent in shape;

Fig. 13 shows details of the bracket after being bent;

Fig. 14 is a fragmentary elevation of the slightly modified form of cross bearer;

Fig. 15 is a fragmentary section taken on the line 15—15 of Fig. 14;

Fig. 16 is an end view of the cross bearer without the arm attached;

Fig. 17 is a vertical sectional view taken on the line 17—17 of Fig. 14;

Fig. 18 is an enlarged section of the arm taken on the line 18—18 of Fig. 14;

Fig. 19 is an enlarged sectional view taken on the line 19—19 of Fig. 14 showing how the pocket for the arm is formed;

Fig. 20 is an enlarged sectional view taken on the line 20—20 of Fig. 14; and

Fig. 21 is a fragmentary elevation of the lower end of the arm and the pocket of the bolster for receiving the same.

Referring now more specifically to the several views, and first to the preferred form, it will be seen that the cross bearer is a unitary structure and preferably formed of cast steel, so that after the patterns are once made, the bolsters can be made in large quantities at a relatively low price.

The bolster comprises the bottom member 1 with the downwardly extending projections or feet 2 at its opposite ends, while extending from points right above these feet are the two diagonals 3 which respectively merge with the arms 4. These arms, in turn, are formed integrally with the bottom member 1 at points just to one side of the center of the bottom member and extend up to the respective side stakes 6. The lower portions of the arms 4 form small diagonal braces for the cross bearer. Extending between these arms 4 at points where they merge with the diagonals 3 is the top member 7, so that there is a truss formed between the two sides of the car. There are also the small diagonals 8 that extend from the top member 7 to the lower ends of the arms 4, thus forming the small triangles 9, as may be readily seen. So far, with the exception of the feet 2, the cross bearer is the same in structure as shown in the companion case above referred to.

These different unitary parts of the cross bearer, such as the bottom member, top members, arms and diagonals are all of rail formation, that is, they have a head, a web and a base or bottom flange, to provide as much strength as possible for the amount of metal involved.

It is not thought necessary to write a detailed description of the cross section of each of these parts, as the cross sectional views in themselves explain the different sectional formations. For instance, the diagonals 3 are formed as clearly shown in Fig. 11, the arms 4 are of rail formation, as shown in Fig. 9, the small diagonals 8 are of the cross sectional area, as shown in Fig. 10, while the top member is of the general cross sectional formation, as shown in Fig. 8.

Now referring to the lower member 1, there will be seen, at points on either side of the center, the two downwardly extending projections or lugs 10, which are of integral formation and which are provided with the rivet holes 11, so that the two sets of brackets 12 may be respectively riveted to these lugs and to the center sill 13, as may be clearly seen in Fig. 1.

Reference is made for the moment to Figs. 12 and 13 to show the economical manner of forming the brackets 12. I first take a rectangular sheet of metal and mark off the same, so that the little corners 15 may be snipped off and then bend the plate along the line 14, so that out of the entire rectangular sheet, only the two little corners 15 are wasted. Figs. 12 and 13 clearly show the manner in which this plate is developed or bent to form these brackets.

It will be noticed that there are rivet holes 16 along the lower edges and along the top edges, so that after the brackets are made, they may be inverted and tightly riveted in position, as shown in Fig. 1 to thus tightly tie the cross bearer to the center sill. Of course, these little brackets may be made in other ways, but the manner shown is a very simple and economical one.

In Fig. 3, these brackets are shown on an enlarged scale and their position with relation to the other parts of the car may be readily seen.

There is a special form of side stake illustrated in this application and accordingly the upper ends of the arms 4 are also specially constructed to be accommodated by them.

Reference now will be made to Figs. 4 and 5 to explain more in detail the upper ends of these arms and it will be understood that a description of the one is substantially a description of the other, as they are the same, with the exception of a small step being cast on one of the arms and likewise, of course, they extend in the opposite directions. It will be noticed that the upper end of the arm 4 is enlarged at 20 to provide, first, the connecting plate 21 with its two rivet holes 22, that is, designed to fit between the two component parts of the side stake 6 and be tightly riveted thereto.

