No. 685,025. Patented Oct. 22, 1901.

J. N. BARR.

BRAKE BEAM.

(Application filed Nov. 22, 1897.)

(No Model.)

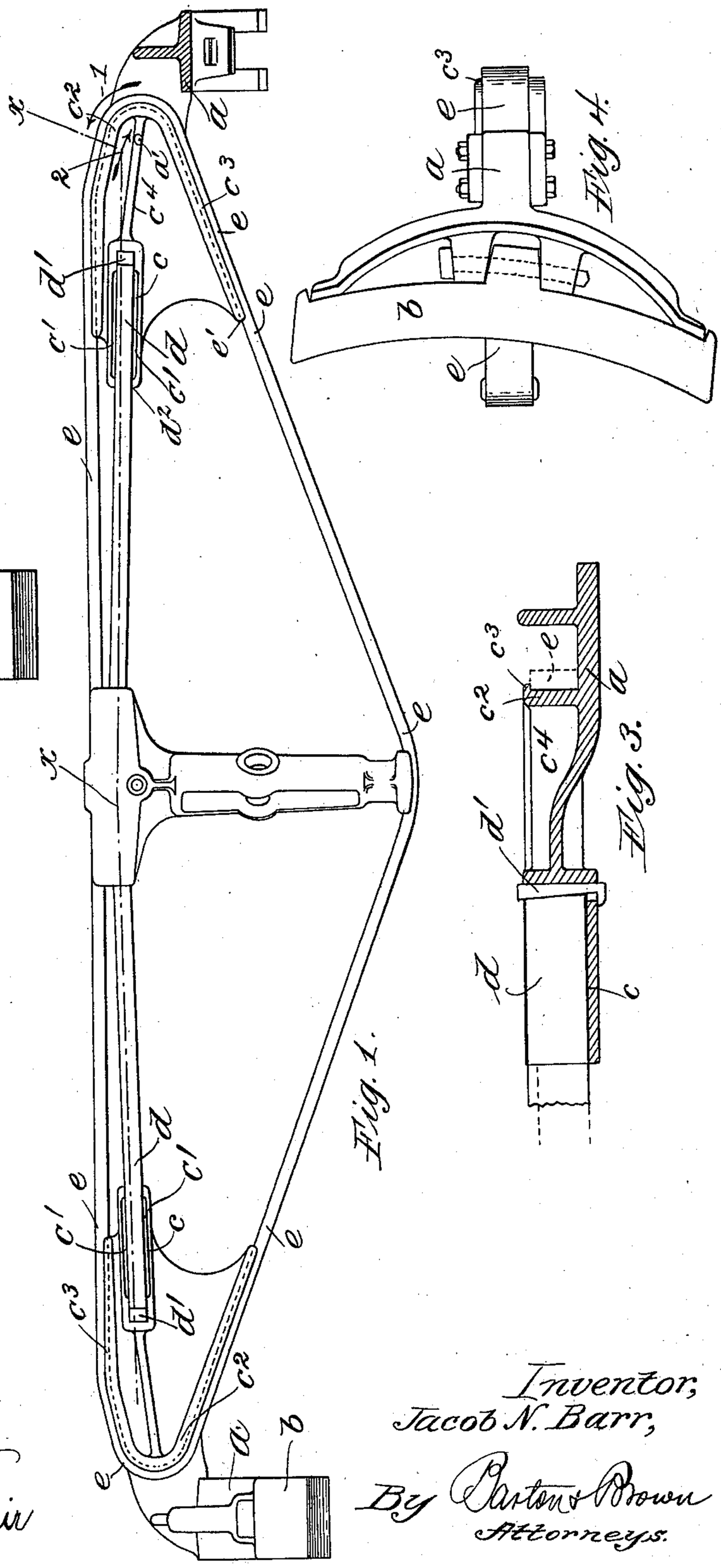

Fig. 1.

Fig. 4.

