No. 723,062. PATENTED MAR. 17, 1903.

S. B. STEWART, JR.

THIRD RAIL INSULATOR.

APPLICATION FILED SEPT. 29, 1900.

NO MODEL.

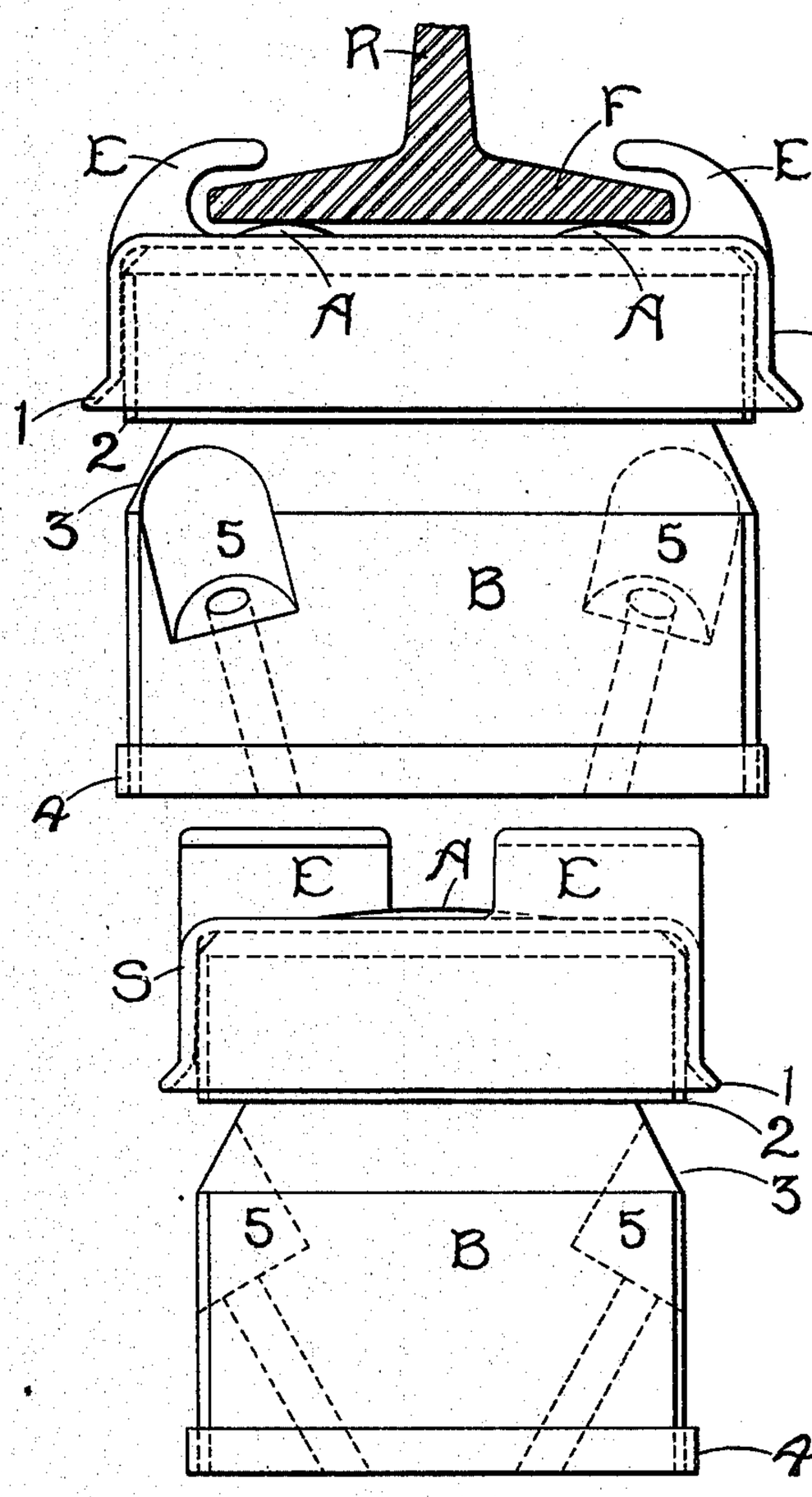

Fig. 1.

