

C. R. STURDEVANT.
RAIL BOND.
APPLICATION FILED MAY 5, 1911.

1,056,854.

Patented Mar. 25, 1913.

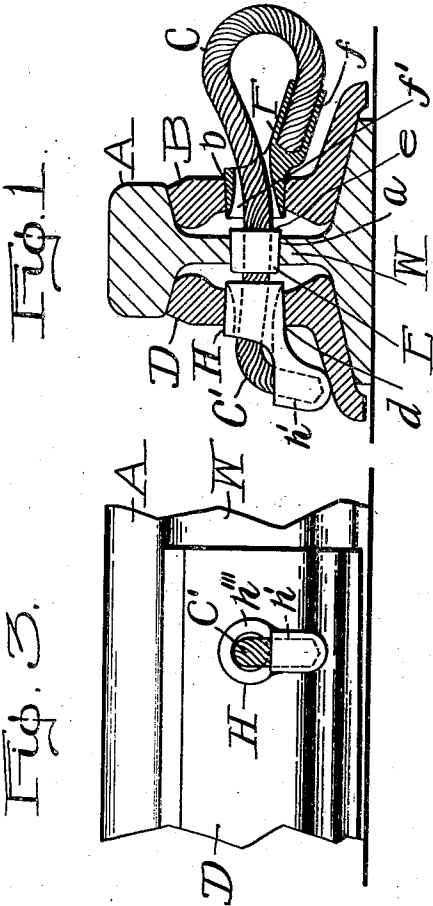
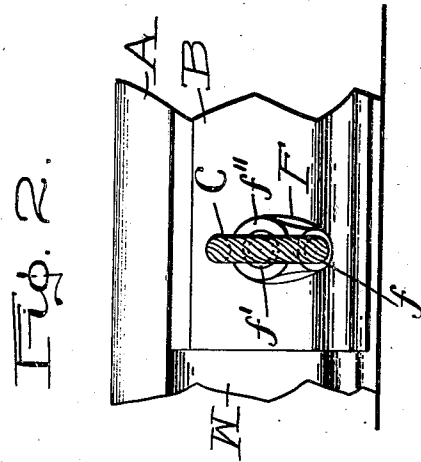


Fig. 6.

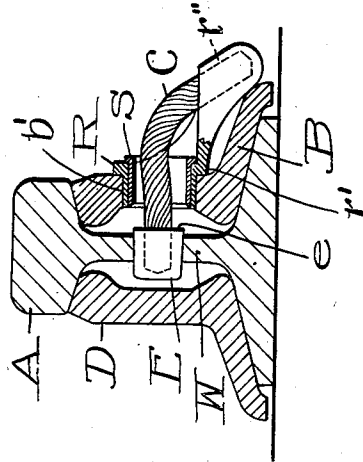


Fig. 5.

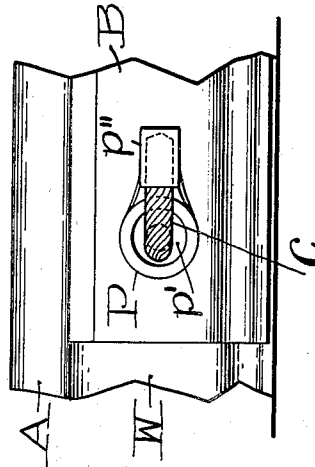
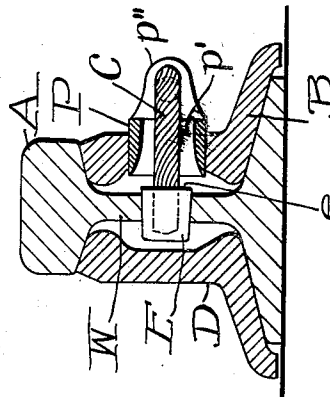


Fig. 4.



Witnesses:
C. F. Misson
E. M. Allen.

Inventor
C. R. Sturdevant.
By Attorneys
Southgate & Southgate.

UNITED STATES PATENT OFFICE.

CHARLES R. STURDEVANT, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE
AMERICAN STEEL & WIRE COMPANY OF NEW JERSEY, OF HOBOKEN, NEW JERSEY,
A CORPORATION OF NEW JERSEY.

RAIL-BOND.

1,056,854.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES R. STURDEVANT, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Rail-Bond, of which the following is a specification.

This invention relates to a rail bond for connecting a rail with the splice bar instead of connecting two rails directly with each other.

The principal objects of the invention are to provide a rail bond which will not be entirely exposed and which will not be liable to theft or to mechanical breakage from external causes; to provide a construction in which the conductor is not cramped in the narrow limited space between the splice bar and web, causing crystallization and breakage at an early date; to provide a construction in which the installation of the bond will not necessitate the removal of the splice bars; and to provide a construction in which the splice bar itself is used as a part of the circuit which can be done because they are generally of high conductivity steel as compared with the rails and the combined cross section of a pair of them is approximately equal to that of the rail ordinarily used.