There is additional metal allowed to flow at this upper end 20 to form the small step 23, which metal merges with the plate 21 and the arm 4, and there is also a small outer rib 25 running down from the top of the step and merging with the top or head section of the arm 4. The arm 4 to the right of the drawing (Fig. 1) has a similar plate 26 with its

rivet holes 27 but instead of having a step on this rail, the reinforcing metal 28 simply merges with the top of the arm and the top of the plate to provide the additional strength at this point.

It might be mentioned that by providing steps at the top of the cross bearers, the trainmen can walk along them and hold on to the top rail rather than climbing up and down over the hoppers, but as it is only necessary to have the steps along the one inner side of the car, only the left hand arms are so provided.

By forming the ends of the upper arms with the plates as shown, they may be tightly riveted to the side stakes 6, that is, between the two component parts and thus tie the side stakes 6, side sheets 19 and cross bearer tightly in position.

Referring for the moment to the feet 2, it will be seen in each instance that they widen out to form the respective face plates 30, and these outer face plates each extend upwardly beyond the top of the lower member and right on up to the top of the respective lugs 29. Each plate is provided with a small offset 18, as heretofore mentioned, and there may be seen the two series of rivet holes 31 in these face plates, so that the side sheets 19 may be riveted thereto, as well as the respective upper legs of the side sills 17.

Referring for the moment to Fig. 4 again, it will be seen that the top rib of each of the diagonals 3 terminates at the respective points 32, so that the lower ends of the side stakes may fit over their lugs 29.

A word about the side stakes 6. It will be seen that they each comprise two angle members and have their webs riveted together, as at 33, and are humped outwardly, as at 34, to form a space to receive the heretofore mentioned plates 21 of the upwardly extending arms 4. The lower ends of the two angles that form the side stake 6 are bent outwardly, as at 35, so that these offset ends 35 may fit over their respective lug 29 and be riveted in position, as may be seen in Fig. 1.

These feet 35 are also slightly offset from the vertical, as at 36, so that they may fit behind the outer plate 30 of the foot, as may be seen from Fig. 1 and not affect the vertical alignment of the side sheet.

At the upper end of each of the stakes 6, there will be noticed the small bracket 37, and there may also be seen the top rail 38 riveted to the side sheet and to the brackets 37.

As heretofore mentioned, the opposite ends of the cross bearer are of identical formation with the exception that one of the arms 4 is provided with a step while the other is not.

In the enlarged view of Fig. 3 I have shown several parts in elevation and several parts in section, and I have also shown a fragmentary part of the slope sheets 39 which will be riveted to the lower member of the cross bearer, the rivets passing through the row of rivet holes 40 shown in Fig. 1.

Having explained the preferred embodiment, reference will now be made to the modified form, as shown in Figs. 14 to 21 inclusive, the only difference here being in the arms 4 and the manner in which they are constructed and riveted to the body of the cross bearer.

Referring for the moment, therefore, to Fig. 14, it will be seen that the cross bearer is identical with the preferred form, with the exception that instead of having two integral outwardly extending arms 4, there are two separate arms 4′. Only one may be seen from Fig. 14 due to the limitations of space, but it will be appreciated that there are two arms just as there are two arms in the preferred form.

Also, a description of one will be a description of the other, with the exception of the small step 41 which is not on the arm to the right of the cross bearer. Now this arm 4′ is shown in cross section in Fig. 18, and it will be seen that throughout its body portion, it is in the shape of an I-beam, the top of the head 42 sloping slightly from its center toward its sides. The upper end of the arm is flattened out, as at 43, exactly similar to the preferred form and is designed to fit within a jacket in the two angles, which angles comprise the side stake 44, which fits over the small lug 45, that is, integral with the body 46 of the cross bearer.

