No. 668,903. Patented Feb. 26, 1901.

H. P. BROWN.

ELECTRIC BOND FOR RAILWAY RAILS.

(Application filed Apr. 7, 1900.)

(No Model.)

Fig. 1.

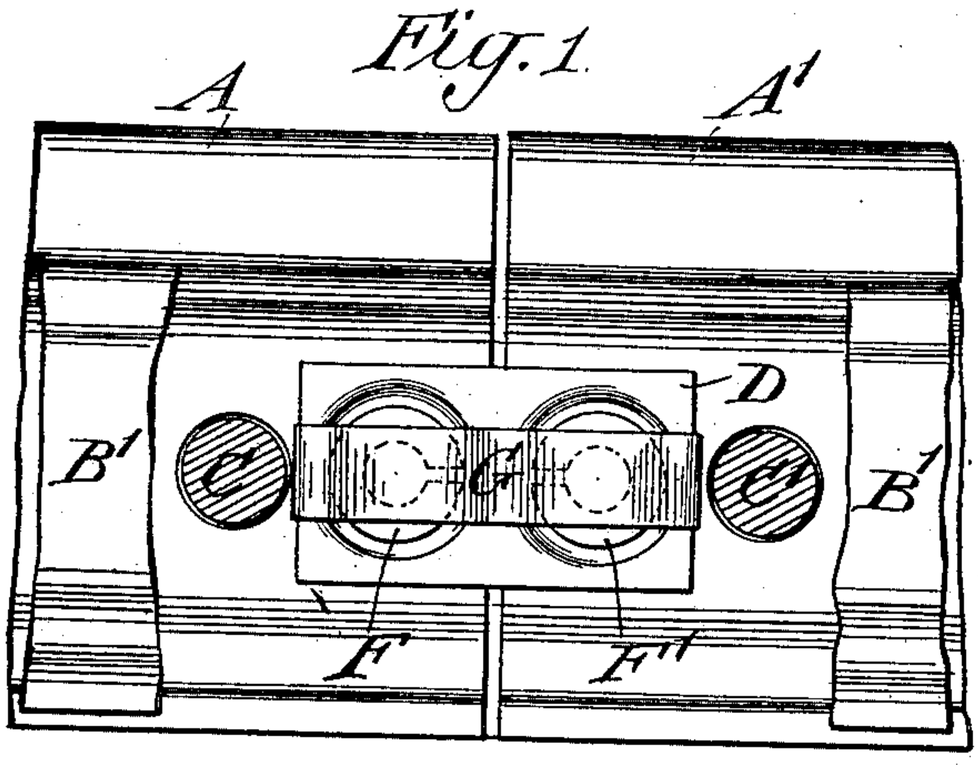


Fig. 2.

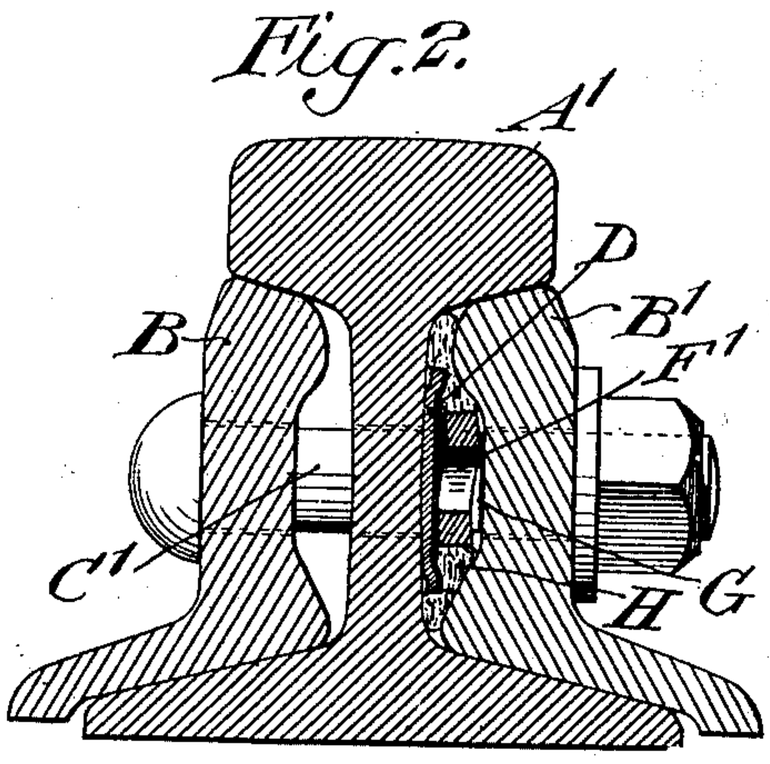


Fig. 3.

