L. P. LOCKE.

RAIL JOINT.

APPLICATION FILED MAY 24, 1909.

979,015. Patented Dec. 20, 1910.

FIG. 1.

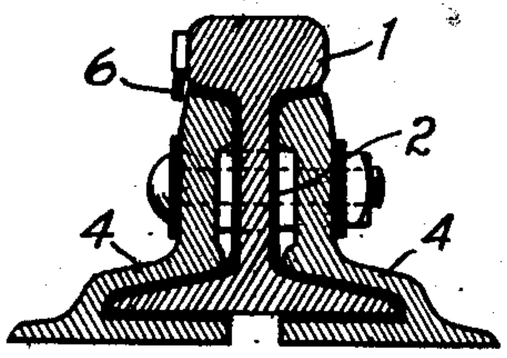


FIG. 2.

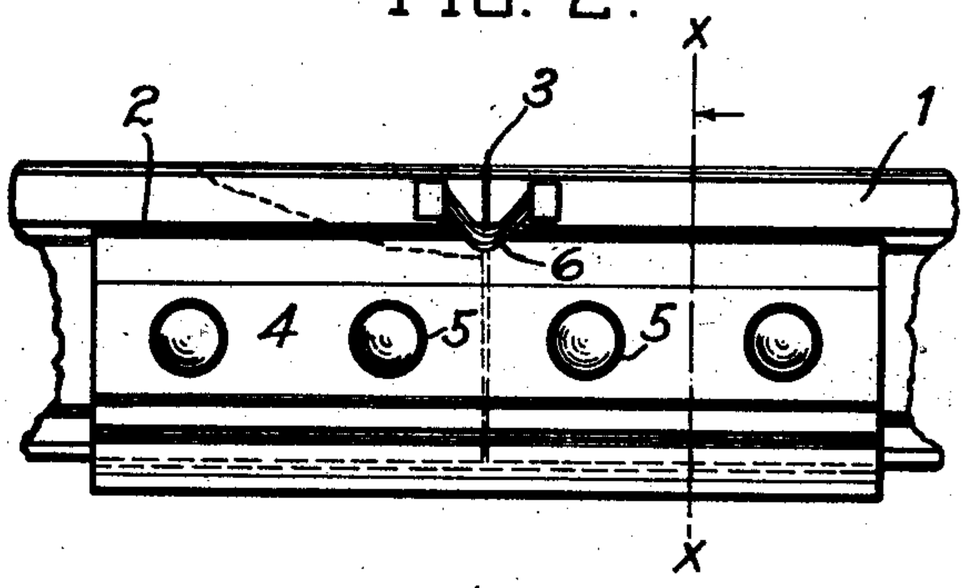
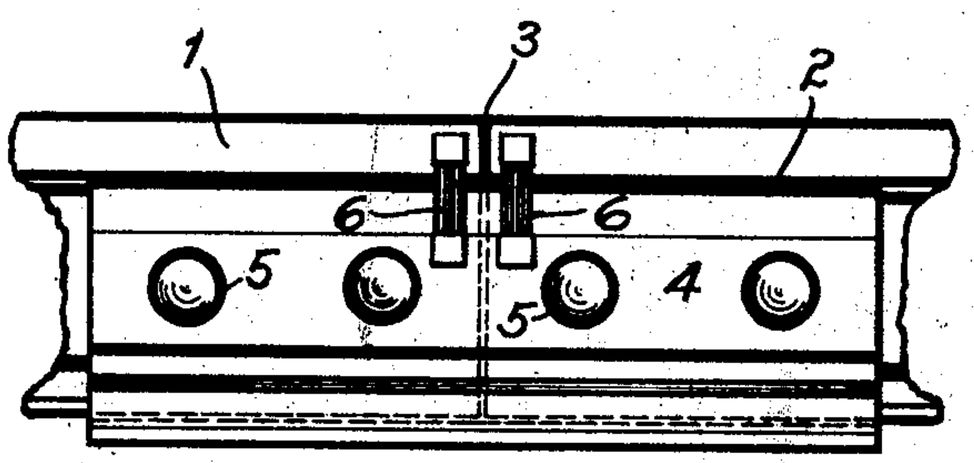


FIG. 3.