Further objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a transverse sectional view of a rail with the splice bars and a preferred form of this invention applied thereto; Fig. 2 is a side elevation of the same; Fig. 3 is an elevation of the opposite side; Fig. 4 is a transverse sectional view showing a modification; Fig. 5 is a side elevation of the same; and Fig. 6 is a transverse sectional view of another modification.

The invention is shown in several forms, in all of which the rail A is to be bonded to a second rail at the end thereof with the assistance of a splice bar B or D or both.

It will be understood, of course, that the invention is applicable to all types of rails and iron or steel bars for connecting them.

Figs. 1, 2 and 3 illustrate a double bonded construction but each part can be used by

itself, and the two parts will be described separately. The part shown on the right of Fig. 1 and in Fig. 2 comprises a flexible conductor C having two terminals E and F, of hardened steel or other suitable metal or alloy. The terminal E consists simply of a smooth surfaced tapered member having an opening therein or passage therethrough for the reception of the conductor. The terminal F is also tapered and enlarged on the outer surface and it has a passage *f'* therethrough through which the conductor can pass freely. It is also provided with a projection on the outer side having a hole extending into the same, in which the end of the conductor C is brazed, soldered or welded before installation of the bond. The conductor is taken from this point around through the passage *f'* and inserted into the terminal E and there brazed, soldered or welded before installation, the conductor thus forming a loop on the outer side. To install the bond, holes *a* and *b* are drilled and reamed to proper diameter and tapered in the rail and splice bar respectively. These holes are made in axial alinement with each other so that they will be concentric, and the hole *b* is large enough for the terminal E to be inserted through it and to receive the conical part of the terminal F. The terminal F is now drawn back as far as possible on the conductor C and the terminal E inserted through the hole *b* into the hole *a*. It is then driven solidly in with great force to form a cold weld. This can be done by sledge hammer blows or a powerful compressor applied to a U-shaped punch passing through the hole *b* fitting over the conductor C, and resting against a face *e* of the terminal E. When this has been accomplished the conical part of the terminal F is moved up along the conductor into the hole *b* and driven home in like manner, the punch resting against the surface *f''*. In operation, the track current will flow from the rail A into the terminal E, through the conductor C into the terminal F, thence into and through the splice bar, through a corresponding bond at the other end of the splice bar (not shown) and into the next rail. So long as the track bolts are drawn tight there is no relative

vertical motion between the rail A and splice bar B (which motion is so destructive to all other types of bonds) and the whole bond moves or vibrates vertically with the rail and splice bar. There are occasional relative linear movements between the rail and splice bar however and this is taken care of by allowing plenty of clearance at f' about the conductor C on the inside of the terminal F. As the rails expand or contract the conductor will be bent slightly without injury. The durability of the bond is thereby assured. The above described parts may constitute the entire bond. Fig. 1 also shows a method of double bonding in which both splice bars are bonded to the rail web W. Conductor C has a continuation C', brazed or soldered into a socket h' of a terminal H after the terminals E and H have been installed. H, like F, is a tapered tubular terminal of hardened steel (or other suitable metal) and is driven home in a tapered hole d through the splice bar D (in alinement with the hole a through web W,) by means of a circular tubular punch which fits over conductor C' and rests against the face h''' of the terminal H. After installation of the terminal H, the end of conductor C' is bent into socket h' and soldered thereto. The bond is then complete. It is evident that the terminal H and E could be used as a single bond instead of terminal F. In a rail joint thus double bonded the current from the rail A enters the terminal E and divides, a part going through the conductor C, terminal F and splice bar B; the balance through conductor C' to terminal H, into splice bar D. From the other ends of the splice bars the currents flow through similar bonds into the adjoining rail.

In the bond shown in Figs. 4 and 5, we have the same steel terminal E and conductor C and a modified form of splice bar terminal P. This terminal differs from terminal H only in two respects. First, the opening p' through the terminal is large enough to admit the U-shaped punch to pass through it (and about conductor C) to impinge against the face e of terminal E so that it can be driven home. And secondly conductor C is welded, brazed or soldered to both terminals before installation. It is thus shown (Fig. 5) secured to the socket p'' of terminal P. The two steel terminals of this bond are driven simultaneously with suitable punches, that is, after both are inserted in the tapered holes prepared for them, first one terminal is driven part way, then the other and so on until both are properly seated.

