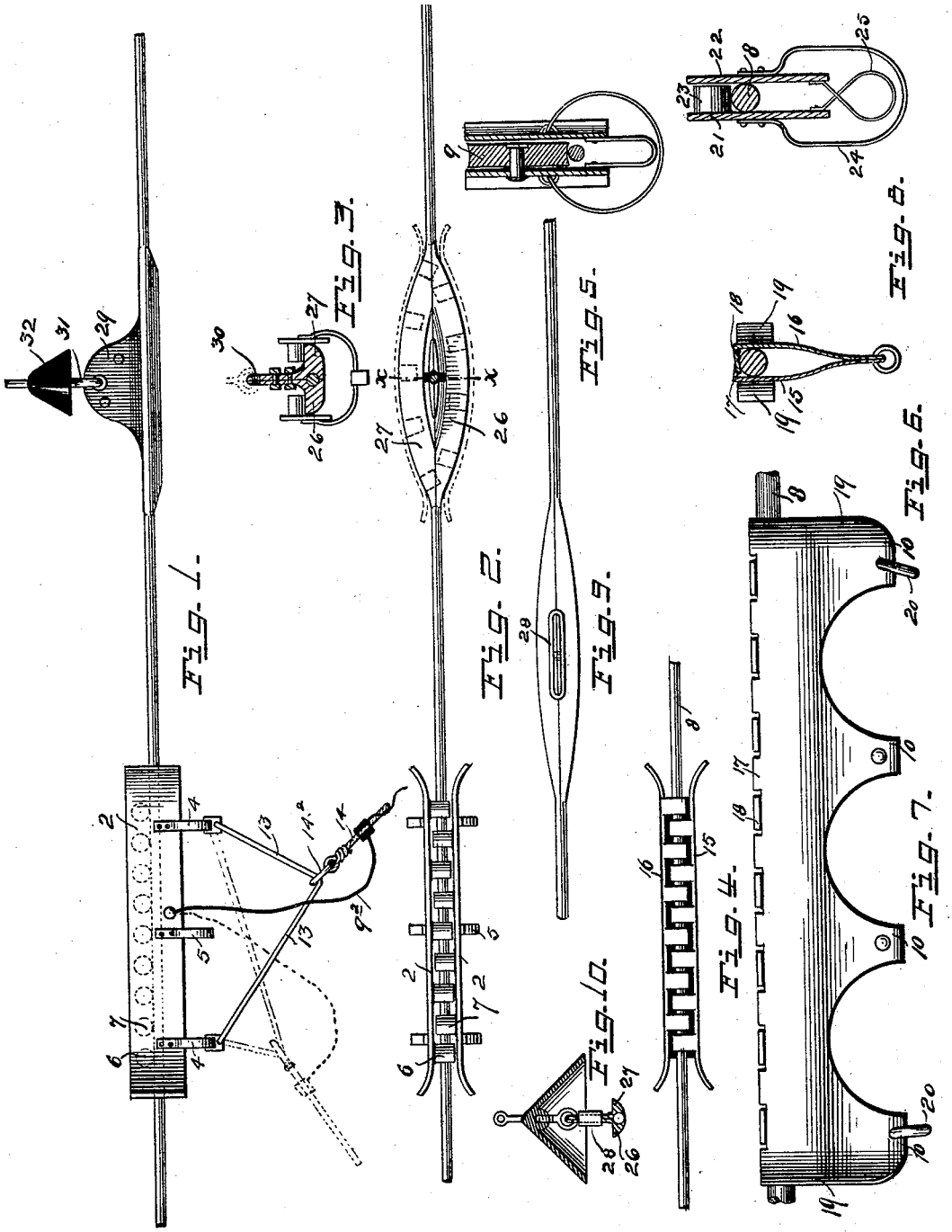
(No Model.)

G. J. SCOTT.

OVERHEAD ELECTRIC CONDUCTOR SYSTEM.

No. 454,881. Patented June 30, 1891.



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UNITED STATES PATENT OFFICE.

GORDON J. SCOTT, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR OF ONE-HALF TO CALVIN G. GOODRICH, OF SAME PLACE.

OVERHEAD ELECTRIC-CONDUCTOR SYSTEM.

SPECIFICATION forming part of Letters Patent No. 454,881, dated June 30, 1891.

Application filed December 10, 1890. Serial No. 374,136. (No model.)

To all whom it may concern:

Be it known that I, GORDON J. SCOTT, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain Improvements in an Overhead Electric-Conductor Contact System, of which the following is a specification.

