No. 633,887. Patented Sept. 26, 1899.

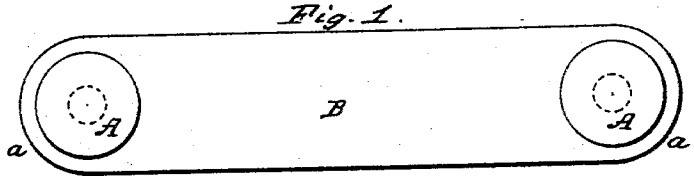
T. J. McTIGHE.

ELECTRIC RAILWAY RAIL BOND.

(Application filed May 24, 1899.)

(No Model.)

Fig. 1.



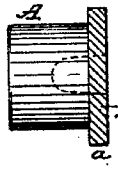


Fig. 2.

Fig. 3.

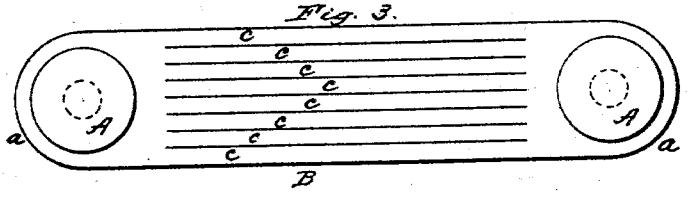




Fig. 4.

Fig. 5.

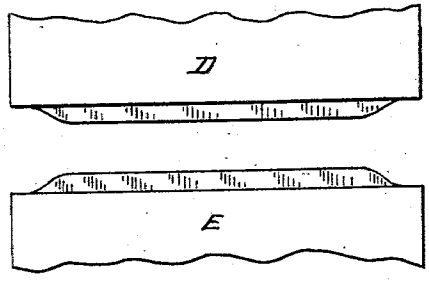


Fig. 6.

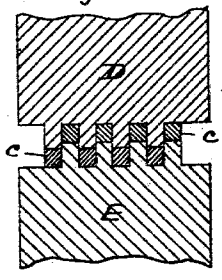


Fig. 7.

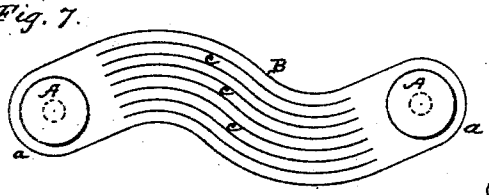


Fig. 11.

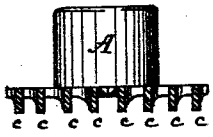


Fig. 12.

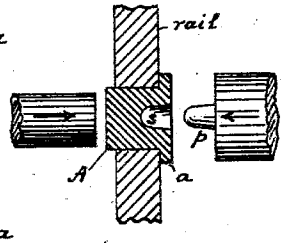


Fig. 8.

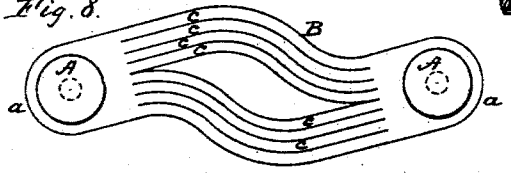


Fig. 9.

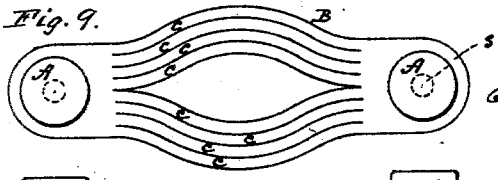
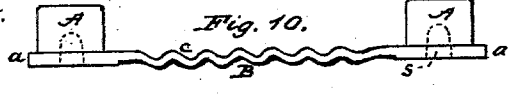


Fig. 10.



WITNESS

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UNITED STATES PATENT OFFICE.

THOMAS J. McTIGHE, OF NEW YORK, N. Y.

ELECTRIC-RAILWAY RAIL-BOND.

SPECIFICATION forming part of Letters Patent No. 633,887, dated September 26, 1899.

Application filed May 24, 1899. Serial No. 718,092. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. McTIGHE, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electric-Railway Rail-Bonds, of which the following is a specification.

The object of this invention is to produce a rail-bond for electric railways of a generally flat form with laterally-projecting solid terminals for attachment to the rails to adapt the device for use behind the fish-plates or splices and at the same time provide flexibility in all directions to accommodate the various motions to which railway-rails are subject in use.

A further object of my invention is to construct such a rail-bond of a single piece of wrought metal.

A further object is to form the terminals in such a way as to facilitate their application to the drill-holes in the rails and effect a tight and permanent contact therewith.

To these and other ends my invention consists in the construction and mode of application, as hereinafter fully described and claimed.

