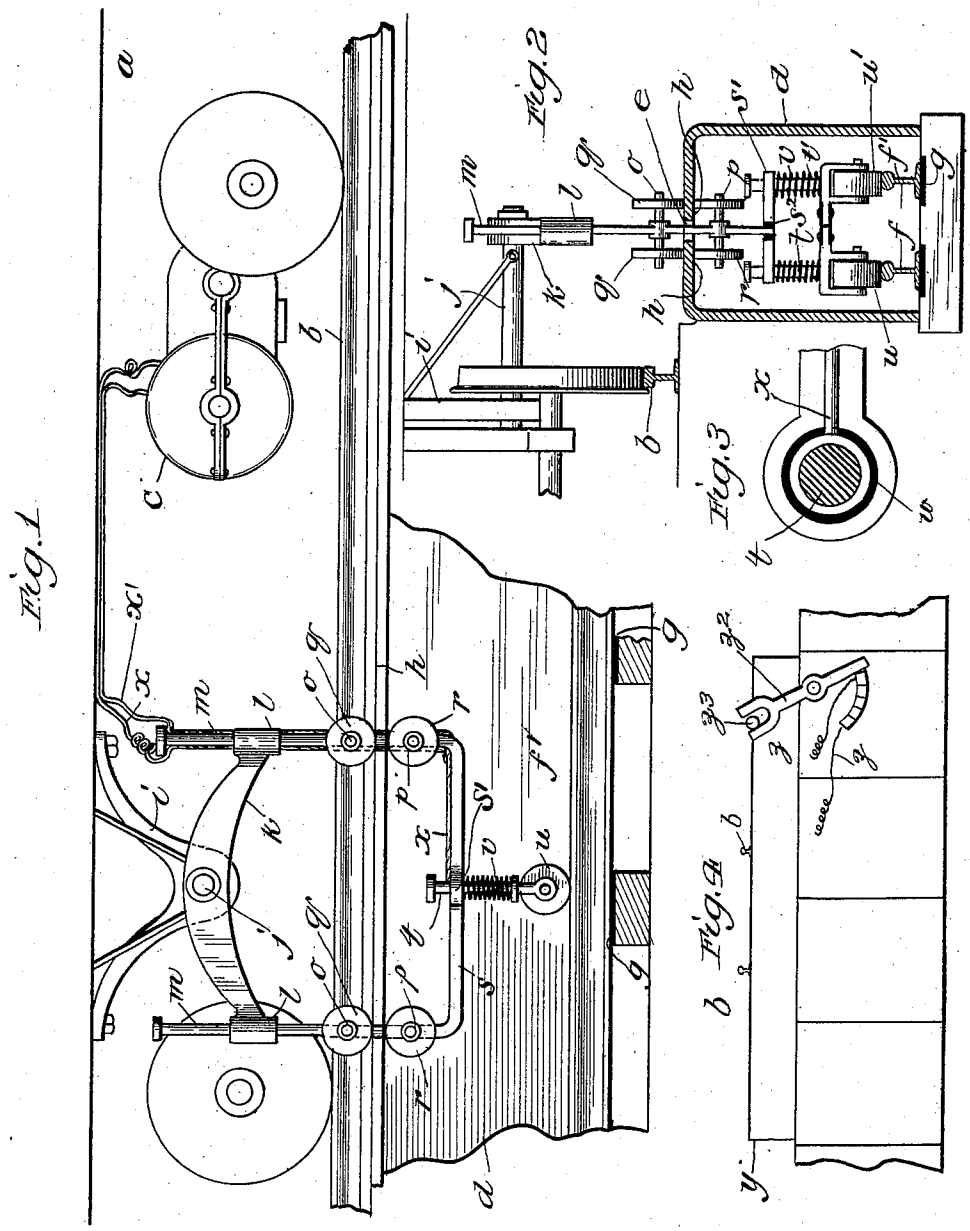
No. 692,817. Patented Feb. 11, 1902.

D. S. BERGIN.

ELECTRIC SYSTEM FOR RAILWAYS.

(Application filed May 11, 1901.)

(No Model.) 3 Sheets—Sheet 1.



