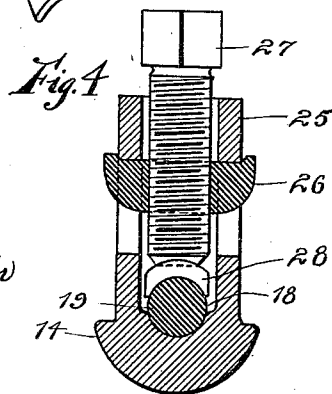
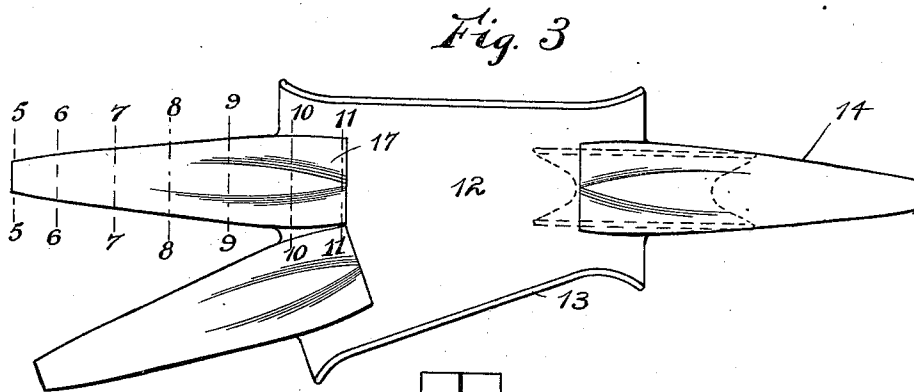
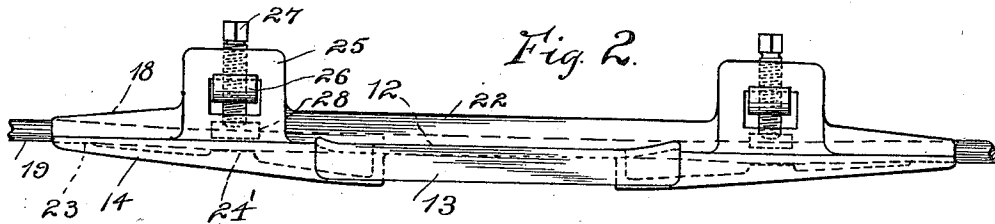
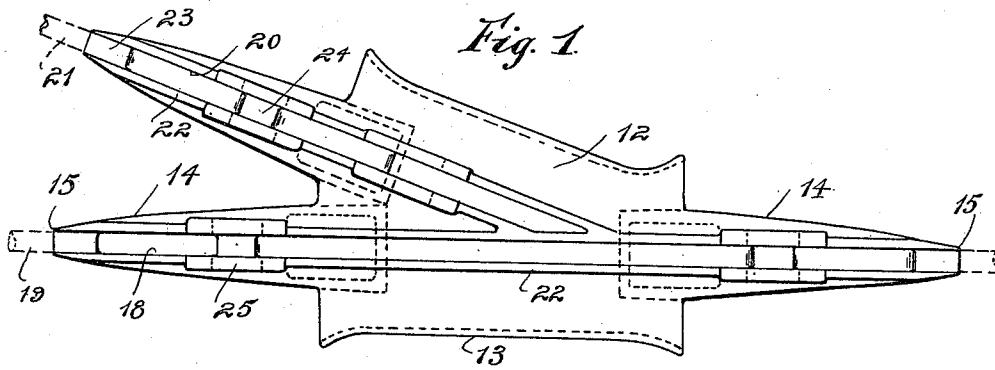


R. E. NOBLE & L. E. MITCHELL.
TROLLEY FROG AND CROSSING.
APPLICATION FILED JUNE 11, 1909.

1,004,811.

Patented Oct. 3, 1911.

