(57) Abrégé/Abstract:
A brake beam assembly containing a compression member, a tension member, a strut connected to the tension member and the compression member, and two brake heads with recesses. The ends of the compression member and the tension member are disposed within the recesses of the brake heads together with two fasteners per recess; each of the fasteners is substantially perpendicular to the tension and compression members; and no other structural elements are present in the recesses.
Abstract of the disclosure

A brake beam assembly containing a compression member, a tension member, a strut connected to the tension member and the compression member, and two brake heads with recesses. The ends of the compression member and the tension member are disposed within the recesses of the brake heads together with two fasteners per recess; each of the fasteners is substantially perpendicular to the tension and compression members; and no other structural elements are present in the recesses.
IMPROVED BRAKE BEAM

Field of the invention

A brake beam for use on railroad car trucks.

Background of the invention

Brake beams are well known to those in the art and have been used with railroad car trucks for at least ninety years.

The prior art does not provide a brake beam structure which is relatively light weight and, also, has relatively high static strength and fatigue resistance properties. It is an object of this invention to provide a structure with these properties and, additionally, having the properties of being substantially more durable and less likely to self-destruct during use.

Summary of the invention

A multi-piece brake beam assembly comprised of a rectilinear compression member, a rectilinear tension member, strut means for connecting the tension member and the compression member, a brake head with a recess adapted so that the tension member and the compression member may be partially located therein, and first and second fastening means for fastening the tension member, the compression member, and the brake head.

Although the preferred embodiment of this invention is illustrated with regard to a hangerless brake beam, the invention is equally applicable to a hanger type brake beam.

According to an aspect of the invention, a brake beam assembly comprised of a compression member with a first end and a second end, a tension member with a third end and a fourth end, a strut connected to the tension member and the compression member, a first brake head with a first recess, and a second brake head with a second recess, wherein:

(a) the first end and the second end of the compression member and the third end and the fourth end of the tension member are each comprised of a first hole and a second hole extending completely through each said end;
(b) the first end of the compression member and the third end of the tension member are disposed within the first recess, and the second end of the compression member and the fourth end of the tension member are disposed within the second recess;

(c) disposed within each of the first hole is a first fastener, and disposed within each of the second hole is a second fastener, wherein each of the first fastener and the second fastener is disposed substantially perpendicularly to the compression member and the tension member;

(d) disposed within the first recess is the third end of the tension member, the first end of the compression member, a first fastener and a second fastener;

(e) disposed within the second recess is the fourth end of the tension member, the second end of the compression member, a first fastener and a second fastener;

(f) the compression member comprises a first end surface and a second end surface;

(g) the brake beam assembly is comprised of a first brake head and a second brake head;

(h) the first brake head is contiguous with the first end surface of the compression member; and

(i) the second brake head is contiguous with the second end surface of the compression member.

**Brief description of the drawings**

The present invention will be more fully understood by reference to the following detailed description thereof, wherein like reference numerals refer to like elements, and wherein:

Figure 1 is first perspective view of one preferred embodiment of the brake beam of this invention.

Figure 2 is a plan view of the brake beam unit of Figure 1.

Figures 3 and 4 are plan and side views, respectively, of tension member 12.
Figures 5, 6, and 7 are plan, front, and side views, respectively, of compression member 14.

Figures 8 and 9 are side and top views, respectively, of brake head 18.

Figure 10 is a perspective view of a brake beam strut.

Figure 11 is a plan view of the brake beam strut 16 disposed within the tension member 12.

Description of the preferred embodiments

Figure 1 is a perspective view of the brake beam unit 10 of this invention, which is comprised of a rectilinear tension member 12, a rectilinear compression member 14, strut 16 joining members 12 and 14, brake heads 18 and 20 with recesses (not shown) within which members 12 and 14 partially nest, fasteners 22 and 24 which connect brake heads 18 and 20 to members 12 and 14, and a fastener 26 (not clearly shown in Figure 1) connecting strut 16 to compression member 14.

Figure 2 is a plan view of the brake beam unit 10. In this embodiment, the unit has only two fasteners 23 per end.

Figure 3 is a plan view of tension member 12. In addition to having a constant width 96, tension member 12 preferably is comprised of parallel walls 107 and 109, and 111 and 113 which, when they extend past arcuate section 112 on either side, are substantially straight, without any bends.

Figure 4 is a side view of tension member 12. In the embodiment depicted in Figures 3 and 4, tension member 12 has a substantially "flat" cross-sectional shape. Upper surface 92 and lower surface 94 are substantially parallel to each other, thereby producing the desired flat structure 12 which consequently can be within the recess (not shown) in brake head 18 and/or 20.

Walls 107 and 111 are cut to form notched sections 114 and 116. Tension member 12 is preferably symmetrical around its midpoint 102, distance 102 is preferably at one-half of distance 100; and it is comprised of legs 108 and 110 which are integrally
connected to each other through arcuate section 112.