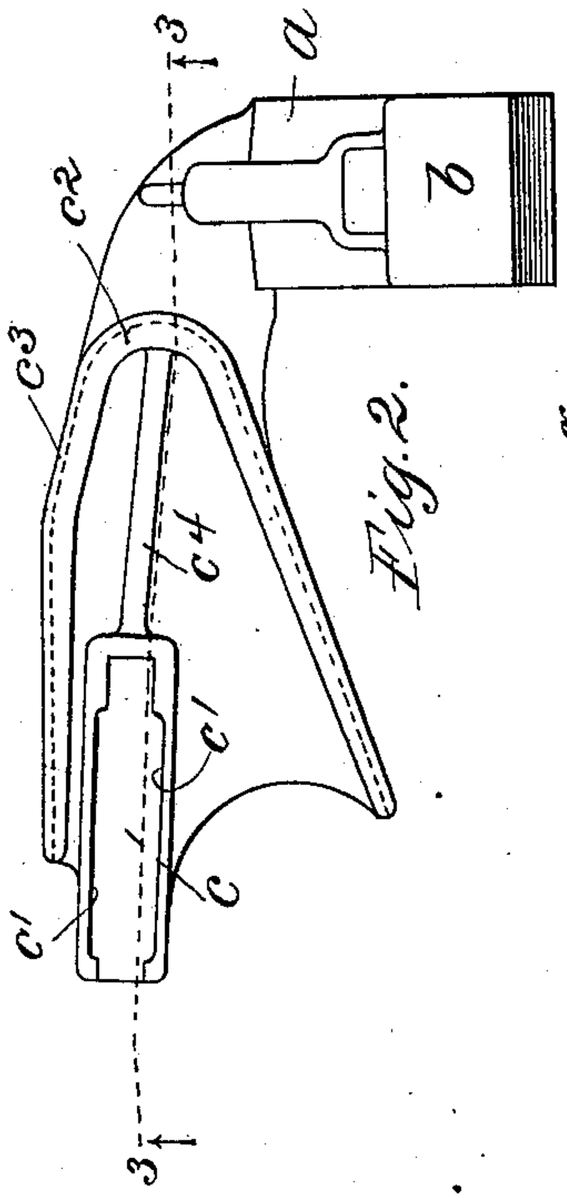

Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

JACOB N. BARR, OF MILWAUKEE, WISCONSIN.

BRAKE-BEAM.

SPECIFICATION forming part of Letters Patent No. 685,025, dated October 22, 1901.

Application filed November 22, 1897. Serial No. 659,496. (No model.)

To all whom it may concern:

Be it known that I, JACOB N. BARR, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Brake-Beams, (Case No. 1,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to brake-beams, and has for its object the provision of an improved form of trussed brake-beam which will overcome certain objections to structures of this class as heretofore constructed.

More specifically, one object of the invention is so to construct the brake-beam that any torsional or twisting strain to which the beam may be subjected—as, for example, when the brake-shoes are applied to the wheels at unequal heights from the rails—will be distributed throughout the beam to prevent undue stress at one point and the consequent fracture of the beam.

A second object is to avoid the destructive wearing engagement of the car-wheels, particularly the flanges thereof, with the beam and to produce a beam wherein the required rigidity may be secured with less material than heretofore.

A third object of the invention is to provide an improved adjustment of the truss-rod without the introduction into the structure of the truss-rod of any weakening element for the purpose of this adjustment.

A fourth object of the invention is to provide a brake-beam wherein opposing forces are created upon the application of the brakes, one force being exerted by the compression member and the opposing force by the brake-heads. By constructing a brake-beam in which the compression member and brake-heads are adapted to create opposing forces the structure may be very simple and light.

Generally speaking, one feature of my invention consists in adjusting the tension of the truss-rod or tension member by means extraneous to the truss-rod, the initial adjusting force being preferably exerted at an angle to the particular portion of the tension member where the adjusting force is applied. I preferably adjust the tension by changing the distance between the brake-heads or truss-heads with which the tension member is engaged. In practice I secure the adjustment by interposing an adjusting device between the compression and tension members.