2 SHEETS—SHEET 1.



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2 SHEETS-SHEET 2.

Fig. 5

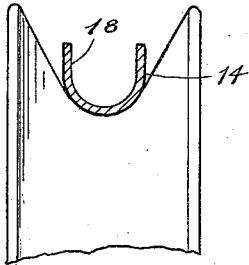


Fig. 6

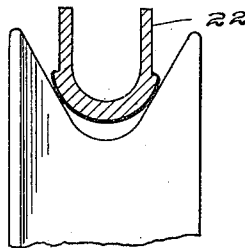


Fig. 7

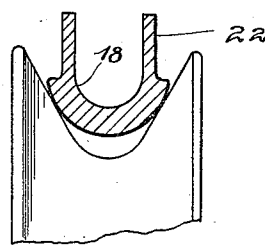


Fig. 8.

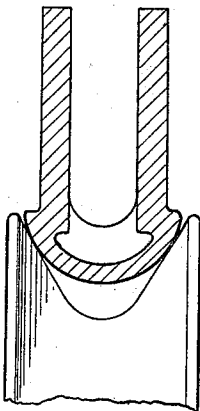


Fig. 9

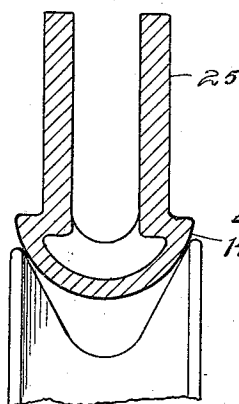


Fig. 10.

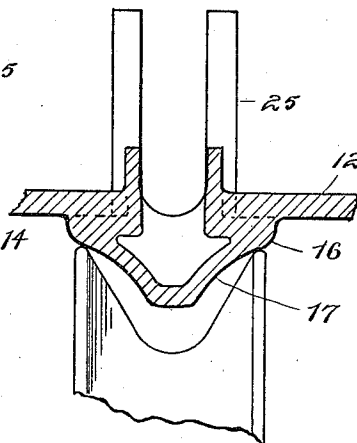
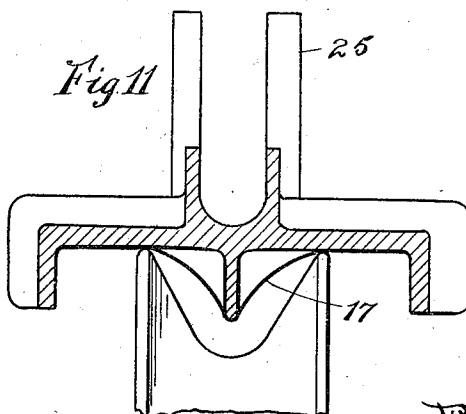


Fig. 11



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UNITED STATES PATENT OFFICE.

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TROLLEY FROG AND CROSSING.

1,004,811.

Specification of Letters Patent.

Patented Oct. 3, 1911.

Application filed June 11, 1909. Serial No. 501,497.

To all whom it may concern:

Be it known that we, RALPH E. NOBLE and LOUIS E. MITCHELL, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Trolley Frogs and Crossings, of which the following is a specification.

It is the common practice to provide the ordinary forms of frogs, crossings, and other similar devices or guideways for overhead trolley wheels, with ribs or arms so that when the trolley wheel passes from the wire to make contact with the lower side of the plate thereof, the point of contact is changed from the bottom of the groove in the wheel to the outer periphery of the wheel flanges. These arms or ribs are made comparatively thin to correspond with the cross-section of the wire, that is, so as to merely make contact with the bottom of the groove in the wheel. We have, therefore, observed that when the trolley wheel is running along under the wire or in contact with such ribs, it is given a comparatively large number of revolutions on account of the relatively small diameter at the bottom of the groove; and then, when the wheel comes in contact with the plate, it is given a much less number of revolutions, in proportion to the speed of the car, on account of the relatively large diameter of the wheel flanges. The change from the contact with the ribs to contact with the plate is made rather suddenly, so that there must necessarily be a sudden braking action placed on the trolley wheel, tending to reduce its speed of rotation to make up for this difference. Again, in leaving the plate to pass onto the ribs and from thence to the trolley wire, there will be a correspondingly sudden change tending to increase the speed of revolution of the wheel from its speed while crossing the plate to its normal speed while running along the wire. These sudden changes in the speed of revolution of the trolley wheel cannot help to be more or less injurious thereto and to the frog or crossing.