In the drawings which form part of this specification, Figures 1 and 2 are respectively a face view and transverse section of a rail-bond made after my invention before the body has been made flexible. Figs. 3 and 4 are similar views of the same bond after the slitting of the middle portion of the body or strap. Figs. 5 and 6 are respectively a side elevation and transverse vertical section of one kind of slitting-dies which can be used. Figs. 7, 8, and 9 are face views of the finished bond with the strips bent laterally to allow for contraction and expansion of the rails. Fig. 10 is an edge view showing the slitted strap with transverse crimping for the same purpose. Fig. 11 is a transverse section of a modification, and Fig. 12 shows the rail and one terminal in section and the adjacent faces of the compressing-tool ready for operation of upsetting said terminal in the hole drilled for it in the rail.

Fig. 1 illustrates the form I prefer, with the solid massive terminals A for attachment to the rails, with flanges or shoulders *a* wholly surrounding the said terminals and the flat connecting body or strap B, the terminals A being designed to pass a little more than through the rail to allow for upsetting therein. Such a rail-bond may be made in various ways; but I prefer to make it of a single piece of wire or rod by upsetting, shaping, and flattening, as described in my application filed March 23, 1897, Serial No. 628,836, thus producing a rail-bond all the parts of which are absolutely integral and in which the terminals are massive and solid. The bond is as yet practically unyielding to vertical and longitudinal movement of the rails. I therefore subdivide the strap B into a number of parallel strips *c* in any suitable manner—such, for example, as the slitting-dies D E. The slits do not extend to the terminals, as it is desirable to leave an unbroken flange or shoulder *a* all around the head of the solid terminal. This slitting may be done with saws or by other means. The rail-bond thus formed, Figs. 3 and 4, is quite flexible and will yield to all lateral and vertical movements of the rails, and if applied diagonally to the rails it allows for contraction and expansion; but I propose to bend the strap or its row of strips, as in Fig. 7, or to spread and bend its two halves into oppositely-curved positions, as in Fig. 8 or Fig. 9, or crimp the slitted strap transversely. In any of these forms the bond yields to vibration, contraction, and expansion of the rails, can be applied under the fish-plates, and has the advantage of being in a single piece of metal throughout. The electric carrying capacity of such a bond may be made very great. If required, the terminals may be made an inch or more in diameter of solid metal and the strap in proportion.

Rail-bonds of this general class are usually attached to the rails by being upset therein by a powerful compressor, either screw or hydraulic. To facilitate such operation, to minimize the weight of metal required for a given conducting and contact capacity, and to insure a lateral flow of the metal of the terminals radially outward against the walls of the holes in the rails, I proceed as follows: In forming the solid terminals A, I form the conical countersinks *s* in the center of the outside

or head of the terminal. The screw or ram is fitted with an end piece having a conical pin *p*, projecting axially, as in Fig. 12, and fitting the countersink. After the pin *p* is pressed home in the countersink *s* of the terminal in the operation of forcing the latter into its hole in the rail the continued application of the pressure causes the other side of the press to act upon the farther or inner end of the terminal and compels the metal from that side to flow down the conical face of the pin and spread out and completely fill all irregularities in the walls of the hole.

Where extreme flexibility is desired, the flat strap of the bond may be made relatively wider and thinner and the strips after slitting may be twisted up nearly or wholly at right angles to the plane of the strap.

What I claim, and desire to secure by Letters Patent, is as follows:

1. A rail-bond made of wrought metal in one integral piece comprising shouldered solid rail-attaching terminals and an edgewise-yielding flat connecting-strap.

2. A rail-bond made of wrought metal in one integral piece comprising a flat conducting-strap, flexible edgewise, with solid terminals located wholly outside the flexible section of the strap and connected therewith by rigid portions forming shoulders for the terminals.

3. A rail-bond made of wrought metal in one integral piece comprising solid terminals with shoulders surrounding their bases and a flat, edgewise-flexible, conducting-strap connecting said shoulders.

4. A rail-bond made of wrought metal in one integral piece comprising a flat, edgewise-flexible, conducting-strap having upset solid terminals.

5. A rail-bond made of wrought metal in one integral piece comprising a flat, longitudinally-slitted, conducting-strap with upset solid shouldered terminals formed at right angles to the plane of the strap.

6. A one-piece rail-bond of wrought metal, consisting of the solid rail-attaching terminals A with heads or shoulders *a* surrounding the same and connected between the shoulders by a flattened body or strap integral therewith and slitted lengthwise between the said shoulders, substantially as described.

7. A rail-bond made of wrought metal in one integral piece consisting of solid rail-attaching terminals and a connecting-body of metal, such terminals being cylindrical and having heads or shoulders surrounding their outer ends, and countersinks in the said outer ends, substantially as and for the purpose described.

Signed at New York, in the county of New York and State of New York, this 11th day of May, A. D. 1899.

THOMAS J. McTIGHE.

Witnesses:
WM. G. MORRISEY,
FRANK W. BLANKLEY.