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G. R. CLIFFORD.

RAIL JOINT.

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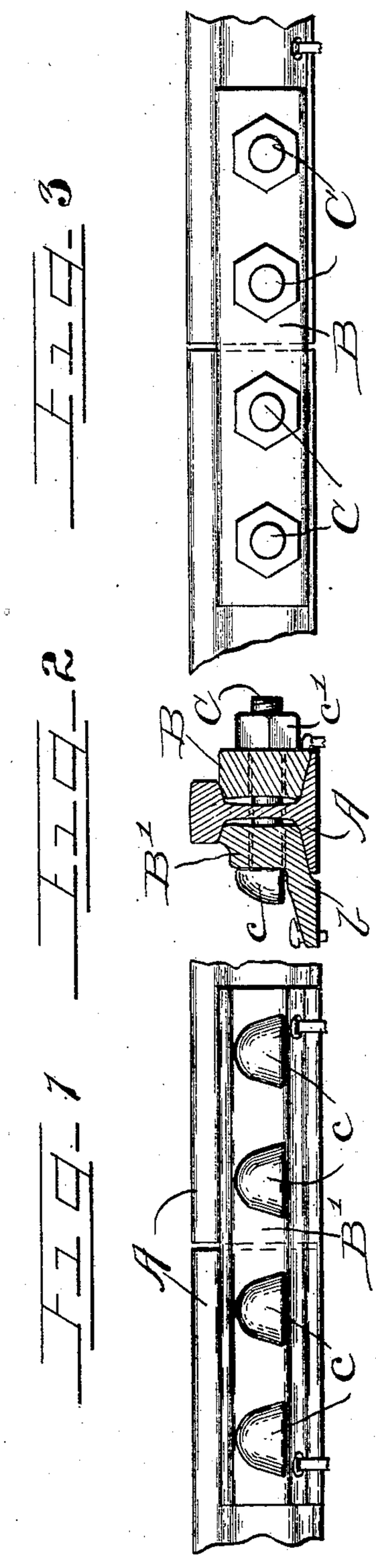

FIG. 1

FIG. 2

FIG. 3

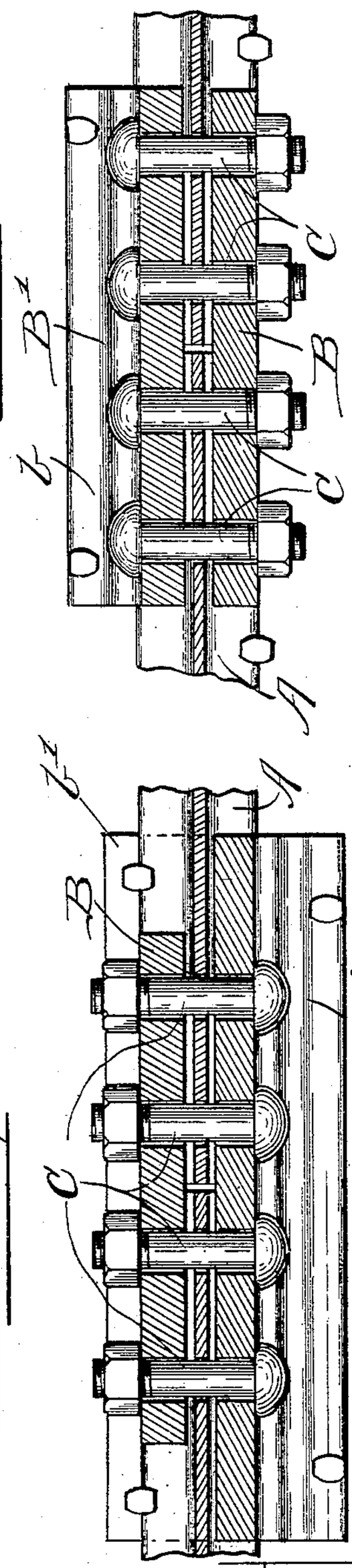

FIG. 4

FIG. 5

FIG. 6

FIG. 7

FIG. 8

Witnesses

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RAIL-JOINT.