It is one of the principal objects of our invention to provide a rib or arm for such a trolley frog, crossing, or other similar device, so that the change from the speed of revolution of the trolley wheel while running along the wire to that while running along under the plate of the frog or other device, will be

made gradually, thereby preventing the sudden change above pointed out and also preventing the injurious effects consequent upon such change; another object of our invention is to improve the method of securing the wires to the frog or crossing; and our invention also includes such other improvements in construction as will be pointed out and claimed hereinafter.

We have illustrated our invention in the accompanying drawings, in which—

Figure 1 is a plan view of a frog embodying the principal features thereof; Fig. 2 is a side elevation of the same; Fig. 3 is a bottom plan view; Fig. 4 is an enlarged sectional view showing a detail of the wire clamping device; and Figs. 5 to 11, inclusive, are partly sectional and partly diagrammatical views illustrating the manner in which the trolley wheel makes contact with the arm or rib; these views being taken at the positions correspondingly indicated in Fig. 3.

While we have illustrated our invention in connection with a railway frog and for convenience will describe it in connection therewith, it is, as above suggested, also applicable to railway crossings or other overhead guideways for trolley wheels, and the following specification is intended to include such devices.

As shown in these drawings, 12 indicates the plate of a trolley frog having depending side flanges 13. At the end of the plate 12 are downwardly and outwardly projecting ribs or arms 14, the particular form of which comprises one of the principal features of this invention. At their outer ends these ribs are tapered down as indicated at 15 to correspond as closely as possible with the size of the trolley wire; from thence toward the plate these ribs are gradually increased in thickness, or their lower surface is given such a form as will cause the under-running trolley wheel to gradually change its point or line of contact from the bottom of the groove thereof up along the sides of said groove until finally at the time the wheel passes onto the plate the contact will be substantially at the outer periphery of its flanges, so that there will be no abrupt change in the speed of revolution of the wheel in passing through the frog or crossing. In order to secure the desired conformation of the bottom portion of these ribs or arms, we preferably form the lower

portion thereof as most clearly indicated in Fig. 3 and Figs. 5 to 11, inclusive. From these illustrations it will be noted that at the outer end of the arm or rib its lower edge corresponds closely with the bottom of the groove in the trolley wheel. The curved lower edge is then widened as indicated successively in Figs. 6 to 10, inclusive, so that the line, or lines, of contact is gradually shifted from the bottom of the groove to the outer edges of the flanges.

In order to accommodate wheels varying in width, we preferably make the lower face or side of the arms or ribs adjacent to the plate with a slight reversed curve as indicated at 16. Also, in order to allow the wheel to turn laterally with respect to the plate so as to accommodate the wheel to the position of the trolley pole in passing around curves, we prefer to groove the ribs somewhat adjacent to the ends thereof nearest to the plate, as indicated at 17, although this may not be necessary in all cases. By means of this particular form of rib, which may be utilized in connection with different types of frogs or crossings or the like, it will be noted that the trolley wheel will pass from the wire to the end of the rib or arm where contact is made with the bottom of the groove; then, as it passes farther along onto such rib or arm, the contact will be made farther up along the sides of the groove until finally the contact is at the outer edges of the flanges, this change being made gradually so that there will be no sudden stoppage of the speed of revolution of the wheel. Likewise, in passing from the plate of the frog or crossing, the contact will gradually change from the flanges of the wheel down along the inner sides of the groove thereof until finally it will be at the bottom of the groove at about the time the wheel passes onto the wire, thereby preventing any sudden change in the speed of the wheel in passing from the frog or crossing.

