The present invention is a continuation in part of my application Serial No. 668,469, filed April 19, 1946, entitled Brake-beams.

The invention relates to improvements in wedge-lock brake-beams and more specifically to a truss type of beam comprising in combination brake-heads of novel design mounted on opposite ends of a connecting compression member, an interposed strut, and a tension rod of non-circular cross section passing over said strut and rigidly engaging the brake-heads through wedge members of unique design readily insertable in said heads.

A general object of the invention is to provide for a truss type of brake-beam which may be readily assembled or disassembled, and at the same time be capable of resisting the distortive tendency incident to the added burden of present day increased mileage, heavier rolling stock and longer trains.

While several features of the above described general objective are obtained in my previously mentioned co-pending application, the present invention comprehends an improved method over the former in dual wedge application and construction, resulting in a more rapid assembly being possible, and a greater balance in stress-compression effect.

A prime object of the present invention is to provide for development of a unique lock or freeze between the compression member, tension member and the dual wedges in their contact area in the brake-heads.

An object corollary to the foregoing is to attain, through such improved lock means, a frozen assembly substantially integral in effect, whereby all members are fortified under extreme load and the life of said beam, and its capacity for heavy duty and resistance to fatigue increased per unit weight of metal employed.

Another object of the invention is to provide for locking the assembly without the need of riveting said dual wedges, and conversely obviating the necessity of cutting off and driving out wedge rivets if it is required to disassemble the beam.

An important object of the invention is to provide for the construction of the brake-heads in reversible form; i.e., so that a head may be mounted on either end of the beam, special right and left heads being thus not required.

A further object of the invention is to provide a truss construction in which the tension member, of non-circular cross section and unflexed at each end, is upset adjacent to and at each end to form non-rotatable, dual compression contact surfaces with said insertable wedges; such construction, plus likewise non-rotatable, lateral surface engagement between said wedges and said tension member, ensuring the optimum in prevention of torsional distortion of the latter. It will be further noted, that in the stress developed between the tension member and the compression member on whose ends the brake-heads are mounted, the two compression contact surfaces per tension rod leg afford double protection against pulling out of said tension member should an outer upset head fail and/or an outer wedge surface collapse.

The tendency of round tension rods to twist with accompanying misalignment of brake-heads and shoes, to say nothing of the danger of fracture, also shared by tension members of non-circular cross section with flexed ends, is completely avoided in the present invention.

The above described improvements and others not heretofore mentioned will be more clearly understood by reference to the accompanying drawings, wherein like parts are numbered the same throughout and where:

Fig. 1 is a vertical elevation taken in a plane at right angles to the car wheel axle applying to either near or far side and depicts a complete brake-head with conventional face for brake-shoe insertion, but adapted for use with the compression, tension and wedge members as subsequently described.

Fig. 2 is a fragmentary cross section along the line IX—I of Fig. 1 showing in addition, tension, compression and wedge-lock members; while Fig. 3 is a vertical sectional view along the line III—III of Fig. 2.

Fig. 4 is a top view of the filler-wedge used between the compression and tension members; Fig. 5 a side view of such wedge along the line V-V; and Fig. 6 an end view along the line VI—VI of Fig. 5.

Fig. 7 is a top view of the key-wedge used in front of the compression member; Fig. 8 a side view of Fig. 7 along the line VIII—VIII; and Fig. 9 an end view along the line IX—IX of Fig. 8.

Fig. 10 is an assembly of the entire beam; Fig. 11 a fragmentary detail of strut §4 along the line XI—XI of Fig. 10, showing strut lock; and Fig. 12 a top view of the strut lock taken along offset line XII—XII of Fig. 11.

Referring to the drawings and particularly to Figs. 1 and 2, where in the latter the conventional portion of the complete brake-head is not shown for the sake of clarity, it will be noted
the compression member engaging portion 31, hereinafter designated as the brake-head, has no end walls; such omission admitting of right or left hand beam mounting.