No. 863,835. Specification of Letters Patent. Patented Aug. 20, 1907.

Application filed April 9, 1906. Serial No. 310,723.

To all whom it may concern:

Be it known that I, GEORGE RONSTROM CLIFFORD, a subject of the King of England, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Rail-Joints; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in rail joints and more particularly to suspended **T** rail joints for modern railway track rails.

The "wheel bases" of locomotives and cars in railroad trains are transversely independent of each other; and are only guided by the rails, and each individual "wheel base" is somewhat narrower than the gage of the track. Each wheel base in consequence gradually acquires an independent continuous zigzag motion between the rails of the track; its depending wheel flanges striking now here and now there, against the inside of the rail heads and deflecting the truck across to the opposite rail. The force of these lateral blows depends upon gravity, velocity of motion, condition of track, and other circumstances. This continuous zigzag motion of its "wheel bases" between the rails of the track—aided by curves or defects in the track—causes the bodies of locomotives and cars to settle into a peculiar swaying and rolling motion; whereby a considerable portion of a wheel's load is continuously thrown from one wheel over upon the opposite wheel and back again. In other words; the wheel loads of a moving train are not constant—but variable—quantities and rails of track, under the influence of such a train, will receive blows of varying strength and locality not only in a vertical—but also in a horizontal plane. The moving variable, vertical force causes vibrations of the rails in vertical planes and such vibrations aided by the variable lateral forces before mentioned in their turn create vibrations of a secondary character and intensity in a horizontal plane.

Under the aforesaid horizontal, lateral vibrations of track rails, the two abutting ends in a rail joint tend to spread or open the splice bars, and stretch the splice bolts of the joint. In fact the bolts do stretch to some extent, thereby allowing the splice bars to open out somewhat at the joint, and the abutting rail ends between to vibrate or swing around freely both vertically and laterally.

The abutting rail ends in the joints are thus to a certain extent unsupported or insufficiently supported in the vertical plane and in consequence the ends of a tee rail in such suspended rail joints sink or deflect somewhat under the pressure of each passing wheel and the wheel strikes against the still unloaded end or corner of the abutting rail in the joint, with a force proportional to its own pressure and velocity. This causes a heavy wear on rolling stock and track material limits the speed and safety and comfort of movement and the incessant characteristic click as the wheel passes the rail joints is annoying to the traveling public.

The object of this invention is to construct a theoretically perfect suspended tee rail joint for modern railway track rails in which the combined strength of the splice bars with regard to the vertical or horizontal forces equals that of the corresponding tee rail section.

It is also an object of the invention that the splice bars under all conditions are kept rigidly wedged in their respective positions beneath the under sides of the rail heads and the upper sides of the rail bases by means of the transverse splice bolts.

It is also an object of the invention to so construct and proportion the splice bolts and splice bars with reference to each other and to the vertical height of the rail as to insure maximum rigidity and resistance under lateral stresses; thus thereby resisting any actual deformation either of the splice bolts or splice bars under maximum stress to be applied thereto, and in which the rail joint is at all times held in position to rigidly support the ends of the rails in alinement.

It is a further object of the invention to afford splice bars and splice bolts of simple and economical construction and to combine the same into an exceedingly rigid and durable rail joint of the class described.

The invention consists in the matters hereinafter described and more fully pointed out and defined in the appended claims.

In the drawings: Figure 1 is a side elevation of a rail joint embodying my invention showing the heads of the bolts in elevation. Fig. 2 is a transverse section of the same. Fig. 3 is an elevation of the opposite side of the joint. Fig. 4 is a horizontal section taken at the splice bolt. Fig. 5 is a transverse section showing one of the splice bars slightly modified. Fig. 6 is a side elevation of the same joint showing the bolt heads. Fig. 7 is an elevation of the opposite side of the joint. Fig. 8 is a horizontal section taken at the splice bolt.