I am aware that it is old to adjust the tension of tension members of brake-beams by the application of force in a longitudinal direction upon the tension member; but to this end a construction has to be employed which weakens the beam.

A second feature of the invention may generally be described as consisting in extending the brake-heads longitudinally beyond the tension member, parts of the brake-heads thus extended preferably projecting toward the wheels. Brake-shoes may be supported upon the extended portions of the brake-heads, sufficient space being thus afforded between the car-wheels and the beam to reduce the liability of the flanges of the wheels to cut the tension member.

Other objects and features of my invention will be set forth hereinafter.

I will explain my invention by reference to the accompanying drawings, in which—

Figure 1 is a plan view of the preferred form of brake-beam with the truss-heads and brake-heads in position, one of the brake-heads being shown in section without the shoe portion. Fig. 2 is a plan view of a combined truss-head and brake-head with the brake-shoe in position. Fig. 3 is a sectional elevation on line 3 3 of Fig. 2. Fig. 4 is an end view of a modified form of combined truss and brake head.

Like letters indicate like parts throughout the different views.

In Figs. 1, 2, and 4 I have illustrated brake-heads *a*, adapted to carry suitable brake-shoes *b*, which are preferably removably secured in position, so that they may be renewed when worn out. The brake-shoes may be of any desirable construction, the brake-heads being adapted for the support of the particular make of shoe employed. The brake-heads in the construction shown in Figs. 1, 2, and 3 are formed integrally with the truss-heads c^4. In the construction shown in Fig. 4 the brake-heads are bolted to the truss-heads. Each truss-head is preferably provided with a socket *c* for the reception of a compression member *d*, preferably consisting of an elon-

gated piece of metal of any desirable cross-section and of such proportions as to withstand the strain to which it is subjected. The compression member is suitably cambered. The compression member is preferably of oblong cross-section, placed edgewise in the sockets *c c*. I preferably recess the walls of the sockets at *c' c'*, the inner and outer ends of the sockets engaging the tension member. Each truss-head is provided with a portion or projection c^2, preferably angular and preferably cast integrally with the body portion of the truss-head, an outwardly-projecting lip c^3 being preferably provided upon each projection, between which and the body portion of the truss-head the tension member *e* is placed. That portion of each combined truss and brake head extending outwardly beyond the projection c^3 constitutes the brake-head. The tension member *e* is preferably in the form of a continuous non-adjustable band, which engages the ends of the strut and which surrounds the curved ends of the truss-heads, the projections or flanges c^3 serving to prevent vertical displacement of the truss-heads and the tension member. The tension member is engaged at its middle portion by angular extensions of the strut, the outer ends of the compression member being inserted within the sockets *c*.

By the term "compression member" I mean that portion of the brake-beam interposed between the truss-heads, between which portion of the brake-beam and the tension member a strut is interposed. To adjust the effective length of this portion of the brake-beam constituting the compression member, I provide means for separating the truss-heads.

In the embodiment of my invention herein shown I employ wedges or keys *d' d'*, which, in fact, form parts of the compression member, which wedges being driven downwardly press the truss and brake heads away from the compression member. After the wedges have been driven in the required distance their lower ends are bent to engage the bottom of the heads, as shown in Fig. 3. It is obvious that other means may be employed acting between the compression member and the truss-heads and brake-heads for adjusting the effective length of the compression member. By providing means interposed between the compression member and the truss-heads for adjusting the effective length of the compression member the engagement between the tension member and the truss-heads is not impaired, the surfaces of the truss-heads and tension member that are opposed being driven into closer engagement upon increasing the effective length of the compression member instead of being separated, the engagement between the tension member and truss-heads being maintained. I am aware that it is old in the art to interpose adjusting means between the tension member (instead of the compression member) and the brake-heads; but it is obvious that with this construction an adjustment which will increase the tension of the tension member will tend to separate the same from the brake-heads, so that the engagement between the tension member and the brake-heads is impaired.