It will be understood that the body 46 of the cross bearer is similar to the body of the preferred form, with the exception that at 47, there is formed a socket to receive the inner end of the arm 4′, which socket is not present in the preferred form, as the arm in that instance is integral. In Fig. 21, there is shown a fragmentary portion of the body of the cross bearer and a form of socket at the point 47, where the top member 45′ and the two diagonals merge. In this socket, there is a tapered tongue 48, reference being made to Fig. 20, which is a section taken on the line 20—20 of Fig. 14.

Now the lower end of the arm 4′ is bifurcated to form the two lips or jaws 49 which are adapted to engage the tongue 48 and be riveted thereto, as at 50. These lips are provided with the top flanges 51 which, in turn, fit under the head 52 of the tongue 48. The lips or jaws 49 are also formed with flanges 53 so that they may abut against the base 54 of the tongue 48, as may be understood by referring to Fig. 19.

When the arm 4′, therefore, is forced within the socket, it will be tightly held in position and will not be able to shift either upwardly or downwardly, as it is backed up at its upper and lower edges by the head 52 and by the base 54 and, of course, there can be no lateral motion, as the lips and tongue will be tightly held in place by the rivets.

It will be noticed that right under the socket 47, the metal is allowed to flow outwardly, as at 55, so that the socket is reinforced at the bottom; likewise, at the top the extra metal 56 may be seen, so that this socket may be strongly reinforced against upward or downward tilting of the arm. As before mentioned, it will be understood that the opposite end of the cross bearer is constructed in exactly the same manner but, of course, the arm will extend in the opposite direction from the arm already explained.

With the exception of these differences just pointed out, the cross bearer is identical with the preferred form.

Also, as previously mentioned, a cross bearer formed with these separate arms may be somewhat easier to cast, as smaller molds may be used, and by forming the inner ends of these arms as pointed out, and by forming the sockets to receive them, the cross bearer in its entirety will be substantially as strong as if these arms were cast integral.

The side sheets 57 will be riveted to the stakes 44 in the same manner and to the face 58 on the feet 59 of the cross bearer, and the side sill 60 will be fastened to the end of the cross bearer in the same manner.

From the foregoing, it will be seen that in both the preferred and modified forms, I have provided a cross bearer that is relatively light in weight, provides the maximum strength and, at the same time, will tie all of the component parts of the car together.

By providing the integral feet at the ends of the cross bearer, provision is made for attaching the cross bearer to the side sill and provision is also made for receiving the lower ends of the side stake, so that when the cross bearer is in position, the sides of the car and the under frame will be all rigidly held together.

Finally, the upwardly extending arms rigidly fit within the component parts of each of the side stakes while the lower ends of these arms may be either integral with the body of the cross bearer or, as shown in the modified form, may be separate therefrom and secured thereto by arranging portions of the arms and cross bearer in interleaved relation to effect what may be termed a tongue and grooved connection.

Many slight changes might be made without in any way departing from the spirit and scope of the invention.

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

1. A cross bearer for railway cars formed of cast steel and comprising a top and bottom chord members, said bearer being adapted to extend continuously from one side of the car to the other in spaced relation to the top of the center sill of the car, said lower member being provided at its ends with integral downwardly extending projections, each of said projections having an enlarged outer face and each of said faces being adapted to be secured to an adjoining side sill and side sheet of the car.

2. A cross bearer for railway cars formed of cast steel and comprising top and bottom chord members, said bearer being adapted to extend continuously from one side of the car to the other in spaced relation to the top of the car center sill, said lower member being integrally provided at its ends with downwardly extending projections, each of said projections provided with a widened outer face, the lower portion of each face being offset to receive a leg of a side sill and the upper portion of each face being adapted to be riveted to a side sheet.

3. A cross bearer for railway cars formed of cast steel and comprising top and bottom chord members, said bearer being adapted to extend continuously from one side of the car to the other in spaced relation to the top of the car center sill, said lower member being provided at its ends with downwardly extending projections, each of said projections provided with a widened outer face, the lower portion of each face being offset to receive a leg of a side sill and the outer surface of the upper portion of the face lying flush with the outer surface of the side sill, said faces being adapted to be riveted to a side sheet of the car.

