Aug. 22, 1939. C. R. BUSCH 2,170,113

TRUSSED BRAKE BEAM

Filed April 3, 1937 2 Sheets-Sheet 1

Fig. 1.

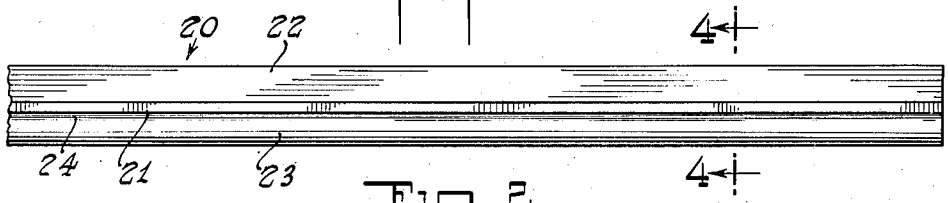


Fig. 2.

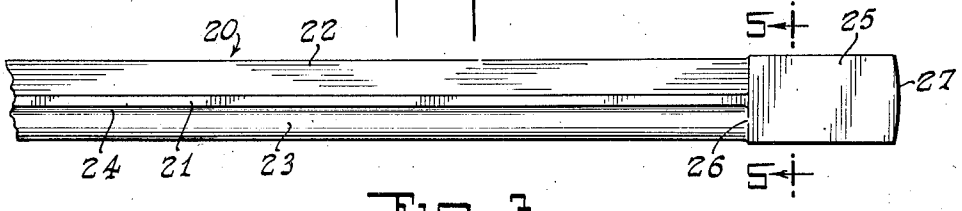
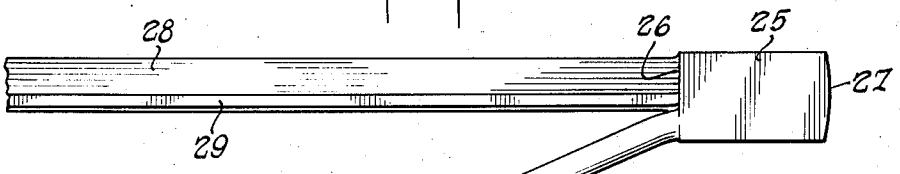


Fig. 3.



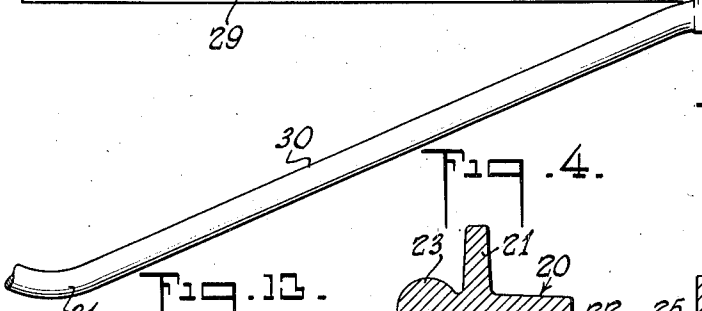


Fig. 4.

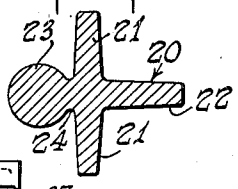


Fig. 5.

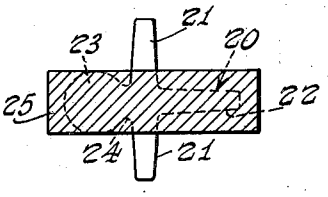


Fig. 10.

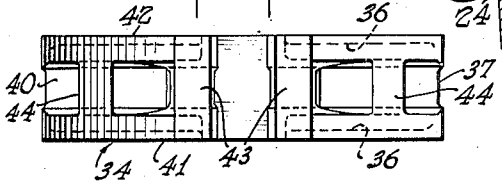
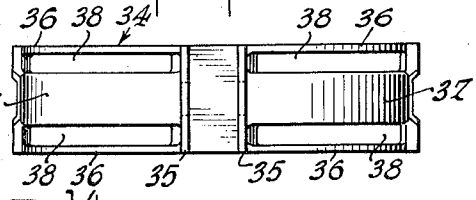


Fig. 12.