My invention relates to a system of devices by means of which a number of good contacts are made with the electric conducting-wire and to means whereby the disconnection of the contact device from said wire is avoided, and whereby a motor-car upon the track is left free to reverse its course without regard to the position of the contact device above the car.

The object of the invention is to do away with the single-wheel flanged trolley supported by the long trolley arm or rod, and which from various causes continually gives trouble by jumping the wire, thereby cutting off the current and stopping the car, and to substitute for such a trolley a long multiple-contact device adapted to hang from the top of the wire and to embrace the same in such manner as to make it practically impossible for the device to become detached from the wire, said device being drawn along after the car in any suitable manner, and, dependent upon the provision of such a contact device, to provide means whereby the same is safely piloted past the several arms or brackets by which the conducting-wire is supported.

My invention consists in a multiple-contact device made up of two flexible side strips adapted to engage opposite sides of the conductor and having projections or lugs extending across the top of the conductor, with means for normally holding said plates or strips together and for conducting the current collected from the said wire to the motor-car; and, further, my invention consists in a metal spreader device adapted to be secured upon the conducting-wires at points where the supporting-arms engage the conductor, said spreaders being formed in a gradual swell on each side of the conductor and adapted to pilot the contact device about or past said supporting-arm and to prevent the lugs or projections on said device from striking the supporter arm or bracket.

My invention consists, further, in various details of construction and in combinations hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming a part of this specification, Figure 1 is a vertical elevation showing a conducting-wire, one of my multiple-contact devices, and a spreader and supporting-arm. Fig. 2 is a plan view thereof. Fig. 3 is a section of the spreader, taken on line $x\,x$ of Fig. 2 and showing a section of the contact device in position on the spreader. Figs. 4 and 5 show contact devices of a somewhat different pattern than that shown in the first two figures. Figs. 6 and 7 are enlarged views of the device shown in Fig. 4. Fig. 8 is a transverse sectional detail of the contact device. Figs. 9 and 10 are details of the spreader.

The multiple-contact device, as shown in Figs. 1 and 2, consists, generally, in two independent flexible plates or strips 2 and 3, held together lightly against the conductor or at most a short distance therefrom by the end springs 4, the middle springs 5 being adapted to prevent the strips from spreading out at the middle while on the wire. Small cylindrical lugs 6 and 7 extend in alternate positions on the two plates or strips and are adapted to form a straight hook across the top of the wire and to move along the same, as upon a track. As shown in Fig. 2, the lugs or projections 6 and 7 are formed as integral projections upon the flexible side strips, while in Fig. 5 small rollers or wheels 9 are employed.

In Figs. 4, 6, and 7 a sliding trolley is illustrated as consisting in two wide sheets 15 and 16 of flexible brass, connected together at their lower edges, their sides embracing the conducting-wire 8 and having lugs or projections 17 and 18 like unto teeth projecting across the top of said wire and adapted to support the device thereon in a hanging position. As shown, every other tooth or lug extends from the same side or strip. The ends 19 of the strip are flared out, as shown, to form a wide mouth at each end of the contact device to make more gradual and certain its engagement with curves or switches. As shown in Fig. 7, the lower parts of the plates are cut away, so as to leave only short

connecting portions 10 at the bottom, thereby giving the plates a greater flexibility, which might otherwise be destroyed by the rigid lower edge and the curves in the plates, which would serve to brace the plates against lateral torsion. Rings 20 or other convenient means are provided in the lower parts of the contact device for the fastening of the connections which lead down to the roof of the motor-car. These connections consist, as shown in Fig. 1, in a flexible loop 13, of durable cord or rope, having its upper ends fastened in the bottom of the trolley device. This loop engages the ring 14^2 or a suitable sheave provided on the upper end of the rope 14, which may be called the "draft-rope" and which leads down to the top of the car, where its lower end is secured. A suitable conductor-strand, preferably of insulated wire, is provided in connection with this rope and leads up the same through the flexible conductor-strand 9^2, having its upper end or ends secured on one of the plates or on both and making a good electrical connection therewith. It will be seen that by making the loop 13 and rope 14 of conducting material current might be taken off directly by them and through the ring 14^2. The first connection described is, however, preferable. This draft device is self-adjustable, for as the angle of the rope 14 changes a different pull will be exerted on the loop 13, and the ring 14^2 will slip thereon to adjust the pull quite evenly on the two ends of the contact device.