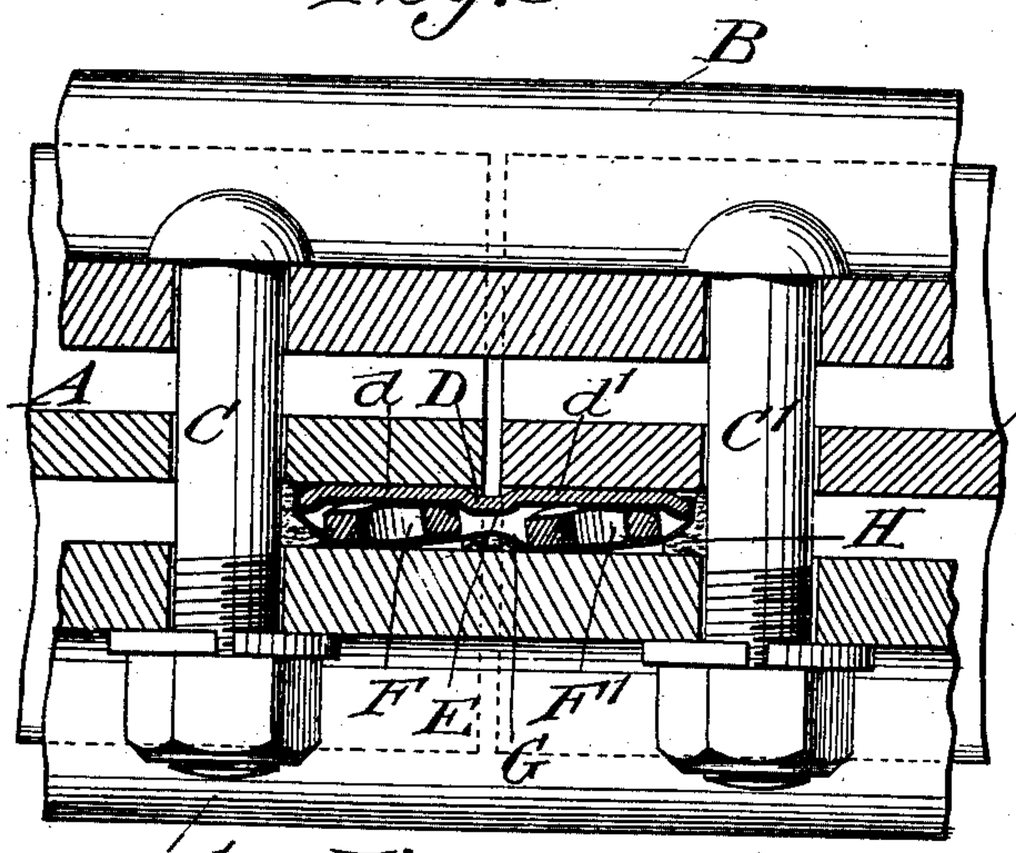


Fig. 4.