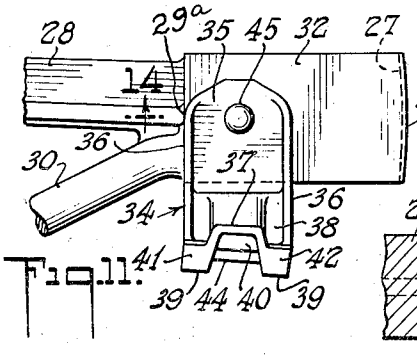
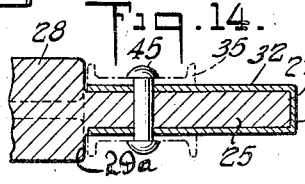


Fig. 11.

Fig. 14.



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TRUSSED BRAKE BEAM

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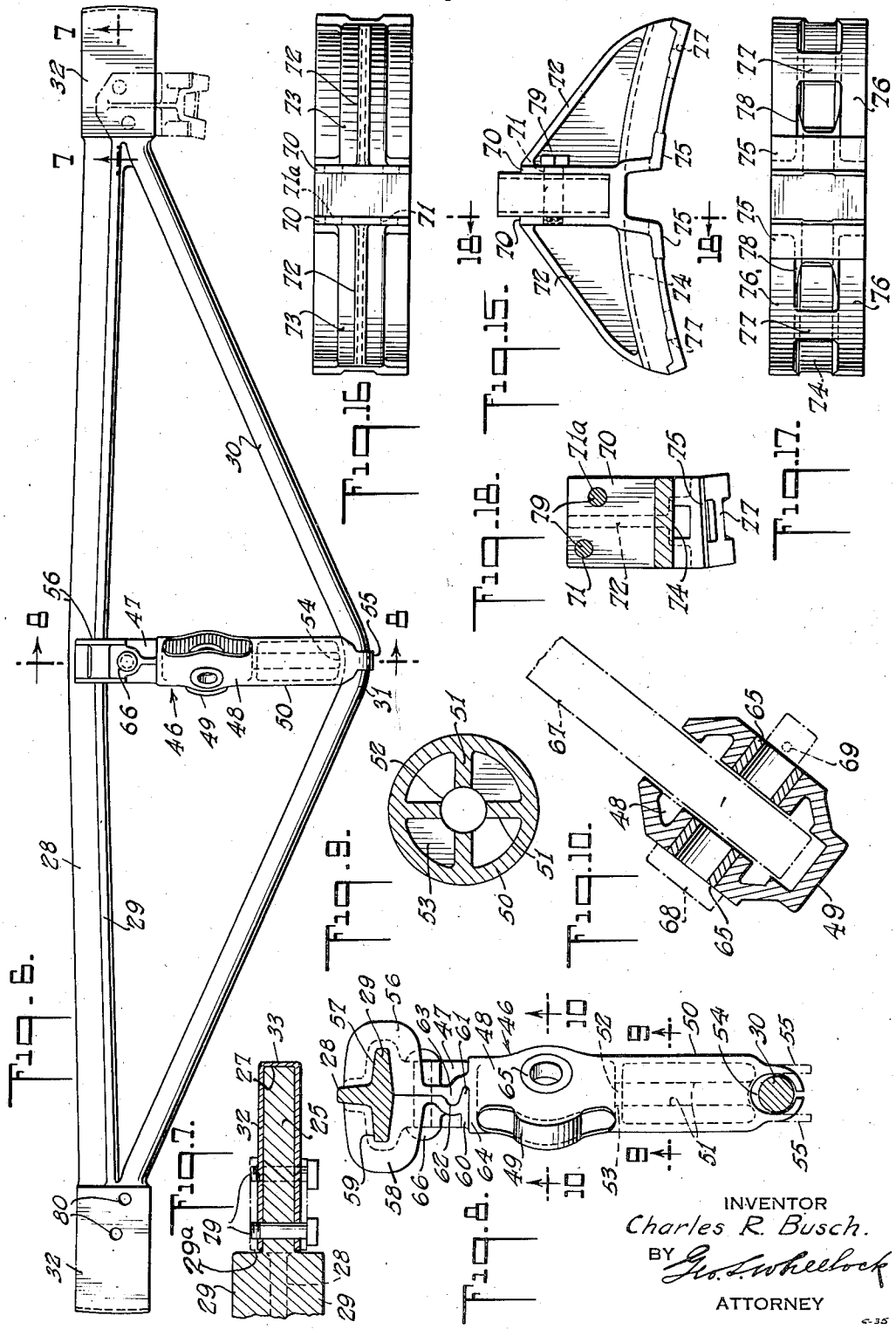


Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 15.