As shown in Figs. 5, 6, and 8, the conductor is absolutely confined in the space within the sides of the contact-strips, and it is impossible for the conductor to slip down and to get under the lower edges of the said strips, in which case the device would hang improperly on the conducting-wire and be apt to jam against the supporting-arms thereof. In Fig. 8 two independent strips 21 and 22 embrace the sides of the conductor 8. These strips or sides 21 and 22 are similar to those shown in Figs. 1 and 2 and have the cylindrical lugs or projections 23 secured upon them after the manner shown in Fig. 2, or these may be cylindrical rollers, each acting as a revolving trolley adapted to run on the top of the wire. In practice the wheels or the cylindrical lugs may be provided with shallow grooves if under the existing circumstances it is deemed necessary to provide such a precaution against the spreading of the sides of the device and its slipping off the contact device. The plates 21 and 22 (shown in Fig. 8) are held together on the wire by simple bent springs 24, having their ends riveted or otherwise secured to the outsides of the strips. In order to prevent the wire from getting down under the lower edges of the strips 21 and 22, I provide light springs or straps, as the strap 25, bent upon itself and secured to the lower edges of the plates, as shown. In this way it will be seen that the passage between the lower edges of the plates is cut off without regard to the distance to which the plates 21 and 22 are spread apart, for as the plates spread the ends of the spring 25 are drawn across each other to form a V having a closed point.

It will readily be seen that as soon as a trolley is provided to run on the top of the conductor-wire some means must be provided whereby the same may be allowed to pass by the depending arms or brackets by which the electric conductor-wire is supported over the car-track. For this purpose I have provided what I call a "spreader bracket or clamp" adapted to form a swell or expansion in the metal conductor and to leave room on each side of the depending supporter-arm for the passage of the lugs or projections upon the flexible plates of the contact device above described. This spreader bracket or clamp consists, as shown in Figs. 1, 2, 3, 9, and 10, in the two plates 26 and 27, having the plain inner sides and the semicircular or other longitudinal grooves adapted to receive the conductor 8. These two plates may be bolted or riveted together, as shown in Fig. 3, or be clamped together by a clamp-wedge ring 28, (shown in Figs. 9 and 10,) adapted to slip down over the tongue or ear formed by the upwardly-projecting portions of the plates 26 and 27. An opening 30 is provided in the top of the ear 29, through which the ring of the supporting or depending arm 31, having the insulator 32, is adapted to be secured. The wedge-ring shown in Figs. 9 and 10 is adapted to be driven down tightly just far enough to allow the ring 31 to be inserted through the said opening and thereby lock the ring on the ear. The upper surface of the spreader-plate is flat and is of such width as to allow the projections, lugs, or rollers to pass by freely without striking against the ear, which, it will be seen, forms a part of the wire-supporting device. In other words, the width of the upper surface of the spreader on each side of said ear is greater than the distance between the inside of the flexible strip and the ends of the projection extending therefrom. Now, as the contact device on the conductor is drawn along by the car, to the top of which the rope 14 is attached, the contact device coming to one of the spreaders will spread and the strips pass on either side of the spreader. The strips meantime are pressed quite closely against the edges or sides of the spreader, so making a good contact, and, further, the projections or rollers engaging the top of the spreader and other contacts prevent the contact device from dropping down off the wire. The upper surface of the spreader is on a level with the top of the conductor-wire, and the sides of the spreader curve outwardly very gradually, so that the plates receive no shock as they strike the spreader, but expand freely to pass the same.

As shown in Fig. 10, I preferably provide

a hood 35 above the spreader and adapted to prevent snow falling or ice forming upon the upper surface thereof.

One great advantage of my invention over the ordinary trolley-contact arrangements consists in the simple self-adjusting means for connecting the contact device with the top of the motor-car—namely, the loop 13, on which the ring 15 is adapted to slide to adjust itself according to the angle of the pull on the rope. The tension of the spring sides or springs for holding the sides together is such as to prevent the side strips from spreading, so as to drop off the wire. Hence, as the trolley cannot get up above and out of contact with the wire and cannot drop off the same, the trouble heretofore met with in the use of the common pole-trolley—namely, its jumping the wire—is avoided.

It is clearly evident that my contact device and spreader is readily adaptable to use in any position about the car—as, for instance, beneath the motor, in a trunk, or with a conductor provided to one side of the track as well as upon an overhead conductor—and, further, that though several constructions have been shown for the devices of my invention many others of slightly-modified form would readily suggest themselves to one skilled in the art, and I therefore do not confine myself to the exact construction shown and described, but claim, broadly, the flexible plates or strips provided on either side of the conductor and having projections adapted to engage the top of the same, and the whole device being adapted to be drawn along after the car, to which it is attached by suitable electrical and draft connections, and the spreader whereby the contact-plates with the lugs are adapted to pass the depending supporter arms or brackets.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, in a conductor contact system, of strips or plates adapted to pass on opposite sides of the conductor and adapted to electrically engage the same, means for drawing said contact-strips along the conductor, the arms or brackets adapted to support said conductor, and means whereby said plates or strips are adapted to pass said arms without striking the same, substantially as described.