4. A cross bearer formed of cast steel, the outer ends of the lower portion of the cross bearer provided with downwardly extending projections, the outer faces of said projections being cut back, the said faces adapted to be respectively secured to side sheets and the resultant spaces between the side sheets and the cut back portions of the faces adapted to receive the leg of a side sill.

5. A cross bearer for freight cars adapted to extend continuously from one side of the car to the other in spaced relation to the center sill, said bearer comprising an upper and a lower member, diagonals, and upwardly extending arms, the lower member provided at each end with a downwardly projecting foot, the outer face of each foot being enlarged and adapted to be riveted to an adjacent side sill and side sheet of the car, lugs formed on the bottom member directly above said feet, said lugs being adapted to be secured to an adjacent side stake.

6. A cross bearer for railway cars in combination with car side stakes, said cross bearer comprising a body portion and upwardly extending arms, each of said side stakes formed of two parts and provided with a pocket, the upper end of each arm adapted to fit within the adjacent pocket.

7. A cross bearer for railway cars in combination with car side stakes, said cross bearer comprising a body portion and upwardly and

outwardly extending arms, each of said side stakes formed with a pocket and the upper end of each arm being adapted to fit within the adjacent pocket, and integral means on the opposite ends of the cross bearer for attachment to the lower ends of said side stakes.

8. A cross bearer for railway cars in combination with car side stakes, said cross bearer comprising a body portion and upwardly and outwardly extending arms, each of said side stakes formed with a pocket near its upper end and diverging feet at its lower end, the body of the cross bearer being provided with lugs fitting respectively between the diverging feet of the side stakes and the upper ends of said arms being disposed within the pockets of the side stakes.

9. A cross bearer for railway cars in combination with car side stakes, said cross bearer comprising a body portion and upwardly extending arms, flat plates formed at the outer end of each arm, each of said side stakes comprising two members riveted together and provided with a pocket for receiving the flat plate of the adjacent arm of the bearer, the lower ends of the two members of each side stake being bent outwardly, the cross bearer being provided with webs fitting between the respective lower ends of the side stakes.

10. A cross bearer comprising a bottom member and a top member, outwardly extending arms, the upper ends of said arms adapted to be secured to respective side stakes, diagonals extending from the arms to the opposite ends of the cross bearer and said diagonals being of rail formation, the lower ends of the diagonals changing from a rail formation to flat plates, the said plates adapted to be secured to the respective side stakes, a foot on each end of the lower member of the cross bearer and adapted to be secured to the side sheets and side sills.

11. A cross bearer for railway cars comprising a lower member, a top member, diagonals between the lower member and the top member, the lower member provided with integral face plates on its outer ends, said plates extending below the normal upper surface of the bottom member and adapted to be secured to side sills and side sheets of the car, the lower member also provided with lugs spaced from the center and extending below the normal edge of the lower member, said lugs being adapted to be indirectly secured to a center sill.

12. A cross bearer having a lower member, a top member, the top member being shorter than the lower member, diagonals extending from the ends of the top member to the ends of the lower member, the cross bearer provided with sockets at the points where the respective diagonals meet the top member, and arms provided with interlocking parts at their inner ends to respectively fit within said sockets.

13. A cross bearer comprising a bottom member, a top member, and diagonals, arms provided with diverging lips on their inner ends, the said cross bearer provided with sockets where certain of the diagonals merge with the top member, each of said sockets provided with a tongue to respectively interlock with the lips on said arms.

14. A cross bearer comprising a top member, a bottom member, and diagonals, reinforced sockets formed on the opposite ends of the top member, each of said sockets provided with a tapering tongue, arms provided with tapering lips which respectively engage the tongues of the sockets, and means for locking the tongues within the sockets.

15. A cross bearer comprising a top and a lower member, diagonals connecting the same, sockets formed at the points of merger of the outer diagonals with the top member, said sockets comprising a tapering web, a head flange and a base flange, arms provided with lips, said lips provided with flanges on their upper and lower edges to interlock under the first mentioned flanges and said lips riveted to the said web.