Fig. 16

Fig. 17.

Fig. 18.

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2,170,113

TRUSSED BRAKE BEAM

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Application April 3, 1937, Serial No. 134,792

10 Claims. (Cl. 188—222)

The present invention relates to specially constructed brake beams.

An object of the invention is to provide reliable brake beams, each beam either being a floating one or preferably as disclosed by my prior application, Serial No. 130,881, filed March 15, 1937.

The trussed beam is preferably forged or cast from a single piece of malleable metal such as forged steel, and formed integrally with each end thereof is a heavy mass of the solidified metal which is so shaped and proportioned as to have substantially parallel upper and lower surfaces of considerable area, of oblong or more or less rectangular contour, the thickness of the mass being substantially the same preferably as that of the tension member of the beam, or of less thickness or greater thickness if desired, whereby the beam is substantially strengthened and is adapted more particularly but not necessarily to be guided in guides of the side frames of a car truck, as disclosed in my aforesaid application.

These being among the objects of the present invention, the same consists of suitable features of construction and combinations of parts to be hereinafter described and then claimed with reference to the accompanying drawings illustrating suitable embodiments thereof and wherein

Fig. 1 is an edge view of a suitably shaped bar of metal;

Fig. 2 is a similar view showing one end of the bar as having been upset and shortened;

Fig. 3 is a plan view of a bar after the compression and tension member portions have been formed for eventually providing a brake beam;

Fig. 4 is a transverse section on line 4—4, Fig. 1, looking in the direction of the arrows;

Fig. 5 is a transverse section through the upset end of the bar on line 5—5, Fig. 2, looking in the direction of the arrows;

Fig. 6 is a plan of the complete trussed brake beam showing in broken lines a brake head on one end thereof

Fig. 7 is a longitudinal section of the end portion of the beam taken on the line 7—7, Fig. 6, looking in the direction of the arrows;

Fig. 8 is a transverse section of the beam on line 8—8, Fig. 6, and showing the preferred strut thereof in elevation;

Fig. 9 is an enlarged transverse section on the line 9—9, Fig. 8, looking in the direction of the arrows;

Fig. 10 is an enlarged transverse section of the strut on line 10—10, Fig. 8, and showing other parts in broken lines;

Fig. 11 is a broken plan of one end of the beam showing one construction of brake head mounted thereon;

Fig. 12 is a rear view of the brake head shown in Fig. 11;

Fig. 13 is a face view of such brake head;

Fig. 14 is a longitudinal section on the line 14—14 of Fig. 11 looking in the direction of the arrows;

Fig. 15 is a side elevation of another construction of brake head mounted on one end of the beam;

Fig. 16 is a rear view of the head shown in Fig. 15;

Fig. 17 is a face view of the same brake head, and

Fig. 18 is a section on line 18—18, Fig. 15, looking in the direction of the arrows.

In Figs. 1, 2 and 3 only the approximate lengths of the halves of the bar of steel from which the brake beam is formed in its preliminary stages is shown, and it will be understood that the other halves not shown will correspond. As shown in Fig. 1 the bar 20 is of malleable metal and is of the aproximate cruciform or plus sign shape as shown in Fig. 4. Such bar 20 when so shaped from rolled steel or the like will have a pair of longitudinal flanges or webs 21 extending in opposite directions and in the same plane, a longitudinal web or flange 22 extending at right angles to the plane of the pair of webs 21, a rod shaped rib or bead 23 located in the same plane as the web 22 and a reduced neck 24 which connects the rib 23 with the webs 21.