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Fig. 5

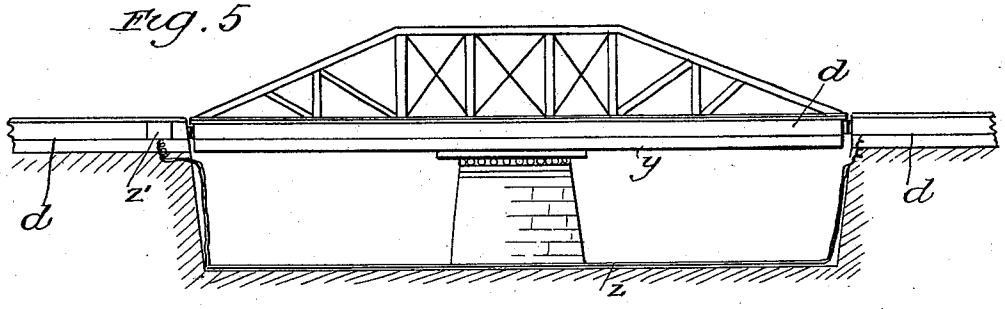


Fig. 6

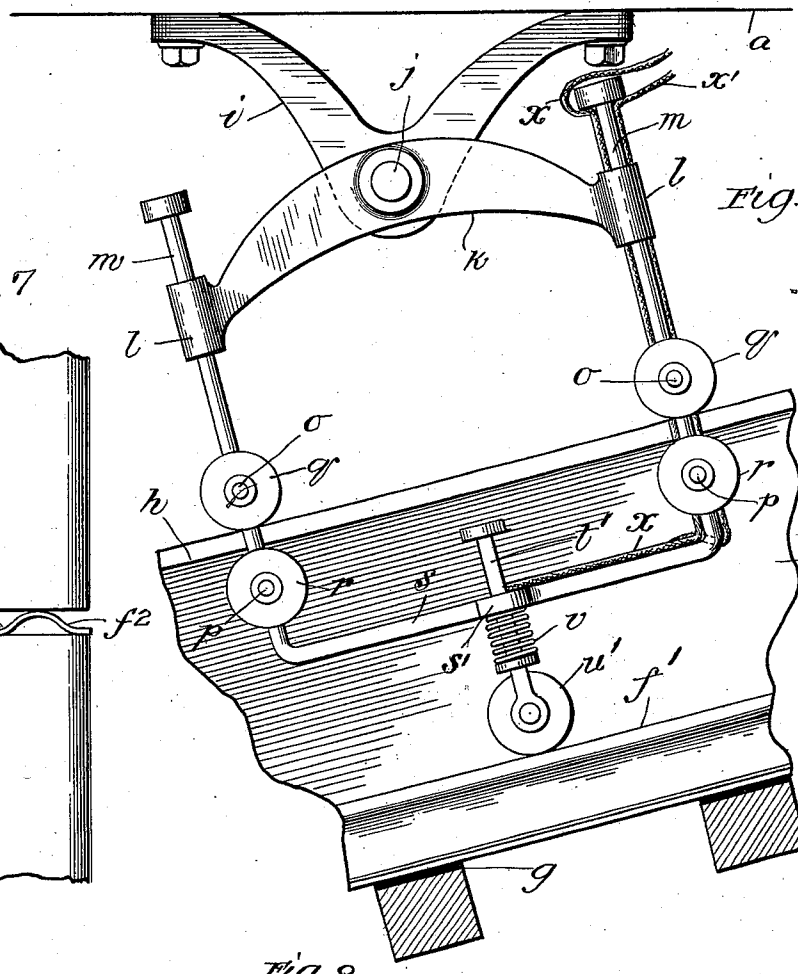


Fig. 7

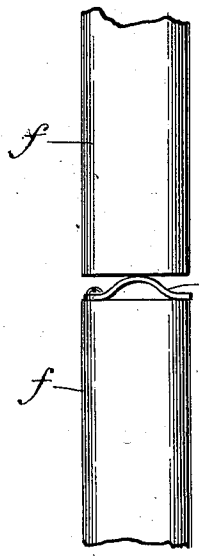
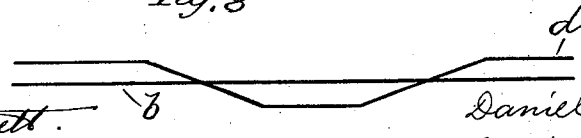