Referring specifically to Fig. 2, the surfaces 32 and 33 of the inner back wall of the brake-head are shown of equal length and conversely inclined from the center line S. S. of said head. The degree of inclination corresponds to the angle of camber of the compression (beam) member; the conversely inclined surface feature allowing the same angular relationship between brake-head and beam whether right or left side mounted, thus eliminating the necessity of right and left brake-heads. The inclined surfaces 34 and 35 are similarly developed on the inner front wall of the brake-head, 34 being parallel to 32, and 35 to 33; such V-shaped opposed surfaces being instrumental in forming the wedge-lock or freeze as subsequently described.

The tension member 36 is upset both at the end and adjacent thereon, respectively forming the head 38 and enlarged portion 37. The latter is equally developed about its axis 37' to engage the parallel surfaces 40, 41 and 42 of the filler-wedge 39, also the corresponding surfaces 50, 51 and 52 of the key-wedge 53; such construction affording at 41 and 51, also at 52 the previously mentioned compression contact surfaces and increasing the safety factor over the single upset head 38 described in my aforesaid co-pending application.

The inclined upper surface 43 of the filler-wedge 39 parallels the angle of camber and mates the inner surface of the compression member, herein shown as a channel 43'; it being understood such channel is but one embodiment of a compression member that could be used in such construction. Surfaces 44 and 45 of the wedge mate the inner surface of each leg of the channel, and surfaces 46 and 47, the respective abutting surfaces of the tension member 37, herein depicted (Fig. 3) as of polygonal cross section to prevent torque thereof; it being further understood that any convenient shape of non-circular cross section, such as a rectangle or ellipse, would be admissible.

Referring to the detailed drawings of the filler-wedge, i. e., Figs. 4, 5, 6, and 7, it will be noted the right end of such wedge terminates in an enlarged shoulder, the latter including two abutting surfaces 48 for each leg and one contact surface 49 for the web end of channel 43'; these three surfaces being at 90° to angle of camber. Surface 50, also a part of said enlarged shoulder, is parallel with and abuts inclined surface 33 of back wall of brake-head when final lock or freeze of parts is effected. The surface 51 of filler-wedge, herein shown as a section of a cylinder whose axis lies in the extension plane of axis 37', obtains on completion of said freeze in compressive contact with the similarly developed cylindrical surface of the tension member upset head 38. To avoid fouling of the thus created joint by any flash or pin resulting from upsetting of the tension member, surface 51 is slightly relieved at 52. A key way is provided at 53, the same extending through each side wall 54. The filler-wedge, one of the initially mentioned dual wedge-lock members, providing as it does both the compression freeze close fitting contact surfaces with inside and end of compression member, back wall of brake-head, one face, inclined edges and cylindrical face of tension member, is an important element in maintaining the rigid and integral effect of the final assembly.

Another equally important member of the dual wedge-lock combination is the key-wedge 55 whose contacting surfaces 56, 57 and 58 with a part of the upset portion of the tension member have already been mentioned. Such wedge, detailed in Figs. 7, 8, and 9, has an overhanging lip 58' spanning the front half of the reduced sectional area of the tension member is thereby formed; its thickness 41' of the filler-wedge the back half; they together forming the additional previously mentioned safety factor against failure of head of said tension member. Surface 56 of key-wedge is parallel to the axis 37' of the tension member, while surfaces 60 and 61 are respectively parallel to surfaces 33 and 32 of the brake-head when assembly is effected as shown in Fig. 2; it being noted that surface 62 will be parallel to axis 37' and surfaces 65 and 61 respectively parallel to surfaces 33 and 32 of the brake-head as when assembly is effected at the other end of the beam. When the key-wedge is forced into final position, surfaces 56, 58, 60, 61 and 62 mate corresponding surfaces in front wall of brake-head, while the cylindrical surface 53 forms a part of the pressure contact surfaces 50 and 52 of the cylindrical face of the surface of the upset head of the tension member; it being understood that in lieu of the herein depicted cylindrical pressure contact surfaces 51, 53 and the correspondingly developed surface of the enlarged heads 38, that spherical contact surfaces could be employed as recited in my co-pending application for Patent Serial No. 668,489, filed April 19, 1946.