Referring to Fig. 2 the bar 20 has been reduced in length by upsetting or forging so as to form at each end of the same a solid portion 25, the same having been formed from the cruciform shaped end, by compacting the metal at that end. The solid end portion 25 is flattened and is preferably of the thickness shown in Fig. 5. The vertical thickness shown is of much less dimension than the vertical width of the bar along the flanges or webs 21 and as viewed endwise it will preferably have a substantially rectangular contour, as is clear from said figure. The width or transverse dimension of the flattened solid portion 25 is preferably greater than the width of the bar 20 and its corresponding dimension, so as to provide shoulders 26. The substantially flat parallel surfaces of the solid end portion 25 are each of substantial area and of substantially rectangular shape except that preferably said surfaces are continuous across the end portion. The actual terminal surface of the portion 25 is of the arcuate shape 27 for reasons clearly set forth in my

aforesaid application. The length of the upset and flattened end portion 25 is preferably such that a brake head may be rigidly mounted upon the innermost half thereof, while the outermost half preferably extends beyond such a brake head, although the portion 25 may if desired be made only long enough lengthwise of the bar to merely receive a brake head thereon.

Referring to Fig. 3 the bar 20 is shown as having been incised end parts thereof spread apart so as to provide a member 28, 29 which is to become the ultimate compression member of the brake beam and the member 30 to become the ultimate tension member thereof. A compression member with a horizontal flange 28 and the upwardly and downwardly extending flanges 29 may thus be produced. The preformed brake beam in the shape shown in Fig. 3 is preferably obtained by shearing the bar 20 along the line of the neck 24 and by spreading the member 30 to form the tension member away from the member which forms the compression member, such shearing extending very close to the opposite end portion 25 at one end of the bar to the corresponding upset portion not shown in the drawings. It will be observed that the plane of the tension and compression members is preferably the same as the horizontal plane of the end portion 25. In thus forming the tension member 30, it is provided with an elbow 31 at its midlength, for receiving the ultimate strut.

As shown in Figs. 6 and 7, each end portion 25 of the beam is covered longitudinally by wear material preferably made from a bent U-shaped plate 32 of highly tempered metal, the same covering the flat surfaces of the end portion 25, and at the outer end or bend 33 being preferably of arcuate shape so as to fit snugly against the corresponding arcuate shaped terminal 27 of the end portion 25 of the beam. If the wear surface referred to is formed by a hard metal sheet, the same may obviously be permanently secured to the end portion 25 in any approved manner.

After the beam has been suitably trussed by a strut as hereinafter described, a brake head therefor such as shown in Fig. 11 may be secured to each flattened end of the beam. Such brake head 34 is provided with a pair of parallel transverse flanges 35 at the rear thereof as also shown in Fig. 12. These flanges are at the middle portion of the brake head, and from each of them there extends a pair of lateral parallel webs 36 to the corresponding end of the brake head, such flanges being spaced apart and at opposite sides of the rear of the head. Between the webs 36 there is provided the inner wall portion 37 of the ultimate key way and the same is spaced at equal distances from the webs 36, which webs reinforce and strengthen the back portion of the brake head, they being preferably in the form of brackets having considerable area, for example, of the area shown in Fig. 15, in order to properly strengthen the head. Between the inner wall porion 37 and the opposite webs 36 longitudinal depressions 38 are located at opposite sides of the wall portion 37.

As shown in Fig. 11 the face 39 of the one piece brake head is inclined inwardly from side to side of the head, after the manner more clearly illustrated in Fig. 18 to be later described.

Fig. 13 more clearly illustrates the front portions of the brake head than does Fig. 11, and referring thereto it will be noted that the keyway 40 is flanked by solid side walls 41, 42 which extend in opposite directions away from the transverse head lugs 43 to the ends of the head. These walls 41, 42 are preferably formed solid for the sake of strength. Also to insure greater strength for the brake head casting, the side walls 41, 42 at each end portion of the head are connected by a bridge or spanning element 44, so that when the brake head is made of the construction described and illustrated it constitutes a very strong and reliable head. Each half portion from a point mid-way between the back flanges 35 is preferably of identical construction so that the head may be used at either end of the brake beam, the flanges 35 receiving between them the flattened end portion 25 of the beam, and the brake head being rigidly connected therewith by a single rivet 45 which cooperates with the flanges 35 and the rear surface of the brake head which is between said flanges in rigidly holding the brake head in a predetermined fixed position. In Fig. 14 the flanges 35 are indicated in broken lines.