Fig. 8



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Fig. 9

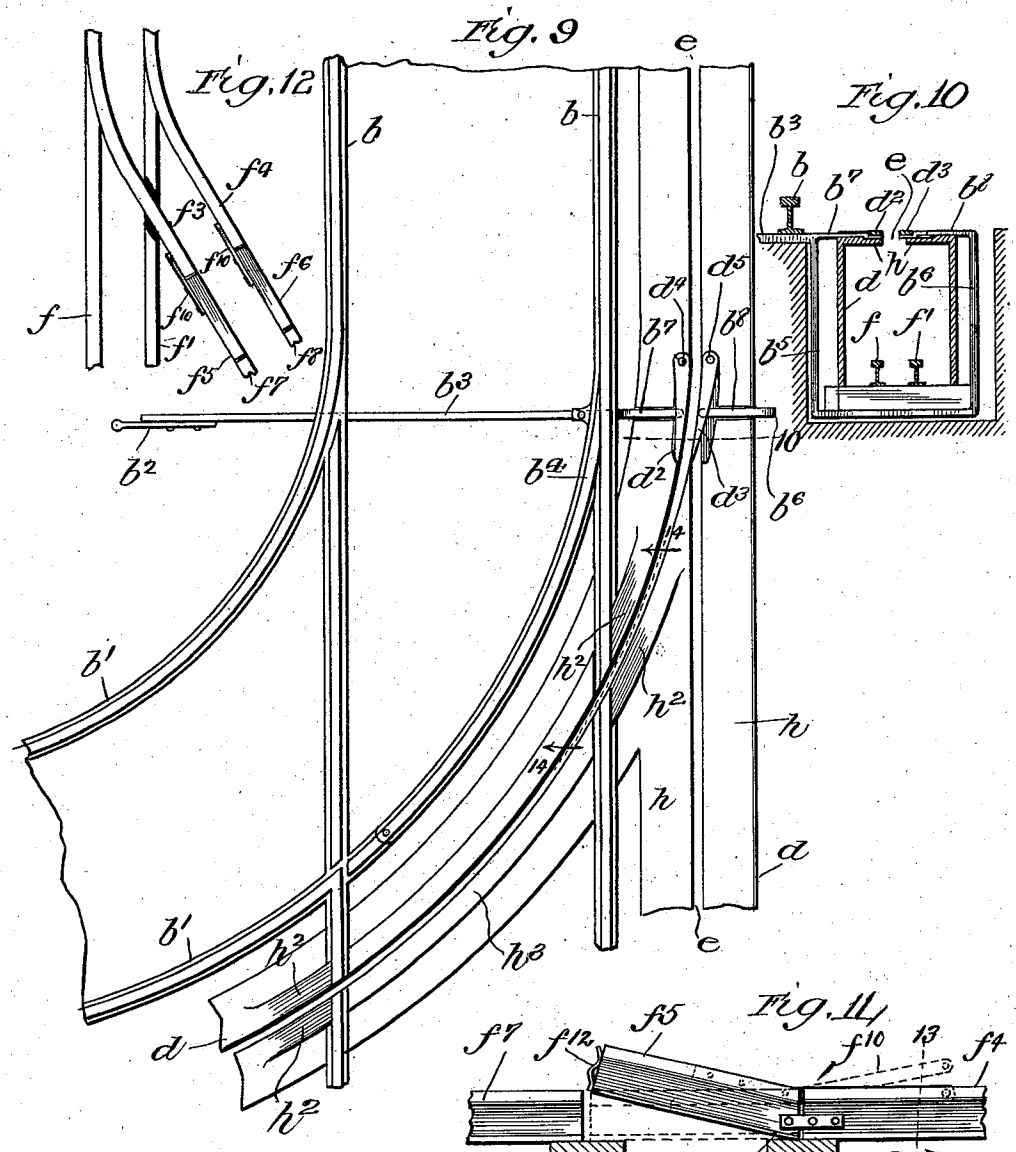


Fig. 12

Fig. 10

Fig. 11

Fig. 14

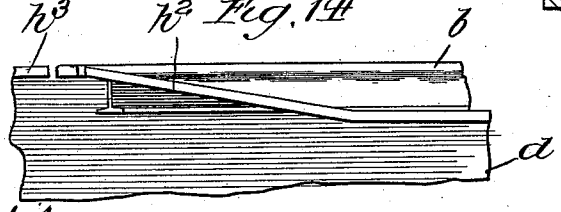
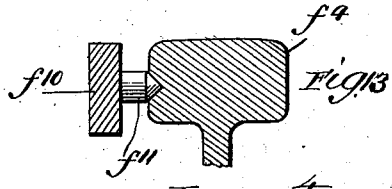


Fig. 13



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UNITED STATES PATENT OFFICE.

DANIEL S. BERGIN, OF CHICAGO, ILLINOIS.

ELECTRIC SYSTEM FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 692,817, dated February 11, 1902.

Application filed May 11, 1901. Serial No. 59,715. (No model.)

To all whom it may concern:

Be it known that I, DANIEL S. BERGIN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Systems for Railways, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in which corresponding letters of reference in the different figures indicate like parts.

My invention relates to electric systems for railways; and my object is to provide a system which shall be so constructed that a certain and positive contact may at all times be insured between the contact element and the conductor regardless of the variations in level between the latter and the car or between the conductor and the top walls of the casing in which it is located, all of which is hereinafter more particularly described, and definitely pointed out in the claims.

In the drawings, Figure 1 is a side view showing a portion of a car and conduit embodying the features of my invention. Fig. 2 is a transverse vertical sectional view thereof. Fig. 3 is an enlarged detail view in plan, showing the manner of connecting the electric insulated conductor with the trolley. Fig. 4 is a detail view of one end of a drawbridge, showing a rheostat connected therewith for controlling the electric current. Fig. 5 is a side view showing a stream of water, a drawbridge, and an electric conductor beneath the stream. Fig. 6 is a side view of a portion of a conduit and a trolley-carriage, showing