Fig. 2.

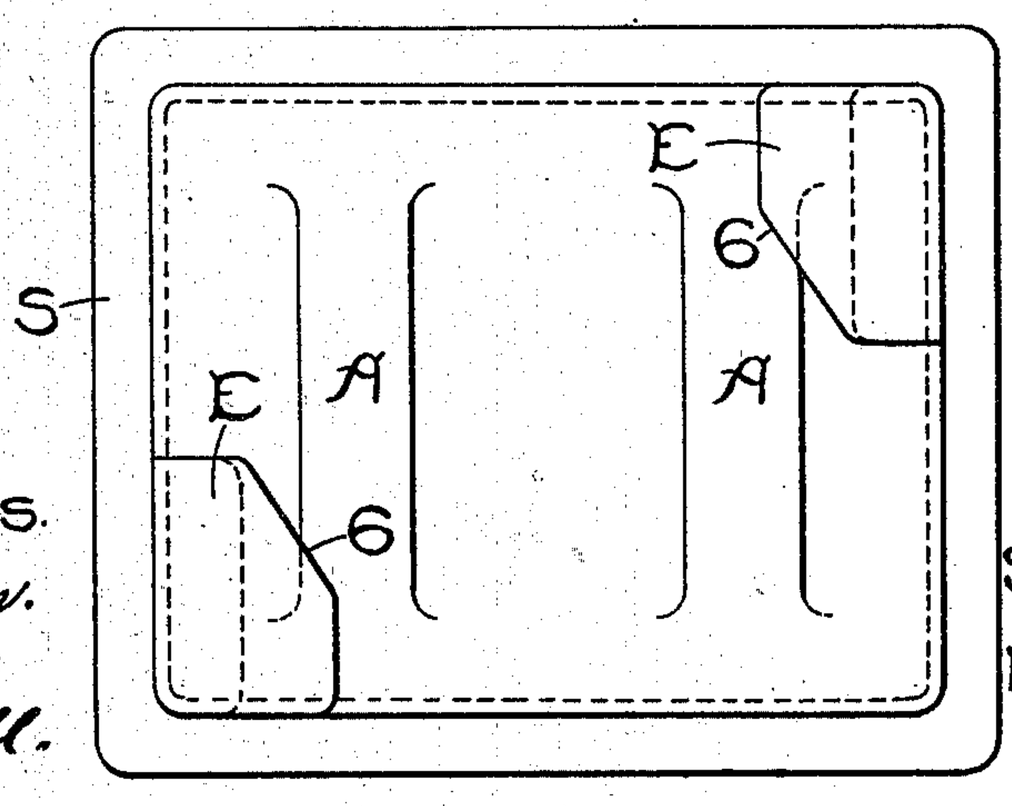

Fig. 3.

Witnesses.
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UNITED STATES PATENT OFFICE.

SAMUEL B. STEWART, JR., OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

THIRD-RAIL INSULATOR.

SPECIFICATION forming part of Letters Patent No. 723,062, dated March 17, 1903.

Application filed September 29, 1900. Serial No. 31,511. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL B. STEWART, Jr., a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Third-Rail Insulators, (Case No. 1,408,) of which the following is a specification.

This invention relates to improvements in insulating-supports for the power-conductor rails of electric railways, which are popularly called "third rails," being usually of the same type as the track-rails. Insulators of this type hitherto in use have been satisfactory with respect to their insulating qualities; but owing to their structure they have not had sufficient mechanical strength to withstand the strains to which they are subjected by the expansion and contraction of the rails and by vertical movements of the ties on which they are usually mounted, which movements are caused by passing trains. The problem presented by the expansion and contraction of the rails is the most serious with which the makers of third-rail insulators have to contend, the variation in length of a section of five hundred feet, for example, being frequently three inches or more.