In Fig. 6 is still a different style of a splice bar terminal. The terminal E and conductor are the same as before described but a terminal R differs materially in being

copper (or other low resistance malleable metal) and being expanded into a non-tapered hole b' through the splice bar B. The installation of this bond is as follows:—

After preparing the holes as above, the copper terminal R provided with a shoulder r' and a socket r'' is inserted in the hole b' , a tapered cylindrical punch is driven through this tubular terminal R opening it out and expanding it with great force against the walls of the hole b' . A close fitting cylindrical steel shell S having a slightly tapered or rounded end is driven into the expanded terminal R after the punch is withdrawn, serving to hold the copper snugly against the steel. The terminal E with the conductor C previously welded, brazed or soldered in the same is then inserted in the hole a of the web W, through the shell S. With a tubular punch surrounding the conductor and resting about the face e , the terminal E is then driven home as in previous cases. The outer end of the conductor C is then soldered in the socket r'' of the terminal R as in previous cases and the bond is completed. It will be noted that in Fig. 1 (terminals F and H) and in Fig. 6 (terminal R,) the bond can be opened up, or the conductor can be disconnected from the terminal by unsoldering the same in sockets f , h' and r'' , without removing the splice bar, because the connection is readily destructible by heat. This is of service in changing rails or plates, allowing the bonds to be used over and over again, and in making tests of sections of tracks. Yet a common thief cannot disconnect the entire bond without cutting its ends. It will also be noted that in all cases except bond E C F Fig. 1, the conductor is very short, offering but little resistance to the current and no inducement for theft; that in each case ample provision is made for a large clearance about the conductor as it passes through the splice bar terminal, for all possible rail motions; also that neither the rail nor the splice bar are injured in the least by the installation of the bond.

While I have illustrated and described several forms of the invention, I am aware that other modifications can be made therein without departing from the scope of the invention as expressed in the claims. Therefore I do not wish to be limited to all the details of construction herein shown and described, but

What I do claim is:—

1. As an article of manufacture, a rail bond comprising a flexible conductor, a solid terminal and a hollow tubular terminal thereon in axial alinement with each other, the conductor freely passing through the tubular terminal.

2. As an article of manufacture, a rail bond comprising a flexible conductor, a solid terminal on one end of the conductor, and a

hollow tubular terminal on the other end, the conductor passing freely through the tubular terminal.

3. The combination with a rail and a splice bar each having an opening, of a rail bond comprising a flexible conductor and two terminals therefor, one terminal being driven into the opening in the rail and the other in the opening in the splice bar, the conductor passing outwardly from one terminal and then inwardly through the splice bar to the terminal secured to the rail.

4. The combination with a rail and a splice bar, of a rail bond comprising a flexible conductor and two terminals therefor, one being secured to the rail and the other to the splice bar, the latter being hollow and the conductor passing freely through to the other terminal out of contact therewith.

5. The combination with a rail and splice bar, of a rail bond having two terminals, and a flexible conductor, one terminal being hollow, said conductor extending outwardly from the hollow terminal and then passing through to the other one.

6. The combination with a rail web and two splice bars, each having an opening therein, said openings being in axial alignment, of a rail bond having three terminals, one fitting in each of said openings, the terminals on the splice bars being hollow, and a flexible conductor passing through the terminal on one splice bar and into the terminal on the other splice bar through the terminal in the rail web.

7. The combination with a rail and two splice bars, each having an opening therein, of a rail bond having three terminals, one fitting in each of said openings, the terminals on the splice bars being hollow, and a flexible conductor passing through the terminal on one splice bar and into the ter-

terminal on the other splice bar through the terminal in the rail, said conductor passing freely through both splice bar terminals. 45

8. The combination with a rail and two splice bars on opposite sides thereof, of a flexible conductor and three terminals therefor, one terminal being secured in the rail and one in each splice bar, the conductor being rigidly secured to the terminal in the rail, and passing through the splice bars to the terminals thereon. 50

9. The combination with a rail and two splice bars, each having an opening therein, of a rail bond having three terminals, one fitting in each of said openings, the terminals on the splice bars being hollow, and a flexible conductor passing through the terminal on one splice bar and into the terminal on the other splice bar, through the terminal in the rail, the ends of the conductor extending beyond the splice bar terminals entering sockets therein and being secured therein by brazing or soldering. 55 60 65

10. As an article of manufacture, a rail bond comprising a flexible conductor and two terminals, one of said terminals being connected with the rail and the other with the splice bar, the conductor extending through the splice bar from the rail and having its end brazed or soldered in a socket located on the outer side of the splice bar, whereby the conductor can be detached by unsoldering the same to permit inspection and repairs. 70 75

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

CHARLES R. STURDEVANT.

Witnesses:

ALBERT E. FAY,
C. FORREST WESSON.