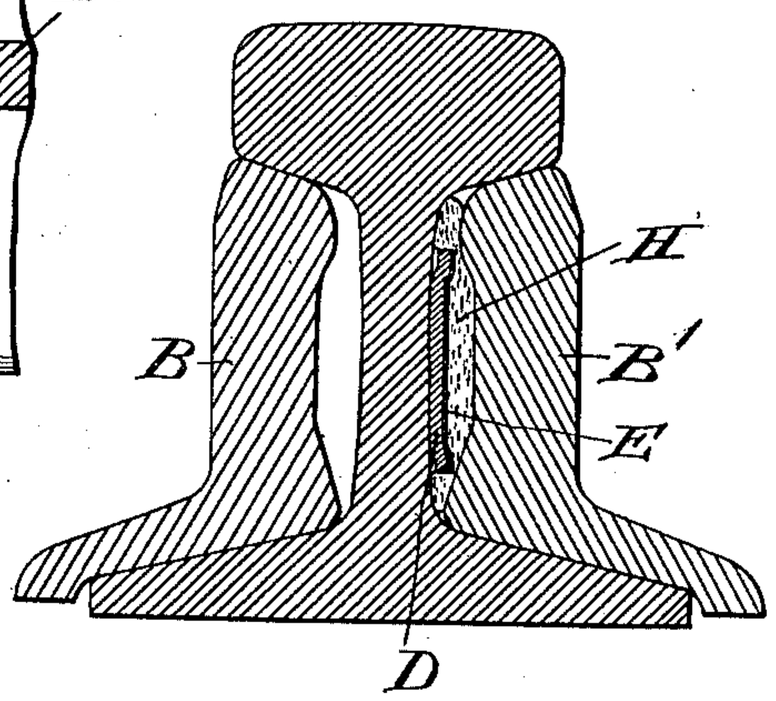


Fig. 5.

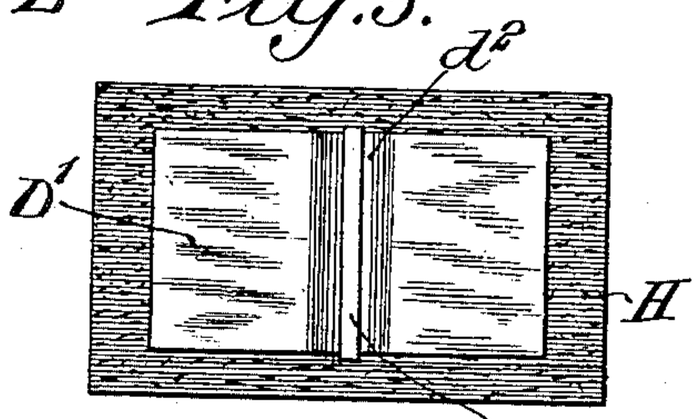
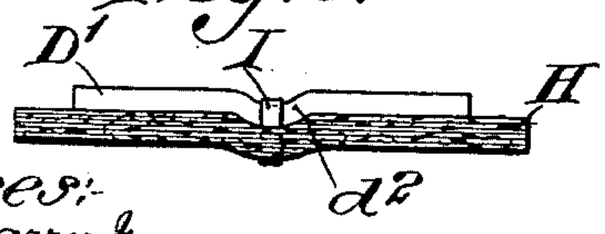


Fig. 6.



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UNITED STATES PATENT OFFICE.

HAROLD P. BROWN, OF MONTCLAIR, NEW JERSEY.

ELECTRIC BOND FOR RAILWAY-RAILS.

SPECIFICATION forming part of Letters Patent No. 668,903, dated February 26, 1901.

Application filed April 7, 1900. Serial No. 11,956. (No model.)

To all whom it may concern:

Be it known that I, HAROLD P. BROWN, a citizen of the United States, and a resident of Montclair, in the county of Essex and State of New Jersey, have invented a new and useful Electric Bond for Railway-Rails, of which the following is a specification.

My invention relates to an electric bond for electrically connecting the meeting ends of two contiguous electric conductors, the form chosen to illustrate my invention being particularly adapted for electrically connecting the adjacent ends of two railway-rails.

The object is to provide an electric contact of low resistance which shall be maintained intact under the varying positions of the meeting rails or conductors as they are influenced by heat, cold, and weight of passing car-wheels, and to further provide means for maintaining such contact which may be furnished at a low cost and placed in position on conductors or rails of varying types and sizes with great facility.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 represents in side elevation the adjacent ends of two railway-rails, the angle-plate being broken away to show the electric bond in position. Fig. 2 is a transverse section through the same, the spaces between the angle-plates and the web of the rail being shown exaggerated to more clearly show the construction and relation of the several parts. Fig. 3 is a horizontal section through the web and the bond. Fig. 4 is a transverse section showing a modified form of resilient backing for the bond. Fig. 5 is a face view showing a modified form of bond and its backing, and Fig. 6 is an edge view of the same.

The rails are denoted by A A′, the angle-plates upon the opposite sides of the webs of the rail by B B′, and the bolts for securing the angle-plates to the rails by C C′. The rails, angle-plates, and bolts may be of any well-known or approved form, such as are commonly found in use upon railways.