Along the upper side of the frog is a groove 18 for the straight or main wire 19 in the form of frog shown, and a groove 20 for the branch wire 21, these grooves being provided with side flanges 22 preferably made integral with the tops of the plate 12 and arms or ribs 14. The bottoms of these grooves are preferably cored out as indicated in the drawings to lighten the structure and also to allow definite points of contact for the wire, the bottom of the groove being arranged so that the wire is preferably engaged at the outer end of the arms as indicated at 23 and again makes contact with an upward projection in the bottom of the groove as indicated at 24, this second point of contact being somewhat lower than the first so that the outer end of the arm will be sure to engage closely with the wire. In order to clamp the wire at the point indi-

cated at 24, the flanges 22 are enlarged and extended upwardly to form supports or bearings 25 which are recessed to receive a removable nut 26, as clearly indicated in Figs. 2 and 4. A screw 27 passes down through the nut 26 and engages either with the wire or with a clamp or follower 28 which presses against the wire and holds it down against the projection 24 in the bottom of the groove. It will be readily seen that on account of this method of attaching the frog or crossing to the wires, it will not be necessary to sever the main wire, and the ends of the arms will be pressed securely against the wires so that there will be a smooth connection made at such point. Furthermore, on account of the removable nuts 26, the wires may be readily slipped into position in the grooves and then the nuts and screws inserted in order to complete the connection.

Having thus described our invention, which we do not wish to limit to the exact form or details shown and described, what we claim and desire to secure by Letters Patent is:

1. A trolley frog or crossing having grooves in the top thereof to receive the trolley wires, said grooves being lower at the central portion of the frog than at the ends of the arms, upwardly projecting lugs at some distance from the ends of the arms, slots in said lugs, nuts engaging with said slots, and screws adapted to engage with said nuts and with the wire to clamp the wire to the frog or crossing, the arrangement being such that the wire will be bent downwardly at the central portion of the frog and will engage closely with the bottom of the groove at the ends of the arms.

2. In a device of the character set forth, the combination of a plate adapted to be engaged by the flanges of the trolley wheel, ribs or arms projecting from said plate, having their lower surfaces curved and tapered so as to cause a gradual change in the speed of revolution of the trolley wheel as it passes from the wire to said plate, grooves along the top of said ribs and said plate for receiving the wires, upwardly extending bearings adjacent to said grooves, removable nuts engaging with said bearings, and screws adapted to engage with said nuts and with the wire.

3. A trolley frog or crossing having grooves in the top thereof to receive the trolley wires, said grooves being provided with upwardly extending end and intermediate projections in the bottom thereof for engagement with the wire, the end projections being higher than the intermediate projections, and clamps over said intermediate projections for clamping the wire, the arrangement being such that the wire will be bent downwardly along the central portions

of the frog, thereby causing the ends of the frog to engage closely with the wire.

4. The combination with the plate of a trolley frog or the like, of means for directing the trolley wheel from a wire to the plate and away therefrom so that the speed of revolution of the trolley wheel will be gradually changed either in passing to the plate from the wire or in passing from the plate to the wire.

5. In a trolley frog or crossing, the combination of a plate, with a guide rib or arm having its lower edge tapered or widened toward the plate so that the line, or lines, of contact with the trolley wheel in passing thereunder is gradually changed from the

bottom of the groove of the wheel to the outer edges of the flanges thereof.

6. A guide rib or arm of the character described, having its lower edge formed so as to permit the contact with a grooved trolley wheel to be shifted gradually from the bottom of the groove to the outer edges of the flanges, or vice versa, in passing under said rib, and having portions of the lower surface thereof cut away to allow the wheel to turn laterally with respect to said rib.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."