I find that upon the application of the brakes force is exerted upon each brake-head, which tends to rotate the same about a center. The approximate position of one of these centers of rotation is marked *a'* in Fig. 1. I preferably so dispose the sockets *c* with reference to these centers of rotation that the line of strain *x* of each adjacent half of the compression member will pass to the rear of the brake-head, whereby the centers of rotation are placed between the said line of strain of the compression member and the front or brake-shoe-bearing portions of the brake-heads. When the brake-shoe is pressed against the wheel, the strain produced has a tendency to cause the truss-heads to revolve about the centers of rotation, which tendency, if unchecked, would bend the tension member *e* at *e'* and the compression member *d* at d^2, these parts being of light construction. By locating the center line *x* with reference to the centers of rotation, as herein shown, this turning moment is resisted by a compressive strain exerted on the member *d*, this strain or turning moment being in the opposite direction, the directions of the two turning moments being indicated by the arrows upon the right-hand side of Fig. 1. Originally plain wooden beams were largely employed, these beams by their inherent rigidity serving to transmit the strain applied at the centers thereof to the car-wheels. Subsequently truss-rods were added to prevent deflection of the beams when the higher pressures and closer adjustment due to the use of air-brakes demonstrated the necessity for their use. The beam performed its function, as before, of carrying the brake-heads, and in addition the function of a compression member of the truss that was formed. The next step was to substitute for the wooden beam a beam of iron of suitable construction; but still the beam continued to perform the double function of carrying the brake-heads in proper position by its inherent stiffness and of forming the compression member of the truss. It will readily be seen that in the present construction the compression members perform the function of resisting compression and that they need not have the rigidity heretofore required in compression members, thus enabling a considerable reduction in the mass of material entering into the construction of the compression member, the brake-heads being supported by the entire structure rather than by a particular portion thereof. The truss-heads are well extended inwardly toward the center of the beams, in order to support the compression member *d* and prevent sidewise deflection thereof. The strut supporting the middle part of the compression

member is extended toward the truss-heads. By thus extending the portions of the truss-heads and strut engaging the compression member I reduce the length of the unengaged portions of the compression member intervening between the truss-heads and strut and effectively brace the compression member to prevent the same from buckling. By extending the brake-heads longitudinally of the beam beyond the points of engagement thereof with the tension member I am also enabled to so far remove the brake-shoes from the region of the tension member as to free the latter from liability to damage from wearing engagement with the flanges of the wheels. This result is further insured by extending the projecting ends of the heads toward the wheels. To secure the best results, I preferably form the tension member of one complete encircling band.

By the construction herein shown I am enabled to place the tension member in position in a cold condition, the necessary tension being secured in the form of beam shown by changing the effective length of the compression member through the agency of the wedges d'. In a patent issued to me October 1, 1895, No. 547,136, I have shown a tension member in the form of one complete encircling band which was shrunk in position. The beam constructed in accordance with my said patent is difficult to repair in case of injury. By my present construction the tension member, although preferably not heated when placed in position, firmly secures the parts of the beam together.

Trussed brake-beams frequently become broken at the brake-heads. I have overcome this objection by my present construction. By the construction herein shown the compression member may be made comparatively light, permitting the brake-shoes to accommodate themselves to the car-wheels, even though they be at unequal heights from the track, the torsional strain being thus distributed throughout the brake-beam, whereby the fracture thereof is prevented.

It is obvious that certain features of my invention may be embodied in brake-beams wherein the brake-head at each end of the beam acts as a truss-head. In some of the claims, therefore, a structure wherein the truss-heads act as and could be called "brake-heads" is contemplated.

While I have shown and particularly described the preferred embodiment of my invention, it is obvious that changes may readily be made therein without departing from the spirit of the invention. I do not therefore desire to be limited to the precise construction shown; but,

Having thus described my invention, I claim as new, and desire to secure by Letters Patent, the following:

1. In a brake-beam, the combination with truss-heads, of compression and tension members engaged by the truss-heads, and means for increasing the distance between the truss-heads to adjust the tension, substantially as described.