the manner in which the carriage adapts itself to inclines. Fig. 7 is a plan view in detail of a portion of a third rail, showing the meeting ends of two sections, one of which is movable, as it would be upon a drawbridge, and provided with means for making an electric contact. Fig. 8 is a diagrammatic view showing the relative levels of the track and conduit. Fig. 9 is a plan view of a railway-track and conduit, showing my improved switching mechanism. Fig. 10 is a transverse vertical sectional view taken upon the line 10, Fig. 9. Fig. 11 is a side view in detail of one of the switch electrical conductors, showing the manner of automatically cutting the same out of circuit. Fig. 12 is a diagrammatic plan view thereof. Fig. 13 is a sectional view taken upon the line 13 13, Fig. 11; and Fig. 14 is a detail view taken upon the line 14 14, Fig. 9, viewed in the direction of the arrows there shown.

Referring to the drawings, *a* represents the body of a railway-car the wheels of which are mounted upon a track *b*. A motor *c*, Fig. 1, of any well-known form of construction, is adapted to propel the car receiving its current from an electrical-supply conductor, as hereinafter described. Located beside the track *b* and running parallel therewith is a conduit *d*, the walls of which are constructed from wood or other suitable material, said conduit being entirely closed, with the exception of a longitudinal slot *e* at the top and suitable openings at the bottom to permit water or moisture to drain therefrom. Preferably two electrical-supply conductors or "third rails" *f f'* are located in the conduit *d* and in case the bottom of said conduit is formed from metal are insulated therefrom by means of insulating material *g*. The parts *h h* constitute the top of the conduit and likewise form the equivalent of the usual slot-rails and will be hereinafter designated as such.