While the novelty of fit of the above described parts is an entirely new conception in brake-beam art; such fit and function of the parts is only part of the benefits obtained. Thus, in the general present day established practice of brake-beam assembly, the brake-heads are seated at the ends of the compression (channel) member at 90° to angle of camber, a manifestly objectionable method since the brake-heads then obtain at an oblique angle; such condition causing a two directional fault, since the bottom half of brake-head is normally set forward 13° as shown in Fig. 1. In the present invention such undesirable objection is overcome by the positioning of the brake-heads at an obtuse angle with respect to line of camber through the instrumentality of the filler-wedge, thus correcting harmful stress.

In assembly of the brake-beam, the strut 64 is secured to beam (channel) 43 as shown in Fig. 10. Camber is forced in such channel and the tension member 37 placed across the bottom of the recessed strut shelf 9, the strut lock 13, detailed in Figs. 11 and 12, and shown in my before mentioned co-pending application having been previously removed. The filler-wedge is next inserted between the channel and tension member legs, followed by passing the brake-heads over the latter and advancing on channel ends until the outer edges of said heads clear key-way openings 53 in the filler-wedges. The key-wedges are then inserted in the brake-heads until key-way opening 58' coincides with key-way 53; it being understood, if any difficulty is encountered in insertion of these wedges, the distance between brake-head and upset head of the tension member may be momentarily increased by temporarily springing the channel in additional camber. With the wedges once inserted, the tension member is forced to the top of the recessed strut shelf 9', the strut lock 13 applied and either
riveted in position as shown in Fig. 11, or otherwise secured according to well known means. Pressure on channel is then released and in consequence compression and tension are applied to the two wedges. The channel pressure on filler wedges is exerted away from the strut, while tension is developed in both legs of the tension member; the results being that when motion has ceased, the channel is wedge-locked or frozen to the brake-head, the filler wedges both to channel and back side of tension member, the key-wedges to the front side of tension member, and the up-set tension member heads to both filler and key-wedges. Such assembly, being bonded under pressure, is practically equivalent to an integral construction that strengthens all members under heavy duty, removes vibration, lessens fatigue, reduces undesirable stress and generally prolongs the life of the beam. As a further factor of safety a key is driven home through key-ways §3 and §5; it being understood a taper pin, cotter key, bolt, screw or rivet could be substituted instead.

What is to be noted is that the wedge-lock or freeze feature is particularly effective since the expansion depth of wedges is substantially equal to half their total travel, such relation of movement spelling for flexibility of assembly within strut lock restrictions. My wedge-lock further obviates drilling either channel or tension rod and thus ensures their original strength, while the reversibility of brake-heads and/or wedges reduces the number of different parts required and generally simplifies assembly.

While the brake-heads and wedges herein illustrated are adapted to present-day practice in regard to channel angularity due to present conventional strut length, it is to be understood my invention is not limited to such particular angularity, but is adaptable to any convenient divergence therefrom. Where shoe accommodation of head to wheel is required, same may be incorporated in shoe contour portion of brake-head without disturbing the automatic alignment herein described. If wheel thread to shoe angularity is built integrally into shoe contour portion of head, then separate right and left brake-heads will be required without, however, departing from the wedge-lock or freeze features herein described.

What I claim as new and desire to protect by Letters Patent is:

1. In a truss type brake-beam comprising a webbed shaped compression member of predetermined camber and brake-heads mounted thereon: a brake-head having an integral tubular member adapted to embrace either end of said compression member, the back and front sides of said tubular member each being formed of two contiguous surfaces whose planes are conversely disposed in an obtuse angle equal to angle of said camber and whose diagonally opposed surfaces are parallel; and the near back wall, and ctitversely the far back wall surface of said brake-heads respectively mating the upper web surface of said channel with near and far mounting thereon by said brake-heads.

2. In a truss type brake-beam comprising a channel having a webbed integral compression member and brake-heads mounted thereon: a brake-head having an integral tubular member adapted to embrace either end of said channel, the back and front sides of said tubular member each being formed of two contiguous surfaces whose planes are conversely disposed in an obtuse angle equal to angle of said camber and whose diagonally opposed surfaces
sion member and in engagement with said seating surfaces thereof, each key wedge-lock and each filler wedge-lock also respectively engaging said inner front walls and one of said inner back walls of a brake-head, and each filler wedge-lock additionally engaging the web and an end face of said channel; and the tension member exerting such compressive force transmitted through its said compression seating surfaces to correspondingly developed surfaces in the filler and key wedge-locks as to force said wedge-locks, said tension member, said channel and said brake-heads into an essentially integral brake-beam of the truss type aforesaid.