Such a brake head as 34 is shown as applied to one end of the trussed brake beam shown and described. It is clear from Figs. 3, 5, 6 and 11, when considered together, that each end of the tension member inwardly of the end portion 25, or 32, as the case may be, is of substantially the same thickness as the depth of the thickness of the end portion. This is clear from the dotted lines in Fig. 5 representing the tension member 23, as the end of the tension member is no thicker than that of the adjacent end portion. This means that the upper and lower surfaces of the end portion 25 or 32 and of the adjacent end of the tension member merge in substantially the same parallel planes, considered breadthwise of the brake beam. Referring to Fig. 11 with Fig. 5 it will be seen that the flanges 35 of the brake head 34 may be engaged over the end of the tension member 30, and in fact over any part of the illustrated tension member which is beyond the strut, at a considerable distance inwardly of the enlarged end portion 32, so that by moving the brake head outwardly along that end of the tension member and onto the flattened end portion 32, the flanges 35 will therefore embrace the end portion 32. The brake head is not moved so far outwardly along the brake beam but that the inner edges of the flanges 35 will just clear the stop shoulders 29a when the brake head is pushed home transversely of said stops, to its ultimately required position an the end portion 32, and then the holes in the flanges easily may be registered with the rivet hole in the end portion 32 to receive a rivet.

On the other hand, when a brake head is to be removed, on first taking out its fastening to the brake beam, the brake head is slid outwardly transversely of the end portion 32 to such position that the rear ends of the flanges 35 will clear the stops 29a when the brake head is slid inwardly along the adjacent end portion of the tension member 30 and can be easily removed therefrom. Such arrangement is very desirable, because in the preferred form of the invention it is aimed to guide the brake beam on the opposite side frames of a car truck, and in such case the brake head cannot be removed transversely in a direction outwardly from the end of the beam. To permit removal of a brake in this manner it is usually necessary to first remove the brake shoe, and then the flange of the adjacent car wheel will not interfere with the removal of the brake head in such manner.

Referring to Figs. 6, 8 and 9 a suitable con-

struction of strut 46 is illustrated, which when forced into place in the position shown in Fig. 6, it will be seen that the power exerted upon the strut to position it will also camber the compression member 28, 29, which as shown in Fig. 3 has not yet been cambered. In its preferred construction the strut 46 is as illustrated and now to be described. The strut is preferably made of a malleable casting or forging having a major member or longitudinal body portion 47 formed with a hollow portion or housing 48 providing a longitudinal slot which slot has a closed bottom 49 extending preferably part way of the length thereof as disclosed in my said prior application. The body portion 47 of the strut is formed at one end with a longitudinally extending cylindrical end portion 50 which is preferably hollow. The hollow cylindrical portion 50 is preferably interiorly reinforced by longitudinal ribs 51 as shown in Fig. 9. These ribs extend from end to end of the hollow and at the inner end of the latter an opening 52 is provided for the sand core in casting, the same being surrounded by an end wall 53. At the outer end of the hollow end portion 50 the same is closed by an inwardly curved closure portion 54 which is so shaped that it can properly engage with the inner surface of the elbow 31 of the tension member 30. At the adjoining end of the cylindrical portion 50 a pair of spaced apart tongues 55 are provided, which may be bent over upon the tension member as shown in full lines in Fig. 8.

Formed integrally with the major or body member 47 of the strut is a jaw 56, which is set back with reference to the longitudinal axis of member 47 and the inner surface of which lies substantially at such axis, such jaw 56 having a recess 57 facing inwardly. To cooperate with the jaw 56 there is provided a minor member 58 having its recess 59 facing the recess 57 of the main jaw. Member 58 longitudinally of the strut is preferably located wholly beyond the housing 48, and the lower surface of its base portion 60 is preferably flat to extend transversely of the longitudinal axis of the strut. The inner edge of the base portion 60 is formed with an inwardly projecting shoulder 61 extending from side to side of the strut and above the shoulder 61 the member 57 is formed with a recess 62 extending from side to side thereof. Above the shoulder or rib 61 the major member 47 is formed with a shoulder or rib 63 adapted to be registered in the recess 62, for the purpose of ultimately forming an interlocking connection between member 58 and member 47. Below the base portion 60 of the smaller member, the member 47 is preferably formed with a shoulder 64 and also flat so that the base portion 60 may rest snugly upon the shoulder 64, the jaw 56 being set back to allow for the formation of the shoulder 64. It will be seen that when the member 58 is in proper cooperative position with respect to the main jaw 56, that the meeting surfaces thereof will be in snug contact so as to form a suitable recess between the two jaws.