2. In a brake-beam, the combination with a compression member, of truss-heads applied thereto, a truss-rod extending wholly around the compression member on both sides of the same and engaging the truss-heads, and means for exerting the primary adjusting force upon the compression member in a longitudinal direction to adjust the tension of the tension member and to secure this adjustment, substantially as described.

3. In a brake-beam, the combination with a compression member, of a tension member or truss-rod extending wholly around the compression member on both sides of the same, truss-heads applied to the ends of the compression member, each having a portion c^2 engaging the tension member, and means for adjusting the longitudinal position of the truss-heads relative to each other to adjust the tension of the tension member, substantially as described.

4. In a brake-beam, the combination with a compression member, of a tension member extending wholly around the compression member, on both sides of the same, a strut interposed between the tension and compression members, truss-heads applied to the ends of the compression member, said truss-heads each having a rib or projection c^2 engaging the tension member, and means for longitudinally adjusting the truss-heads upon the compression member to adjust the tension of the tension member, substantially as described.

5. In a brake-beam, the combination with a compression member, of a tension member, truss-heads interposed between the tension and compression members, and means for adjusting the truss-heads interposed between a truss-head and the compression member, substantially as described.

6. In a brake-beam, the combination with a compression member, of a tension member, truss-heads interposed between the tension and compression members, and means for separating the truss-heads, substantially as described.

7. In a brake-beam, the combination with a compression member, of a tension member; truss-heads, said compression member being interposed between the truss-heads; and means for adjusting the effective length of the compression member, acting longitudinally thereof, whereby the truss-heads are maintained in engagement at all points of contact thereof with the tension member upon an increase in the effective length of the compression member, substantially as described.

8. In a brake-beam, the combination with a suitably-cambered compression member, of a tension member or truss-rod extending around the compression member on both sides of the same, brake-heads applied to the compression member and extending longitu-

dinally of the beam beyond the tension member, whereby the cambered compression member and the longitudinally-extended brake-heads exert opposing turning efforts upon the application of the brakes, substantially as described.

9. In a brake-beam, the combination with a compression member, of a tension member, truss-heads interposed between the tension and compression members, and means for adjusting the distance between the truss-heads, to adjust the tension of the tension member, substantially as described.

10. In a brake-beam, the combination with a compression member, of truss-heads applied thereto, a tension member extending wholly around the compression member on both sides of the same, the truss-heads being interposed between the tension and compression members, and brake-heads extending longitudinally of the truss-heads beyond the truss-heads, the compression member being arranged with its line of strain to the rear of the centers about which the brake-heads tend to rotate upon the application of the brakes, whereby counter rotary efforts are exerted upon the brake-heads when the brakes are applied, substantially as described.

11. In a brake-beam, the combination with truss-heads, of a cambered compression member interposed between the same, a tension-rod engaging the truss-heads and extending on both sides of the compression member, the truss-heads being interposed between the compression and tension members, and brake-heads, the compression member being arranged with its line of strain to the rear of the centers about which the brake-heads tend to rotate upon the application of the brakes, whereby counter rotary efforts are exerted upon the application of the brakes, substantially as described.

12. In a brake-beam, the combination with truss-heads, of a cambered compression member interposed between the same, a tension-rod engaging the truss-heads and extending on both sides of the compression member, the truss-heads being interposed between the compression and tension members, and brake-heads extending longitudinally beyond the truss, the compression member being arranged with its line of strain to the rear of the centers about which the brake-heads tend to rotate upon the application of the brakes, whereby counter rotary efforts are exerted upon the application of the brakes, substantially as described.

In witness whereof I hereunto subscribe my name this 12th day of November, A. D. 1897.

JACOB N. BARR.

Witnesses:
J. C. GRIEB,
AARON KLINE.