16. A cross bearer comprising a lower member and a top member, integral means joining the upper and lower members, sockets formed at the outer ends of the top member, said sockets in the shape of an I-beam in cross section, the web of the I-beam being tapered, upwardly and outwardly extending arms provided with integral lips to fit within the I-beam sockets and interlock therewith, and means for rigidly locking the arms within the sockets.

17. A cross bearer comprising a body portion, a socket in said body portion, an arm to fit within said socket, said socket provided with a tapering web, said arm provided with tapering lips to engage said tongue, and means for locking the arm within the socket.

18. A cross bearer comprising upper and lower members, means connecting said parts together, a socket formed at the end of the upper member and said socket being in the shape of an I-beam in cross section, the web, however, being tapered, an arm provided with tapering lips and substantially in the form of an I-beam section, and means for locking the lips to the tongue.

19. A cross bearer comprising a lower member, a top member and diagonals joining said parts, the lower member being provided with feet at its opposite ends, said cross bearer provided with sockets at the opposite ends of the top member, additional arms provided with cooperating lips to fit within said sockets, and means for locking the arm within the socket.

20. A cross bearer comprising a body portion, sockets formed in the body portion at the opposite upper ends, arms having means at their inner ends for interlocking within said

sockets, and means for holding the said parts together.

21. A cross bearer comprising a lower member and a top member, diagonals connecting the top member to the lower member, further diagonals extending from the opposite direction and merging with the top member respectively at the points where the outer diagonals merge with the top member, sockets formed at these upper points of merger, and arms provided with lips for fitting within said sockets and the additional arms extending in a plane with the second mentioned diagonals.

22. A cross bearer comprising in part a top member and diagonals, sockets formed at the outer ends of the top member, said sockets being reinforced at their top and base and a tongue within each socket, arms provided with similarly reinforced lips but of less height to fit within said sockets, and means for locking the lips to the tongues.

23. A cross bearer comprising a top member, a lower member and diagonals, all of rail formation, arms interlocked with the ends of the top member and the interlocking points being reinforced along their top and bottom edges.

24. A cross bearer comprising a top and a lower member and diagonals connecting said members, sockets each provided with a tongue and located at the opposite ends of the top member, and arms with interlocking lips fitting down within said sockets to thereby form non-integral arms with the lower member.

25. A cross bearer for railway cars comprising a body portion, and upwardly and outwardly extending arms for attachment to side stakes of the car, the lower portions of said arms and adjacent portions of the body portion being secured together in interleaved relation.

26. A cross bearer for railway cars comprising a body portion provided with tongue-like portions, arms adapted to be secured to side stakes of the car, the lower portions of said arms being bifurcated to afford jaws for receiving said tongue-like portions, and means for rigidly securing said bifurcated and tongue-like portions.

27. A cross bearer for railway cars comprising a body portion provided with tapered tongue-like portions, arms adapted to be secured to side stakes of the car having portions rigidly secured to said tongue-like portions in interleaved relation.

28. A cross bearer for railway cars comprising a body portion provided with tapered tongue-like portions, and arms adapted to be secured to side stakes of the car, the lower portions of said arms being provided with V-shaped notches for receiving said tongue-like portions, and means for rigidly securing the arms to said tongue-like portions.

29. A cross bearer for railway cars comprising substantially horizontal top and bottom members, upwardly converging members connecting the ends of said top and bottom members, tongue-like projecting portions adjacent the intersection of said upwardly converging and top members, and arms adapted to be rigidly secured to side stakes of the car connected to said tongue-like portions.

30. A cross bearer for railway cars comprising substantially horizontal top and bottom members, upwardly converging members connecting the ends of said top and bottom members, projecting tongue-like portions adjacent the intersection of said converging members and the said top member, and upwardly diverging arms for attachment to the side stakes of the car; the lower portions of said arms being secured to said tongue-like portions in interleaved relation.

In testimony whereof I affix my signature.

WILLIAM E. WINE.