When the strut is positioned upon the beam, the two members 47 and 58 are rigidly connected together by a rivet 66, preferably located above the inter-engaging shoulders 62, 63. Referring to Fig. 10, the housing 48 is adapted to receive a brake lever 67, shown in broken lines, so that the bottom closure 49 of the housing will be located below the lever so as to prevent the same from falling down through the strut. A pivot pin 68 passes transversely through the housing in an opening lined by bushings 65 and also through the end of the brake lever 67, it usually being held in position by a cotter pin 69.

The elements of the brake beam, with the exception of the strut, having preferably been formed as described, the beam is now ready to receive the strut. The strut will be inserted between the tension and compression members so that the jaws 56, 58 will be engaged over the compression member and the tongues 55 engaged with the bend 31 of the tension member. As the strut is preferably applied when it is substantially in its ultimate position it is necessary to employ suitable power to force it into its ultimate position and to thereby impart the desired camber to the compression member. If necessary the heading up of the rivet pin 66 may be now completed, whereby to rigidly combine the strut with the beam.

A modified construction of brake head is illustrated in Figs. 15, 16, 17 and 18. In this construction the brake head has a pair of parallel back flanges 70 located at the mid-length of the head and spaced apart to receive the ends of the brake beam. Each of these flanges is provided with a pair of holes 71 and 71*a*, the holes of each pair being in offset or staggered relation, the one to the other, for the purpose to be explained. Between the holes 71, 71*a* are located bracket-like back ribs or reinforcements 72 which extend from the flanges 70 to corresponding ends of each head, and each head is preferably cast of an integral piece of suitable metal. These bracket-like ribs 72 therefore preferably extend in a plane which bisects the back of the head.

The back portion 73 of the key-way is really that portion of the head which merges into the back ribs 72, and the key-way 74 is in front thereof extending in the usual manner from end to end of the head. At the front of the head there are brake head lugs 75 between which the shoe lugs may be inserted to connect the shoe with the head when the same are keyed together. Extending from each brake head lug 75 to the corresponding end of the head there are solid flanking side portions 76 at the front of the head which define the width of the key-way, similarly to the head previously described. The flanking side portions 76 on each end of the head are connected by a transverse bridge 77 which defines an opening 78 at the face of the head. As is the case with the brake head previously described the face of the modified head is inclined laterally inwardly from side to side of the head, as illustrated in Fig. 18.

As shown more clearly in Figs. 6 and 7, the modified construction of the head is supported on each end of the brake beam by means of suitable fastenings 79. These fastenings may reside in rivets which secure the heads rigidly to the brake beam, but it is preferred that they be in the shape of strong screw studs with square heads at one end for receiving a wrench, while the other end of each of the studs is screw threaded so as to screw into threaded holes 71 or 71*a*, as the case may be, located at that end of the stud or pin. To prevent each screw stud from turning after it has once been screwed home, suitable means may be employed as will be obvious to those skilled in the art. In so mounting each head upon the beam, the screw studs 79 are to pass through the holes 80 in the end of the beam, which are offset or staggered to correspond with the offsetting of the holes 71, 71*a* in the flanges of the head.

The object of preferably staggering or offsetting the stud holes in the head and in the corresponding end of the beam is to render the head fool-proof against being placed in the wrong position on that end of the beam which is to receive it, inasmuch as preferably the face of the head is inclined, as previously described, and the inclinations of the faces of the head at opposite ends of the beam should incline towards each other, to correspond with the coning of the car wheels. In other words, if a repair man should not set the heads on the beam in the required way, he will know that from the fact that then the screw studs cannot be passed by him through the holes in the end of the beam, but when the holes are in registration he will know that each head is in proper position with its face inclined inwardly.