WITNESSES:

L. Thorn

C. W. Carroll

INVENTOR:

Louis P. Locke

by his attorneys-

Osgood, Davis & Dorsey

UNITED STATES PATENT OFFICE.

LOUIS P. LOCKE, OF VICTOR, NEW YORK.

RAIL-JOINT.

979,015. Specification of Letters Patent. **Patented Dec. 20, 1910.**

Application filed May 24, 1909. Serial No. 497,921.

To all whom it may concern:

Be it known that I, LOUIS P. LOCKE, a citizen of the United States, and resident of Victor, in the county of Ontario and State of New York, have invented certain new and useful Improvements in Rail-Joints, of which the following is a specification.

This invention relates to rail joints for use in connection with railways upon which electric signaling apparatus is used.

In modern electric railway signaling systems it is common to use track circuits for controlling the signals and other traffic-controlling devices, the current in these circuits flowing from rail to rail, and the ends of the rails being bonded together in order to afford a more certain and efficient path for the current. These track circuits not only operate in conjunction with the wheels and axes of the trains to control the signals in accordance with the movements of the trains, but they have the further incidental but valuable characteristic that they detect breaks in the rails, since breaks cause interruption in the track circuit, and thus have the effect of causing signals to assume the danger position.

In the track circuit as ordinarily constructed, the joints between the abutting ends of the rails are made in the ordinary manner, that is, by means of fish plates bolted to the rail ends and more or less in electrical contact with the rails, and, in addition, conductor bonds are used connecting the rails and attached to the rails at points beyond the ends of the fish plates. In such a construction the function of the track circuit in detecting breaks in the rails, as above described, is not completely performed for the reason that if such a breakage occurs in the extremities of the rails between the points of connection of the bonds, there is no interruption to the track circuit and the break is not detected. Even in the absence of a bond, this would be in general the case, since the fish plates themselves, being in electrical contact with the rails, would act to transmit the track circuit current from one rail to another through the fish plate and independently of the proximate extremities of the rails. For the same reason the ordinary track joint affords no provision for detecting breakage in a fish plate since the fish plate is not ordinarily depended upon to conduct the track circuit current, and the bond ordinarily used is not necessarily broken or disconnected in consequence of the breakage of the fish plate.

One object of the present invention is to produce an improved rail joint for use in connection with a track constituting a track circuit, this joint being so constructed that a breakage in a rail will cause an interruption in the track circuit even though it occur at the extremity of the rail, that is, between the abutting ends of the rails and the ends of the fish plates. To this end I so construct my rail joint that the rails are electrically connected at their extremities only, while the fish plates are insulated from the rails, at least at the end portions of the fish plates, so as not to constitute electrical bonds between the portions of the rails substantially removed from their proximate extremities.

A form of breakage very common in connection with a rail joint is the breaking away of the head alone of the rail at the end thereof, and a further object of the invention is to so arrange the joint that such a breakage shall be detected, as well as a break extending entirely through the rail. To this end I connect the proximate extremities of the rails by a conductor joining the rails at their heads, so that in case the head of either rail is broken away, this conductor is interrupted.

A third object of the invention is to produce a rail joint which shall detect a break in a fish plate. To this end I so connect the extremities of the rails with a fish plate that the fish plate constitutes a portion of the conductor connecting the extremities of the rails, so that in case of a break in the fish plate, this conductor is interrupted and the track circuit broken.

In the accompanying drawings: Figure 1 is a transverse section of a rail joint embodying the present invention in its simplest form, taken on the line X—X in Fig. 2; Fig. 2 is a side elevation of the joint shown in Fig. 1; and Fig. 3 is a side elevation of a modified form of the joint adapted to detect a break in a fish plate.