Insulators hitherto in use have been provided on opposite sides of their upper portions or rail-supports with ears or lugs which tightly grip and securely hold the base of the conductor-rail. Each of these ears is in certain types cut away at one corner, so that when the support is turned at an angle to the rails the rail can be inserted upon the top of the support, and when the latter is moved back in line with the rails the rail will be securely gripped and held beneath the ears. Although the ears have been formed integral with a malleable-iron support, they are frequently broken off, and in such case not only is the usefulness of the insulator at an end, but the rail itself will slip off from one side of the top of the support, and the downwardly-spring-pressed collector-shoe carried by the car will be forced against the free abutting end of the next rail and wrecked. If the ears fail to break, the rail will either pull the insulator from the ties or break it, in any case causing the displacement of the rail from the path of the collecting-shoe. As the greater effect of the expansion and contraction of the rails is longitudinal, it might reasonably be supposed, since the ears do not hold the rail from longitudinal movement, that the rail could move longitudinally between the ears without affecting them. This, however, is not the case, as in practice it has been found that the reason that the ears have been broken off is because the insulator had been tipped in the running direction of the rail. This action was caused by the sticking of the foot of the rail to the top of the iron rail-support of the insulator, which was in turn caused by the formation of rust-scales between the rail and the support, which substantially welded the two together.

As has been stated above, the insulators are usually mounted on the same ties to which the traffic-rails are secured, and therefore when the car or train is passing the ties and insulators are depressed, thus pulling the ears against the foot of the rigid rail, causing them to be broken off. It has been proposed to make the insulator in two relatively movable parts, one to be secured to the tie and the other adapted to retain the conductor-rail tightly beneath the ears, thus permitting the lower portion to move with the ties at the time of the passage of a train thereover without affecting the upper portion, which retains the foot of the rail. It is evident that if the base of the rail and the top of the insulator are stuck together by rust, so that by expansion and contraction and by the action of the collector-shoe the insulator is tilted, the parts of such an insulator will be held tightly together by the clamping action of the rail, so that the latter will have absolutely no free movement at the time of the passage of a train and the ears be broken off just as if the insulator had been made in one instead of two pieces.

The above-described difficulties have been a serious annoyance to railroad managers for some time, and competent engineers have been at a loss for a solution of the problem presented.

Insulating-supports constructed in accordance with this invention are no more difficult or costly to make than those hitherto in use,

but they overcome all the defects in the latter which have proved serious in practice.

The invention consists in providing means for insuring free movement of the conductor-rail through the top of the insulating-support and is not limited to details of structure.

Of the drawings, Figure 1 is an end elevation of an insulator constructed in accordance with my invention, showing also in section a portion of a conductor-rail in position upon the top of the support of the insulator. Fig. 2 is a lateral elevation of the same, the rail being removed; and Fig. 3 is a plan according to Fig. 1, but with the rail removed.

The angular insulating-base B of the support is made of suitable wood, such as ash, which is prepared and japanned to increase its insulating properties. A metal band 4 surrounds its lower part to prevent splitting or spreading by the bolts by which it is secured to a tie, which bolts extend through incisions 5 on opposite sides of the base, which incisions are oppositely inclined in the direction of motion of the train and collector-shoes carried thereby. The base B is cut away, as shown at 3 and 2, to increase the moisture-creeping surface, and over its upper portion is jammed the support S, preferably formed of malleable iron, to make a tight fit. The lower edge of the support S is formed with a petticoat for shedding moisture and which also increases the internal creeping surface. Integral projections or ridges A are formed on the top of the support S, and they are curved longitudinally and laterally, so that a very small portion of their surface is in contact with rail R, whose foot F rests upon the ridges, so that the rail when caused to be tilted, as described above, can rock longitudinally or laterally. Since the very small surface of these ridges is in contact with and carries the weight of the conductor-rail and the ridges form a space between the rail and support, the rust-scales which form in the top of the support S and the bottom of the rail-base F are powerless to cause a union or weld of the support and rail. This space also prevents the lodgment of water between the rail and the support and offers free access to air-currents, which will evaporate any water which might temporarily lodge in the space. The latter is thus free at all times to move longitudinally between the ears and without tilting the support, so that the ears will not be broken. Integral ears E also extend upwardly from diagonally opposite corners of the top of the support S, their office being to prevent the rail from moving laterally from off the support and from being removed vertically from the support when the latter is fixed in the road-bed. A sufficient distance exists between the inner surfaces of the ears and the top of the support to provide room for the free movement of the base of the rail when it is rocked longitudinally or laterally. This space also serves to provide limited free vertical movement of the support independently of the conductor-rail when the tie on which the support is mounted is depressed by a passing train. As shown in Fig. 3, each ear is cut away to permit the insertion of the rail-base beneath the ears.