The electric bond consists of a copper plate D, (preferably what is known as "rolled" electric copper plate,) and is preferably about three inches long, one and one-half inches wide, and has a thickness one-eighth of an inch and upward. When the plate is one-eighth of an inch thick or is not too thick to render it impracticable to readily swage it, it is provided with cup-shaped projections *d d′*, pressed inwardly a short distance from the body of the plate upon opposite sides of the central portion thereof, as clearly shown in Figs. 1 and 3, the faces of these cupped portions being intended to form the bearing-contacts between the bond and the webs of the adjacent ends of the rails.

The back of the copper plate D is provided with a thin shield E of some suitable hard metal—such, for example, as steel—to protect the copper from being cut away by the springs, which are utilized to hold the faces of the cups in close contact with the web of the rail. The springs are denoted by F F′, and preferably consist of a single coil of suitable stiffness to afford the desired pressure and of such thickness that when the angle-plate is forced home by the nuts on the bolts C C′ the springs F F′ will be flattened down to a plane, resting throughout the entire coil flatly against the thin sheet-guard E within the cupped portions of the plate.

To hold the springs temporarily in position while the angle-plate is being applied, I provide a soft-metal strip G, intended to extend along the back of the bond-plate D and lap over its ends. The soft-metal strip G may in use cut away, permitting the spring to bear directly against the inner face of the angle-plate, and when it does so cut away the spring will gradually cut itself into the surface of the angle-plate and in so doing will effect an electric contact between the spring and the plate, and to that extent will reinforce the electric conductivity between the adjacent conductors.

To shut out dust and moisture from gaining access to the contact-points, I provide a cork sheet H, which may be cut away opposite the springs F F′ and when the parts are forced home will be compressed into position around the ends and side edges of the bond-plate D, forming a tight closure.

The bond may be applied as follows: first, brighten a contact-spot about one and a half inches long and two inches high on the web of the rail between its end and the bolt-hole nearest the end. This may be done by using

a carborundum or emery-wheel with flexible shaft, such as are in ordinary use, or a heavy track-drill. If the latter is used, a flat drill-point should be used and the surface cut away only deep enough to remove the surface scale. The drill-points for this purpose should be lubricated with soda and water instead of with oil. Be sure that the chips and files are removed from the contact-spots, and while they are still very wet rub these spots with a piece of the Edison solid alloy until the surface of steel is silvered or amalgamated. Then apply clean water by dripping the water thereon, but not by rubbing. As soon as the bubbling stops wet the places again with clean water, so as to wash away any scum left by the process, and then cover these amalgamated spots at once with what is known in the art as "plastic alloy," as this metal is needed to complete the chemical process. Place the copper bond on edge upon the base of the rail with one projecting contact-cup against the web of one rail and the second cup against the web of the other rail and then apply the angle-plate, forcing it home and pressing the faces of the cups *d d'* firmly against the treated contact-surfaces of the web of the rail. The amalgamation and covering with plastic alloy forms a metallic lubricant which greatly reduces the friction of the bond on the rails, and thus prevents wear. This adhering lubricant also serves to fill all interstices in the metal, and thus secures and maintains an electrical contact of extremely-low resistance. The metallic lubricant will adhere to the copper bond-plate as well as to the surfaces of the conductors, thereby forming an intimate electrical contact between it and the copper bond as well as between it and the prepared surfaces of the conductors.

In instances where the bond-plate D is too thick to be readily swaged to produce the cup-bearings the wings on the opposite side of the central arched portion may be left flat, as shown in Figs. 5 and 6, where the plate as a whole is denoted by D' and the central arched portion by d^2. The bond-plate, whether of the cupped form (represented by D) or the flat-winged, as denoted by D', may be held in contact with the cork backing H by means of a broad staple I, the bight of which extends along the arched portion d^2 and the prongs of which may be extended through the cork backing and clenched. This cork backing H when so fastened to the plate may serve to retain the springs in position without the use of the temporary holding-strip G, and where the space between the angle-plate and the web of the rail is quite narrow, as illustrated in Fig. 4, the cork backing H may be relied upon to hold the bond-plate in position without the use of the springs.

When in use, the expansion and contraction of the rails or other conductors will produce a rubbing action between the web and the contact-surfaces of the bond, thereby keeping the contact perfect, and the faces of the cupped portions of the bond will gradually conform themselves to any slight curve which the surface web may have in a vertical direction.