In the illustrated embodiment of the invention, the rails 1 are joined by fish plates 4 in the usual manner, but the fish plates are insulated from the rails by sheets of insulating material 2, the extremities of the rails are insulated from each other by a plate 3 of insulating material, and the bolts by which the fish plates are secured in place

are also insulated by washers 5 of insulating material. This construction is the same as that used in the ordinary insulated rail joint, but in the present instance it is employed not to create an interruption in the conductivity of the track, but merely to permit the confinement of the electrical connection to the extremities of the rails.

In Figs. 1 and 2 the rails are connected by a short bond 6 of any ordinary or usual form, this bond being plugged into the rails in the usual manner, but being connected with the heads of the rails instead of being connected with the webs in the usual manner. The usual long bonds connecting the rails beyond the ends of the fish plates are expressly omitted.

In the construction above described the only path for the current flowing through the track circuit is through one rail to its extremity, thence through the bond 6 to the extremity of the abutting rail, and thence through the latter rail. It is obvious, therefore, that if either rail is broken, even though such breakage occur between the ends of the fish plates, it will interrupt the track circuit and afford a danger signal. This is the case even though the break be merely at the head of the rail, as shown in Fig. 2 by dotted lines, for, owing to the fact that the bond is connected with the head only of the rail, such a break will interrupt the circuit. This is a valuable feature of the invention, for breaks of this character are very frequent, and are, in fact, much more likely to occur than breaks extending completely through the rail.

The embodiment of the invention illustrated in Figs. 1 and 2 is the simplest embodiment, but it is not adapted to detect breaks in the fish plates, and for this reason the form illustrated in Fig. 3 is in some cases preferable. In this form of the invention, two bonds are used, each bond connecting the extremity of one rail with one of the fish plates. The two bonds and the intermediate portion of the fish plate thus constitute a short conductor of low resistance connecting the extremities of the rails, and in this respect are equivalent to the single bond of Figs. 1 and 2. If the fish plate should break, however, between the points of connection of the two bonds, the circuit would thereby be interrupted. Such a break is most likely to occur in the fish plate at the point of junction of the two rails, and thus between the bonds. This form of the invention gives, therefore, complete protection against a serious breakage in the track.

My invention is not limited to the embodiment thereof hereinbefore described and illustrated in the accompanying drawings, but may be embodied in various forms within the nature of the invention as it is defined in the following claims.

I claim:—

1. The combination of two abutting rails electrically and mechanically connected at their adjacent extremities, said connections including a fish-plate secured to the rails and insulated therefrom at its ends.

2. The combination of two abutting rails electrically and mechanically connected at their adjacent extremities, said connections including a bond and a fish-plate, the fish-plate being secured to the rails and being insulated therefrom at its ends.

3. The combination of two abutting rails, and a rail joint comprising a short conductor of low resistance connecting the heads of the rails at their adjacent extremities, the rails, except at said points, being electrically disconnected from each other.

4. The combination of two abutting rails, and a rail joint comprising a conductor connecting the heads of the rails and comprising a bond secured to the head of one rail substantially at the extremity thereof, the rails, except at the extremities of their heads, being electrically disconnected from each other.

5. The combination of two abutting rails insulated from each other, and a fish plate secured to the rails, the fish plate being insulated from the rails at its ends and electrically connected with the rails at their adjacent extremities.

6. The combination of two abutting rails insulated from each other, a fish plate secured to the rails and insulated therefrom, and two bonds connecting the rails, respectively, with the plate on opposite sides of the joint.

7. The combination of two abutting rails insulated from each other, a fish plate secured to the rails and insulated therefrom, and two bonds connecting the adjacent extremities of the heads of the rails, respectively, with the fish plate on opposite sides of the joint.

LOUIS P. LOCKE.

Witnesses:
C. A. MOORE,
B. A. PLIMPTON.