The support S is rigidly mounted upon the square wooden base B at the factory. When the device is to be used, it is turned at an angle to the road-bed, so that the lines 6 6 are parallel with the desired line of rails. The rail-base may then be readily inserted upon the ridges A, and then the entire device is turned so that the ridges A are parallel to the rail, and finally bolts are inserted through the openings 5 and are secured in the tie.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A rail-insulator support which is provided with ears for holding the rail upon its top, and means for insuring free longitudinal and vertical movements of the rail between the ears.

2. A rail-insulator support which is provided with means for forming a space between the proximate surfaces of the rail and support, to prevent their sticking together by rust.

3. A rail-insulator support which is provided with integral projections of relatively small surface, upon which the rail rests.

4. A third-rail insulator comprising an insulating-body adapted to be mounted on the ties or sleepers to which the track-rails are secured and a rail-support rigidly carried thereby, the said support being provided with ears which in the operative position of the support overhang the flange of the rail but are separated from the top of the support and from the flange of the rail by an amount sufficient to permit a free vertical movement between the rail and the support so that when a passing train depresses the ties the support may also be depressed without causing a relative movement between the support and the insulating-body on which it is mounted.

5. A rail-insulator support which is provided with projections of relatively small surface, which projections are higher at the longitudinal center of the support to permit the rail to rock longitudinally.

6. A rail-insulator support which is provided with projections of relatively small surface, and higher at certain transverse points than others, to permit the rail to rock transversely.

7. A rail-insulator support which is provided with projections of relatively small surface, higher at the longitudinal center of the support, and higher at certain transverse points than at others to permit the rail to rock longitudinally and transversely.

8. A rail-insulator support which is provided with a longitudinal ridge which is curved transversely and longitudinally.

9. A rail-insulator support which is provided with projections of relatively small surface, and higher at some points than at others,

to permit the rail to be rocked or tilted, and is also provided with ears which in the operative position of the support prevent the removal of the rail therefrom, but which have sufficient space between them and the top of the support to allow free relative movement of the rail and the support.

10. A rail-insulator support of malleable iron, which has integral projections of relatively small surface, and integral ears for retaining the rail, which allow a limited relative movement of the rail and support.

11. A third-rail insulator comprising an insulating-body adapted to be mounted on the ties or sleepers to which the traffic-rails are secured and a third-rail support rigidly mounted thereon, the said support being provided with ears rigid with the support which in the operative position of the support overhang the flange of the rail but are separated from the top of the support and from the flange of the rail by an amount sufficient to permit a free vertical movement between the rail and the support so that when a passing train depresses the ties the support may be depressed without causing a relative movement between the support and the insulating-body on which it is mounted.

12. A rail-insulator support provided with ears which in the operative position of the support overhang the flange of the rail and prevent the removal of the rail laterally or vertically therefrom, the said ears being separated from the top of the support and from the flange of the rail by an amount sufficient to permit a free relative movement of the rail and the support on the passage of a train, and projections of relatively small surface between the proximate surfaces of the rail and support.

13. An insulated support for conducting-rails which is provided with means for forming a space between the rail and the support, whereby rust-scales are prevented from forming to cause the rail to stick to the support.

14. The combination with a base, of a rail-support rigidly mounted thereon, insulating material between the support and the base, and lugs or ears on the said support, the said ears being arranged to overhang the flange of the rail in the operative position of the support and being separated from the top of the support and the flange of the rail by an amount sufficient to permit a free vertical movement between the rail and the support on the passage of a train.

15. In a third-rail insulator, the combination with the insulating-body, of a third-rail support rigidly carried thereby, and means combined with the support to normally hold the third rail from lateral and vertical removal, but also to permit the support to be depressed independently of the rail.

In witness whereof I have hereunto set my hand this 26th day of September, 1900.

SAMUEL B. STEWART, JR.

Witnesses:
BENJAMIN B. HULL,
GENEVIEVE HAYNES.