Figure 5 is a plan view of compression member 14, which is preferably comprised of legs 126 and 128 (see Figure 7) which extend through substantially its entire length 130. Legs 126 and 128 (see Figure 7) form a substantially ninety degree angle between them. Referring again to Figure 5, compression member 14 is preferably symmetrical around its midpoint 135, distance 133 is preferably at one-half of distance 130. Compression member 14 is comprised of end sections 132 and 134 which are partially disposed within a recess (not shown) in each of brake heads 18 and 20 (see Figure 1). Referring to Figure 6, the end sections 132 and 134 preferably contain flat, substantially parallel surfaces 136, 138 and 140, 142 which are adapted to fit within such recess (not shown). In the embodiment depicted, end compression member 14 is comprised of a first section 146 and a second section 148. The base leg 152 of section 146 is not coplanar with the base 154 leg of section 148.

Referring to Figure 5, compression member 14 is preferably offset in two different directions which are orthogonal to each other. Compression member 14 is comprised of upright leg 156 and upright leg 158, which are not coplanar with each other. Leg 158 has an offset (camber) 160 from leg 156.

Each of sections 146 and 148 are comprised of end walls 168 and 166 which are adapted to be substantially contiguous with corresponding surfaces (not shown) of brake heads 18 and 20.

Figures 8 and 9 are side and top views, respectively, of brake head 18. Brake head 18 (and brake head 20) is comprised of a recess defined by flat, parallel, inner surfaces 176 and 178 (Figure 8). Referring to Figure 9, tension member 12 is comprised of linear surface 113 which, in part, abuts a portion of arcuate surface 180. Because of the curved nature of surface 180, varying the length of distance 72 of assembly 10 while keeping distance 88 constant (see Figure 2) will allow surface 180 to compensate for such variation and to maintain substantially broad contact between
it linear surface 113. Surface 180 is also comprised of arc 182 which, when the assembly 10 under loaded conditions deflects, compensates for such deflection.

Referring to Figures 8 and 9, brake head 18 is comprised of inner surface 184 which is adapted to receive surface 168 of compression member 14.

It will be seen from Figure 9 that fasteners 22 which secure tension member 12 to brake head 20 are not colinear. Three fasteners 22 are used in this assembly, although four or more fasteners also may be used. A welded joint (not shown) also may be used.

Without wishing to be bound to any particular theory, applicants believe that, under load, area 190 of compression member 14 makes contact with the underside of area 192 of tension member 12. Because of the nesting arrangement of members 12 and 14, this movement is limited.

Figure 10 is a perspective view of strut 16 which is preferably comprised of slots 234, 236, 238, and 240, which are adapted to engage the tension member 12 (see Figure 2). It will also be seen that strut 16 is comprised of tail support 242 comprising legs 244 and 246 which are adapted to engage compression member 14 (see Figure 2). Strut pin hole 80 is adapted to receive a bushing (not shown). Figure 10 also illustrates the relative positions of slot pairs 234/238 and 236/240 and legs 244 and 246.

Figure 11 is a plan view of strut 16 engaging tension member 12. In the embodiment depicted, the perimeter 250 of strut 16 intersects tension member 12 at tangent points 252 and 254, thus providing a substantial amount of stability and self-centering. Contact surfaces 256, 258, 260, and 262 help provide such stability. Contact surfaces 256 and 258 each have a pitch which is smaller than the pitch of contact surfaces 260 and 262, thereby insuring contact at points 252 and 254. As the assembly is loaded, contact will be made at the desired contact surfaces 256, 258, 260, and 262.
We claim:

1. A brake beam assembly comprised of a compression member with a first end and a second end, a tension member with a third end and a fourth end, a strut connected to said tension member and said compression member, a first brake head with a first recess, and a second brake head with a second recess, wherein:

   (a) said first end and said second end of said compression member and said third end and said fourth end of said tension member are each comprised of a first hole and a second hole extending completely through each said end;

   (b) said first end of said compression member and said third end of said tension member are disposed within said first recess, and said second end of said compression member and said fourth end of said tension member are disposed within said second recess;

   (c) disposed within each of said first hole is a first fastener, and disposed within each of said second hole is a second fastener, wherein each of said first fastener and said second fastener is disposed substantially perpendicularly to said compression member and said tension member;

   (d) disposed within said first recess is said third end of said tension member, said first end of said compression member, a first fastener and a second fastener;

   (e) disposed within said second recess is said fourth end of said tension member, said second end of said compression member, a first fastener and a second fastener;

   (f) said compression member comprises a first end surface and a second end surface;

   (g) said brake beam assembly is comprised of a first brake head and a second brake head;

   (h) said first brake head is contiguous with said first end surface of said compression member; and

   (i) said second brake head is contiguous with said second end surface of said compression member.
2. The brake beam assembly as recited in claim 1, wherein said tension member is comprised of a first parallel wall and a second parallel wall which extend from a middle section to a first end section and a second end section, provided that, when said first parallel wall and said second parallel wall extend past said section towards said first end section and said second end section, said first parallel wall and said second parallel wall are substantially straight without any bends.

3. The brake beam assembly as recited in claim 1, wherein said assembly is comprised of a first brake head and a second brake head, each of which is under stress.

4. The brake assembly as recited in claim 1, wherein said strut is contiguous with said tension member at a first point and a second point, and wherein said strut is contiguous with said compression member at a third point.

5. The brake assembly as recited in claim 2, wherein (a) said strut is contiguous with said tension member at a first point and a second point, (b) said strut is contiguous with said compression member at a third point, and (c) said first point and said second point are each located beyond said middle section and on a substantially straight section.