6. A truss type of brake-beam comprising: a channel of predetermined camber and a strut mounted thereon; reversible brake-heads having conversely inclined inner front walls and transversely parallel thereto inner back walls, a brake-head engaging through contact of one of its said inner back walls each end of said channel at an obtuse angle to the line of camber of such channel; a tension member of polygonal cross-section having a major and minor noncircular axis flexed over said strut with said major cross-sectional axis parallel to the web of said channel and a strut lock securing such tension member at its line of flexure to said strut, the tension member extending unflexed from said strut respectively through and of upset thickness within each brake-head with each upset portion terminating in an additionally enlarged head having a compression seating surface, and each said upset portion having both a compression and a lateral seating surface; a filler wedge-lock and a key wedge-lock inserted within each brake-head respectively juxtaposed said upset portion of the tension member and engaging said seating surfaces thereof, each key-wedge-lock also engaging said inner front walls and each filler wedge-lock one of said inner back walls of a respective brake-head, and each filler wedge-lock additionally engaging the web and an end face of said channel; and the tension member exerting such compressive force transmitted through its said compression seating surfaces to correspondingly developed surfaces in the filler and key wedge-locks as to compress said wedge-locks, said tension member, said channel and said brake-heads into an essentially integral brake-beam of the truss type aforesaid.

7. A truss type of brake-beam according to claim 6 with the additional feature of the said compression seating surface of the enlarged head of the tension member and the said correspondingly developed surfaces of the respective wedge-lock members obtaining as coincident cylindrical sections.

8. A truss type of brake-beam according to claim 6 with the additional feature of the said compression seating surface of the enlarged head of the tension member and the said correspondingly developed surfaces of the respective wedge-lock members obtaining as coincident spheroidal sections.

9. In a truss type of brake-beam wherein a brake-head having conversely inclined respective inner front and inner back walls engages with one of said inner back walls each end of a compression member on which is mounted a strut, and wherein a tension member of noncircular cross-section and flexed over said strut extends through and obtains of upset thickness within each brake-head with each end of each tension member terminating in an enlarged head: dual wedge-locks within each brake-head engaged by a respective said enlarged head of the tension member; one of said wedge-locks being additionally in engagement with said compression member, one of said inner back walls of said brake-head and with said tension member; and the other of said wedge-locks being additionally in engagement with said tension member and with said inner front walls of said brake-head.

10. In a truss type of brake-beam wherein a reversible brake-beam having conversely inclined respective inner front and inner back walls engages with one of said inner back walls each end of a cambered compression member and flexed over said strut extends respectively through and of upset thickness within each brake-head with each portion of upset thickness terminating in an additionally enlarged head: a filler wedge-lock and a key wedge-lock within each brake-head engaged by a respective said enlarged head of the tension member and obtaining additional in engagement with said compression member, one of said inner back walls of said brake-head and said portion of upset thickness of the tension member; and said key wedge-lock being additionally in engagement with said portion of upset thickness of the tension member and with said inner front walls of said brake-head.

11. In a truss type of brake-beam wherein a brake-head having conversely inclined respective inner front and inner back walls engages with one of said inner back walls each end of a webbed compression member on which is mounted a strut, wherein a tension member of noncircular cross-section and flexed over said strut extends through and obtains of upset thickness within each brake-head with each such upset portion terminating in an additionally enlarged head, and wherein the base of each said upset portion and each said enlarged head are provided with a compression seating surface: a filler wedge-lock comprising two inclined walls obtaining at such angle and of such surface contour as to respectively mate the web of said compression member and substantially half of the surface of a said upset portion of the tension member; a lip projecting from the wall which mate the web and being engaged by the base of said upset portion; and an end wall into which the said two inclined walls integrally converge, with such end wall having internal surfaces obtaining at an obtuse angle and respectively engaging an end face of said compression member and one of said inclined inner back walls of a said brake-head, and an outer face engaged by the said compression seating surface of a said enlarged head.