Rigidly attached beneath or to the side of the car *a* is a bracket *i*, upon a horizontal arm *j* of which is pivotally attached a cross-bar or yoke *k*, having heads *l l* upon the ends, which heads are provided with vertical bores, into which are inserted vertical guide-rods *m m*, constituting a portion of the frame of a movable contact or trolley carrier. Upon the bars *m* are formed horizontal axles *o p*, said axles having wheels *q q r r*, the former of which are above and the latter below the slot-rails *h*. The bars *m m* are connected at the bottom by means of a bar *s*, Figs. 1 and 6. A cross-bar *s'* is rigidly attached to but insulated from the bar *s* by means of insulating material s^2, Fig. 2. Said bar *s'* is provided with bores in its ends, in which I insert rods *t t'*, having trolley-wheels *u u'* mounted upon the lower ends thereof, each with the usual caster-fitting. Springs *v* are interposed between the bar *s'* and a shoulder of the fitting above the wheels, thereby insuring a continuous contact with the electrical conductors *f f'*. The rods *t t'* may be insulated from the sur-

rounding metal, in which they are journaled, by means of insulating material w, Fig. 3, and the wheel u is connected by means of an electrical conductor x, Figs. 1, 3, and 6, with the motor c. Said conductor is coiled or otherwise constructed so that will yield sufficiently to conform to the vertical movement of the trolley-carrier caused by the relative variation in level between the railway-track and that of the conduit. A similar conductor x' serves to connect said motor with the wheel u' to carry the return-current to the conductor f'. As stated, the conduit is located beside the railway-track, and while ordinarily raised above the surface of the ground it would obviously be necessary to lower it for the purpose of crossing roads, streets, and other places where it would be impracticable to have it elevated. In such places the incline would be such as to render it necessary to make provision in the carrier therefor. Hence the reason for pivoting the yoke k upon the arm j.

Fig. 8 shows a diagrammatic view of the track and conduit, indicating the inclines of the conduit and its varying levels with respect to the track.

In Fig. 6 the conduit is shown at a considerable incline with reference to the roadway. It is obvious that the wheels $q\ q\ r\ r$, acting above and beneath the slot-rails, would always cause the contact-carrier to follow and conform to the incline of the conduit, while the sliding of the rods $m\ m$ through the ends of the yoke k would permit said carrier to rise and fall to conform to the variation in level between the conduit and roadway.

In Figs. 4 and 5 I have shown the conduit carried across a drawbridge with means for conveying the current across a stream, while providing for the opening of the bridge. In said figures, y represents the bridge, while z indicates an insulated metallic conductor laid beneath the stream and connecting the two ends of the conductors $f\ f'$ upon opposite sides of the stream. A rheostat z' may be provided and may be cut out of circuit when the bridge is open and into circuit when it is closed by means of the pivoted lever z^2, Fig. 4, the upper forked end of which is adapted to be engaged by a stud z^3 upon the bridge. The result of this construction is that when the bridge is open all the current is permitted to pass freely through the conductor z to the line beyond, while the closing of the bridge causes the rheostat to be cut in, thereby sending the entire current over the third rail f upon the bridge, which is provided with some suitable contact-springs—such, for example, as f^2, Fig. 7—to insure a metallic connection at the rail-joints.

While I prefer to employ the rheostat as described, it is obvious that it may be dispensed with, provided, as is usually the case, an excess of current is employed, in which event the current would be divided, one half going beneath the stream and the other across the bridge upon the movable sectional conductor, the latter current being of sufficient strength to operate the car-motor.

In Figs. 9 and 10 is shown a slot-switch mechanism so constructed as to coact with the usual track-switch, so as to actuate the two by a single movement.

In Fig. 9, $b\ b$ represent the main track, and d the main line of the conduit, while $b'\ b'$ indicate the track branch and d' the conduit branch. The usual railway-switch lever is shown at b^2, and the switch-bar at b^3, the latter being connected with the usual split switch b^4. The bar b^3 is extended beneath the railway-track and is bent in a U shape, as shown at b^5, Fig. 10, to extend downwardly upon one side beneath the bottom and thence upwardly upon the opposite side to the top of said conduit, as shown at b^6. Horizontal extensions $b^7\ b^8$ are formed upon or attached to the parts $b^5\ b^6$, respectively, and extended toward the slot h, where they are pivotally attached, respectively, to switch-arms $d^2\ d^3$, which are in turn pivotally attached to the slot-rails at $d^4\ d^5$, Fig. 9, said arms or members being countersunk in said rails, as shown, to permit the passage of the trolley-carrying truck. The shifting of the track-switch serves to move the arms $d^2\ d^3$ into alinement with the main slot or with that of the branch slot, as may be desired.