As shown in the drawings: Referring first to Figs. 1 to 4 inclusive, A indicates the abutting rail ends, B and B′ the splice bars shaped to fit between the heads and flanges of the rails at said abutting ends. As shown the splice bar B is shaped at its bottom to fit to the rail flange and at its top to fit beneath the head. The thickness of said splice bar is such that the outer flat vertical face thereof projects for some distance beyond the head laterally and is near to the edge of the flange.

The splice bar B′ is of corresponding length as shown and comprises the splice bar proper, which is of a thickness corresponding with the splice bar B and which at its bottom is integrally connected with a relatively thick flange *b* which extends laterally and downwardly, and is shaped on its under side to fit to the rail

flange. The thickness of said flange is such that the upper face thereof extends approximately to the splice bolt holes and affords a shoulder which holds the bolts from turning. Said splice bars are rigidly secured in place one on each side of the abutting rail ends by means of main transversal splice bolts, indicated by C, which are made of large size or diameter or thickness of body and of course corresponding strength. On one end of each splice bolt is provided a head *c* the under side of which is relatively flat and about flush with the body of the bolt. The upper side of said heads as shown is rounded and projects on each side of and above the top of the bolt and a nut *c'* is engaged on the threaded end thereof.

In the construction shown in Figs. 5 to 8 inclusive the splice bar B is constructed as before described. The construction of the splice bar B^2 corresponds in general with the splice bar B' with the exception that an integral plate or flange *b'* is provided on the under side of the flange *b* which is of a width to extend beneath and afford a support beneath the flanges of the abutting ends of the rails. Said splice bar B^2 as shown is of greater length than the splice bar B and affords a relatively long bearing for the flanges at the rail ends; and owing to the strength of the same and the large size of the bolts effectively protects the joints from lateral displacement and from undue vertical vibrations as well.

The operation is as follows: In securing the splice bolts C in place the flat side of the head is turned downwardly toward the shoulder *b* afforded by the top of the flange and inasmuch as the same extends approximately to the bottom of the splice bolt apertures said shoulder in itself taken together with the flat side of the bolt head serves to prevent rotation of the bolt. The relatively large size of the bolt together with the size and shape of the splice bars effectually prevents undue or excessive lateral vibration.

While I have described the splice bolt of large size it is to be understood that the size thereof will be usually a certain proportional part of the height of the rail, but obviously owing to the varying stresses applied to the rails of this kind the ratio may vary for different sizes of rail.

Obviously details of construction may be varied without departing from the principles of my invention.

I claim as my invention:

1. A rail-joint for tee-rails comprising, in combination, a pair of splice bars for application to opposite sides of the rail and having bolt-holes, one of such bars having a lateral foot flange, and bolts the heads of which have a flattened side for engagement with such foot flange.

2. A rail-joint for tee-rails comprising, in combination, a pair of splice bars for application to opposite sides of the rail and having bolt-holes, one of such bars having a lateral foot flange, and bolts the heads of which have a flattened side for engagement with such foot flange, the plane of such flattened side being substantially in line with the surface of the bolt body.

3. A rail joint for T-rails comprising, in combination, a pair of splice bars for application to opposite sides of the rail and having bolt-holes, one of such bars having a lateral foot-flange extending underneath the rail, and bolts having heads, such heads being flattened on their downward side for engagement with the foot-flange.

4. A rail joint for T-rails, comprising, in combination, a pair of splice bars for application to opposite sides of the rail and having bolt-holes, one of such bars having a lateral foot-flange extending with a plate underneath the rail, and draw-bolts the heads of which have a flattened side in substantial alinement with the bolt body, for engagement with the upper face of the foot-flange.

5. A rail joint for tee-rails comprising, in combination, a pair of splice bars for application to opposite sides of the rail, one of such bars having a lateral foot flange and such bars being apertured above the foot flange, and draw-bolts having rounded heads, the downward side of such heads being flattened for engagement of the foot flange.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

GEORGE RONSTROM CLIFFORD.

Witnesses:
W. W. WITHENBURY,
WILLIAM C. SMITH.