It will therefore be seen that with the modified construction of brake heads and where the brake beam is provided with holes to correspond with the holes in the brake heads, means on each head are provided for indicating the particular end of the beam on which such end is to be mounted, while the beam has at its opposite ends means for respectively indicating the particular position of the brake head to be mounted on the beam end corresponding therewith.

The flanges 29 of the compression member of the beam provide stops or shoulders 29a (Fig. 7) at both ends thereof, which are located at the inner limits of the end portions 27 of the beam. When brake heads are properly fitted onto the ends of the beam, the stops define the ultimate inward positions which the brake heads are to have upon the beam and locate the brake heads quite definitely with respect to the staggered holes or indicating means of the beam, thereby facilitating the proper mounting of brake heads upon the beam.

Obviously the invention is susceptible to more or less modification without departing from the scope of the appended claims.

What I claim as new is—

1. A trussed brake beam with end portions each consisting of a solid mass of metal integral with and uniting the compression and tension members between the end portions and having substantially parallel upper and lower surfaces adapted for the mounting of brake heads thereupon, and which are continuous across the end portions, such portions having relatively large dimensions extending in the plane of the compression and tension members.

2. A trussed metallic brake beam with end portions for the compression and tension members thereof and having substantially parallel upper and lower surfaces adapted for the mounting of brake heads thereupon, the thickness of each entire end portion being less than the depth of the compression member of the beam, the ends of the tension member being substantially the thickness of each end portion, and the upper and lower surfaces thereof and of the end portions merging in substantially parallel planes, thereby adapting the beam for permitting the removal of each brake head inwardly along the adjacent end of the tension member.

3. A trussed metallic brake beam with end portions for the compression and tension members thereof and having substantially parallel upper and lower surfaces adapted for the mounting of brake heads thereupon, the end portions lying breadthwise in the horizontal plane of the tension member, and the end portions being extended substantially in line with the compression member and beyond the points of location of the heads to provide guiding extensions for the beam.

4. A trussed metallic brake beam with end portions integral with the compression and tension members thereof and having substantially parallel upper and lower surfaces adapted for the mounting of brake heads thereupon, such portions having relatively large dimensions extending in the plane of the compression and tension members, the width of each end portion being greater than the corresponding thickness of either the tension or compression member and the entire thickness of each end portion being less than the depth of the compression and substantially the same thickness as the tension member.

5. A one piece trussed brake beam with brake head receiving end portions integral with and extending longitudinally from the beam, at the integrally united ends of the compression and tension members thereof, the compression member having upper and lower, longitudinal, substantially vertical, flanges or webs and such end portions being of less vertical thickness than the distance between the upper and lower edges of the flanges or webs.

6. A trussed metallic brake beam with end portions having substantially parallel upper and lower surfaces of relatively large dimensions adapted to receive brake heads thereon, the surfaces extending in the plane of the compression and tension members, and the upper and lower surfaces of the ends of the tension member being continuations of such surfaces of the end portions and in the same planes, and such continuous upper and lower surfaces being so spaced apart vertically as to permit a brake head to be slid outwardly upon either of said ends of the tension member onto the adjacent end portion to its ultimate position for use or to be slid inwardly upon such end portion onto such end of the tension member in removing the brake head.

7. A brake-beam having indicating means at each end for defining given positions of brake heads thereon, and the ends of the beam extended beyond such given positions to adapt the beam for guidance upon the side frames of a car truck.

8. A brake-beam having hard metal surface coverings applied to both ends and shoulders adjacent the inner ends of the coverings.

9. A brake-beam adapted for the mounting of brake-shoe heads on the opposite ends, the ends having stops and also indicating means outwardly beyond the stops for assuring the mounting of each head in a given position only on its own beam end, the stops limiting the heads to such position and each stop projecting from the corresponding end in a direction away from the plane in which the beam is to operate.

10. A trussed metallic brake beam having a length sufficient to adapt it to be guided at its terminals upon opposite side frames of a car truck, the guiding terminals being flat in the operating plane of the beam, and the end surfaces of the terminals being on arcs lengthwise of said surfaces to enable the beam to move freely on such side frames.

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