In Figs. 11, 12, and 13 I have shown a means for automatically closing and breaking the electrical connection between the main and branch conductors. In said construction $f^3\ f^4$ represent stubs branching from the main conductors, said stubs being continuously charged. Sections $f^5\ f^6$ are interposed between said stubs and branches $f^7\ f^8$. The sections $f^5\ f^6$ are pivoted at f^9, Fig. 11, and each is provided with an arm f^{10}, set at an angle thereto and provided with a stud f^{11} upon its free end, as shown in Fig. 13. Said arm or bar is rigidly attached to the pivoted end of said section and is made of spring metal, so that it will yield laterally enough to permit the stud f^{11} to engage with a depression in the side of the rail f^4, thereby lifting the opposite end of the section f^5 and holding it normally out of contact with the rail f^7 in the manner shown in Fig. 11. The device is automatically operated by the passage of the contact-wheel, which serves to depress the section f^5 as the car is moved onto the switch, thereby charging the branch conductor. A reverse movement depresses the bar f^{10} and opens the circuit. The metallic contact with the section f^5 and branch rail may be made by means of a spring f^{12}, Fig. 11.

In Figs. 9 and 14 I have shown a means for extending the conduit across railway-tracks, so as not to obstruct the movement of the trolley-carrier. The slot-rails of the conduit are inclined, as shown at h^2, upon opposite sides of the track, while the intervening portion h^3 is made flush with the top of said track. The railway-rails b are cut away, as shown in

said figures, to provide for the slot and the unobstructed passage of the trolley-carrier.

While I have shown a secondary conductor in the conduit to carry the return-current, it is obvious that it may be dispensed with and the return-circuit from the motor made through the track-rails. The system shown, however, is the preferable one.

Having thus described my invention, I claim—

1. In a system of the class described, the combination with an electric conduit, a conductor, a car, a track and car-motor of a trolley-carrier consisting of a frame in yielding connection with the car, wheels above and below the conduit-slot for maintaining said frame in a constant relation to the latter, and a yielding contact supported by said frame, substantially as described.

2. In a system of the class described, the combination of a railway-track, a car having an electric motor thereon, a longitudinally-slotted electric conduit having a varying level with respect to the track-level, a yoke pivotally sustained at its middle to a support secured to the car, a U-shaped frame the vertical arms of which are extended through bores in the ends of said yoke, the lower portion of said frame being projected into the conduit-slot, wheels mounted upon each of said arms, one above and the other below said slot, an electric conductor within said conduit and a yielding contact supported by said U-shaped frame whereby the frame may maintain a constant and positive relation to said conduit, and an electric contact may be insured.

3. In a system of the class described, the combination of a railway-track, a car having an electric motor thereon, a longitudinally-slotted electric conduit having a varying level with respect to the track-level, a conductor located within said conduit, a yoke pivotally held at its middle to a support secured to the car, a frame consisting of the vertical arms *m m* and cross-bar *s*, wheels *g r*, located above and below the conduit-slot respectively, a yielding, spring-actuated contact in operative connection with said conductor and means for electrically connecting the same with said motor, substantially as described.

4. In an electric-railway system, the combination with an electric-supply conductor, of a railway-track, a car, an electric motor thereon, a longitudinally-slotted conduit for said supply-conductor, a contact-carrier consisting of a depending frame jointedly connected with the car and extending within the conduit, wheels upon said frame located above and below the slot-rails of the conduit for maintaining a constant relation between said frame and slot-rails or conduit-shell, a yielding contact element connected to and supported by said frame and means for maintaining the same in contact with said conductor, substantially as described.

In testimony whereof I have signed this specification, in the presence of two subscribing witnesses, this 8th day of May, 1901.

DANIEL S. BERGIN.

Witnesses:
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CHARLES L. HINE.