While I have shown the bond on one side of the web of the adjacent rails, it is obvious that a similar bond might be placed on the opposite side of the web, thereby doubling the conductivity of the connection whenever occasion requires. It is also obvious that other changes might be resorted to in the form and arrangement of the several parts without departing from the spirit and scope of my invention. Hence I do not wish to limit myself strictly to the structure herein set forth; but

What I claim is—

1. The combination with the adjacent ends of two electric conductors, of an electric bond comprising a metallic plate bearing against the sides of the adjacent conductors leaving the said conductors free to move relatively to the bond and means for pressing the bond against the said conductors to maintain the contact, and an adhering metallic lubricant on the contacting surfaces, substantially as set forth.

2. The combination with adjacent conductors whose surfaces in proximity to their adjacent ends are amalgamated, of an electric bond adapted to span the joint between the two conductors and bear against the amalgamated surfaces and means to hold the bond tightly pressed against the amalgamated surfaces while permitting the conductors to move relatively to the bond, substantially as set forth.

3. The combination with the adjacent ends of two conductors, of an electric bond having a rubbing engagement with the surfaces of the two conductors and means for holding the bond in position, and an adhering metallic lubricant on the contacting surfaces, substantially as set forth.

4. An electric bond comprising a plate of metal of high conductivity provided with a resilient backing, arranged to form a stop against the entrance of foreign matter to the contacting surfaces, substantially as set forth.

5. An electric bond comprising a copper plate, a thin plate of hard metal located adjacent to the back of the copper plate and a resilient backing of cork or other elastic material secured in position against the thin plate of hard metal, substantially as set forth.

6. An electric bond comprising a plate of metal of high conductivity provided with cupped portions, spiral springs adapted to enter the said cupped portions and means for holding the said parts in assembled adjustment, substantially as set forth.

7. An electric bond comprising a plate of metal of high conductivity provided with cupped portions to form bearings, spiral springs located on the backs of the cupped portions and means for holding the springs in assembled adjustment, substantially as set forth.

8. An electric bond comprising a plate of metal of high conductivity provided with cupped portions to form bearings, spiral springs located on the backs of the cupped portions, a backing of cork and means for holding the parts assembled, substantially as set forth.

9. The combination with adjacent rails having their webs treated with plastic alloy, of an electric bond comprising a plate having portions arranged to bear against the treated surfaces of the webs, spiral springs located at the back of the bearing portions of the bond, an angle-plate spanning the joint exterior to the bond, and means for forcing the angle-plate into its binding position against the tension of the said spiral springs, thereby forcing the bearing portions of the bond against the treated portions of the webs, substantially as set forth.

10. The combination with the adjacent ends of two conductors, of an electric bond having a rubbing engagement with the surfaces of the two conductors, a stratum of metallic lubricant interposed between the said bond and conductors, and means for holding the bond in position, substantially as set forth.

11. The combination with the adjacent ends of two conductors, of an electric bond having a rubbing engagement with the surfaces of the two conductors, an adhering metallic lubricant intermediate of the bond and conductors and means for holding the bond in position, substantially as set forth.

12. The combination with adjacent railway-rails having the surfaces of their webs near the ends of the rails prepared for electric contact, of an electric bond arranged to bear against said prepared surfaces, a stratum of metallic lubricant intermediate of the bond and said prepared surfaces and an angle-plate arranged to hold said bond in position, substantially as set forth.

13. An electric bond comprising a plate of metal of high conductivity having a facing of metallic lubricant and a resilient backing, substantially as set forth.

14. An electric bond comprising a copper plate, a metallic lubricant on the face of the copper plate, a thin plate of hard metal adjacent to the back of the copper plate and a resilient backing secured in position against the thin plate of hard metal, substantially as set forth.

15. An electric bond comprising a plate of metal of high conductivity provided with cupped portions, a facing of metallic lubricant on the electric metal, a resilient backing adapted to enter the said cupped portions and means for holding the said parts in assembled adjustment, substantially as set forth.

16. An electric bond comprising a plate of metal of high conductivity provided with cupped portions to form bearings, a metallic lubricant on the faces of said bearings, spiral springs located on the backs of the cupped portions, and means for holding the springs in assembled adjustment, substantially as set forth.

17. An electric bond comprising a plate of metal of high conductivity provided with cupped portions to form bearings, a metallic lubricant on the faces of said bearings, spiral springs located on the backs of the cupped portions, a backing of cork and means for holding the parts assembled, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 3d day of April, 1900.

HAROLD P. BROWN.

Witnesses:
FREDK. HAYNES,
C. S. SUNDGREN.