12. In a truss type of brake-beam wherein a brake-head having conversely inclined respective inner front and inner back walls engages with one of such inner back walls each end of a webbed compression member on which is mounted a strut, wherein a tension member of noncircular cross-section and flexed over said strut extends through and obtains of upset thickness within each brake-head with each upset portion terminating in an additionally enlarged head, and wherein the base of each said upset portion and each said enlarged head are provided with a compression seating surface: a key wedge-lock comprising inclined walls obtaining at such angles and of such surface contour as to respectively
mate the said inclined inner front walls of a said brake-head and substantially one half of a said upset portion of the tension member; a lip projecting from the wall which mates a said upset portion and being engaged by the base of a said upset portion; and an end wall into which the inclined walls integrally unite with such end wall having an external face engaged by the said compression seating surface of a said enlarged head.

13. In a truss type of brake-beam wherein a brake-head having an integral tubular member with side walls and whose inner back and inner front walls are respectively conversely inclined with one of such inner back walls engaging each end of a webbed compression member on which is mounted a strut, and wherein a tension member of noncircular cross-section and flexed over said strut extends through and obtains of upset thickness within each brake-head with each upset portion terminating in an additionally enlarged head having a compression seating surface: a filler wedge-lock comprising two inclined walls laterally united by offset side walls are converging into an end shoulder wall integral therewith, the two inclined walls of said filler wedge-lock being of such angle and of such contour as to respectively mate together with said offset side walls the web of said compression member and a substantial part of said upset portion of said tension member, the said end shoulder wall being engaged by the said compression seating surface of a said enlarged head of the tension member; a key wedge-lock comprising inclined walls laterally united by offset side walls and integrally united with an end shoulder wall, one of such inclined walls being at such angle and two of such walls at such conversely inclined angles and such walls obtaining of such surface contour as to respectively mate together with said side walls of said key wedge-lock a substantial part of said upset portion of the tension member and said inclined inner front walls of a said brake-head, and the outer face of the shoulder end wall of said key-wedge-lock being engaged by the said compression seating surface of a said enlarged head of the tension member.

14. In a truss type of brake-beam according to claim 13, with the additional feature of the said side walls of a said brake-head and the said offset side walls of a said filler and key wedge-lock having a key slot therethrough so positioned and in such alignment that a key driven through such key slot engages said tension member.

15. A method of assembling a brake-beam in a wedge-lock freeze of members consisting of a compression member, a strut, brake-heads having an integral tubular member whose inner back and front walls are respectively conversely inclined, a tension member of noncircular cross-section centrally flexed at an obtuse angle with each end being of upset thickness and terminating in an additionally enlarged head having a compression seating surface, filler wedge-lock members adapted for insertion between said tension member and said front walls of said brake-heads, the said method comprising: centrally securing to said compression member said strut; forcing about said strut a predetermined camber in said compression member; centrally mounting at the bottom of a recessed shelf in said strut said tension member with each leg thereof extending unfixed from said strut and terminating with a said enlarged head adjacent each end of said compression member; inserting back of each of said enlarged heads and between said tension member and said compression member a said filler wedge-lock respectively mating adjacent surfaces of said compression and tension members; mounting on such thus assembled members on either end of said compression member one of said brake-heads and effecting mating of one of the inner back walls thereof with said compression member in a plane parallel to the angle of said camber and the other inner back wall of such brake-head engaging said filler wedge-lock at the converse angle of said camber; inserting under each said enlarged head of the tension member and between said tension member and said front inner walls of a said brake-head a key wedge-lock with such key wedge-lock respectively mating the adjacent surface and said compression seating surface of said tension member, and said inclined front walls surfaces of a said brake-head; forcing said tension member to the top of said recessed shelf in said strut, effecting through such thus attained compression of parts a wedge-lock frozen assembly of compression member, tension member, wedge-lock members and brake-heads essentially integral in effect, and locking said compression member in its top position to said strut.

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