2. The combination, in an electric-conductor contact system, of a conductor-wire with supporting-arms whereby said conductor-wire is held, plates or strips adapted to pass on opposite sides of said conductor, projections or roller-lugs on said strips adapted to engage the top of said conductor, and spreaders provided in connection with said supporting-arms, the upper surface of said spreaders being of sufficient width to permit the passage of said plates and the lugs thereon engaging said surface about said supporter-arms without striking the same, and said plates being adapted to spread apart to pass said spreaders, substantially as and for the purpose specified.

3. The combination, in a contact device, of flexible strips or plates adapted to pass on opposite sides of the conductor, with projections or lugs provided on said plates and extending across and engaging the top of the conductor, and means whereby said device may be drawn along said conductor, substantially as described.

4. The combination, in a spreader device, of a plate or plates with the conductor, said plates adapted to be secured upon the conductor, and the arms or brackets supporting said conductor, said plates forming a swell on each side of the conductor and being electrical parts thereof, substantially as described.

5. In an overhead-conductor contact system, the combination, with the conductor-wire, of spreader brackets or clamps adapted to engage the conductor-supports, expansible contact devices adapted to hang upon the top of said conductor, to be drawn along the same, and to expand at said spreaders to pass said supports, and automatically-adjustable draft and electric connections provided between said contact devices and the motor-cars, substantially as described.

6. The combination, in an electric contact device for overhead conductors, of flexible metal plates provided on opposite sides of the conductor with projections or lugs extending from said plates across the top of said conductor, and means for normally holding said plates together on the conductor, substantially as described.

7. The combination, in an electric contact device for overhead conductors, of flexible metal plates or strips having their ends turned away from the conducting-wire, with lugs or projections extending from alternate positions on said plates across the top of the conductor, a spring connection between said plates or strips, whereby the same are normally held together, a flexible loop having its ends secured in the opposite ends of said strips, a connection extending up from the motor-car and having its upper end in loose engagement with said loop and adapted to move freely thereon, and a suitable electrical connection extending from said plates down to said car, substantially as described.

8. In a contact device of the class described, the sides 15 and 16, secured together at their lower edges and having their ends flared out, said sides provided with the lugs, projections, or teeth 17 and 18, adapted to engage the conductor 8, substantially as described.

9. The combination, in a contact device of the class described, of the long flexible plates or strips, with the conductor, lugs, projections, or rollers provided on said plates and adapted to rest on the top of the conductor, springs adapted to connect said plates, and means

whereby the conductor is prevented from passing beneath the lower edges of said plates, substantially as described.

10. The combination, in a spreader device, of plates, as the plates 26 and 27, adapted to be clamped upon the conductor and to engage the supporter arm or bracket, with means for clamping said plates upon the conductor, said plates forming a gradual swell on each side of the conductor, substantially as described.

11. The combination, in a spreader device, of the plates 26 and 27, having the ear portions or lugs, with the clamping-wedge ring 28, adapted to engage said lugs to clamp the plates 26 and 27 upon the conductor, and means for connecting a conductor-supporting arm with said lugs, substantially as described.

12. The combination, with the herein-described spreader, consisting of the two swelled sides 26 and 27, having grooves adapted to receive the conductor-wire and having ears adapted to engage a suitable support and to be clamped together to secure said sides 26 and 27 on the conductor-wire, and means for clamping said ears together, of a weather-hood of a width and length greater than said spreader and means for supporting said hood above said spreader, substantially as described.

13. The combination, with the conductor 8, of the expansion device consisting of the plates 26 and 27, having the ears or lugs 29, means for clamping said plates firmly on said conductor, the openings 30, the supporter-arm adapted to engage said lugs by means of said opening, the flexible plates or strips provided with the lugs extending therefrom across the top of the conductor, springs adapted to normally hold said flexible plates together, the loop 13, having opposite ends secured to the ends of said flexible strips, the ring 15, and the rope 14, whereby contact is made with said overhead conductor, and said plates and lugs constituting the contact device adapted to pass the supporting arms or brackets of the conductor without striking the same, substantially as described.

14. The combination, with the electric conductor, of the herein-described spreader forming a swell on each side thereof, a supporter-arm for upholding said spreader and said conductor, and a large weather-hood secured on said arm and adapted to prevent the falling of any substance upon said spreader, substantially as described.

In testimony whereof I have hereunto set my hand this 2d day of December, 1890.

GORDON J. SCOTT.

In presence of—

A. M. GASKILL,

C. G. HAWLEY.