(No Model.)

C. RUNELS.

ELECTRIC COUPLING.

No. 367,931. Patented Aug. 9, 1887.

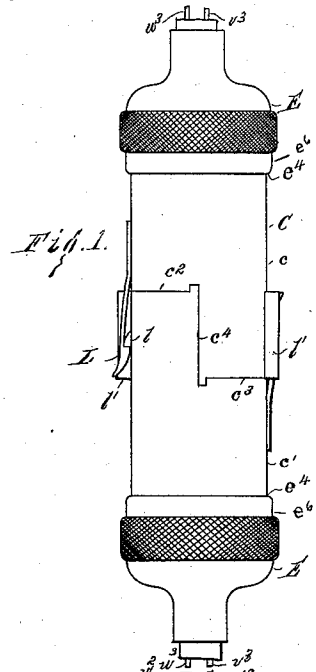

Fig. 1.

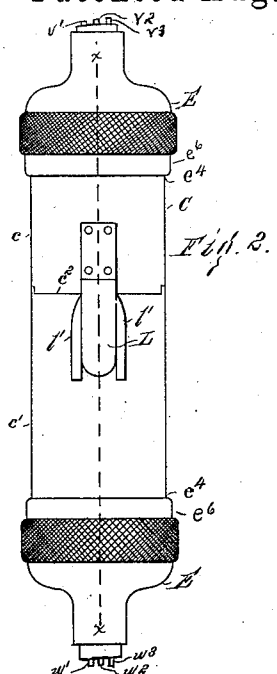

Fig. 2.

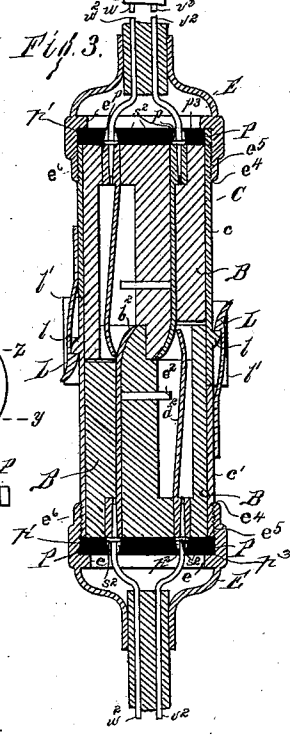

Fig. 3.

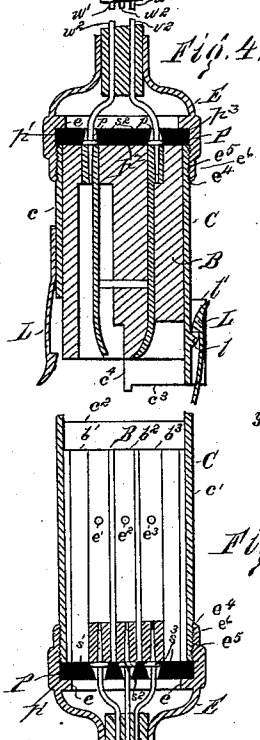

Fig. 4.

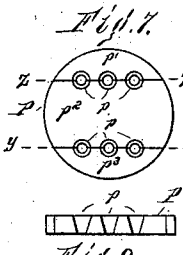

Fig. 7.

Fig. 8.

Fig. 5.

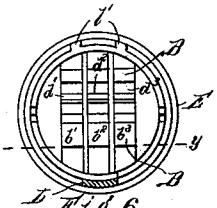

Fig. 6.

Witnesses—
Kirkley Hyde.
Gertrude M. Day

Inventor—
Charles Runels,
By Albert M. Moore,
His Attorney

UNITED STATES PATENT OFFICE.

CHARLES RUNELS, OF LOWELL, MASSACHUSETTS, ASSIGNOR OF TWO-THIRDS TO HENRY RUNELS AND GEORGE W. RAND, BOTH OF SAME PLACE.

ELECTRIC COUPLING.

SPECIFICATION forming part of Letters Patent No. 367,931, dated August 9, 1887.

Application filed March 31, 1886. Serial No. 197,282. (No model.)

To all whom it may concern:

Be it known that I, CHARLES RUNELS, a citizen of the United States, residing at Lowell, in in the county of Middlesex and Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Electric Couplings, of which the following is a specification.

My invention relates to electric couplings or connectors especially adapted to connect separable sections of conductors in a closed circuit and to enable said sections to be connected and disconnected without breaking the circuit, the principal use of said couplings being to unite the electrical conductors employed upon railway-trains, to operate station-indicators, or to signal from one car to another or to the engine, and from the engine to any one of the cars of the same train.

The coupling hereinafter described is capable of connecting sectional conductors in open or closed circuits, and to unite the parts of sectional conductors of two or more circuits, some of which are closed and some of which are open.

In the accompanying drawings, Figures 1 and 2 are side elevations of a coupling constructed in accordance with my invention, the coupling being represented in Fig. 2 as turned on its axis ninety degrees from the position it occupies in Fig. 1; Fig. 3, a vertical central section of the coupling entire on the line $x\ x$ in Fig. 2; Fig. 4, a central vertical section of one of the counterparts of the coupling on the line $x\ x$ in Fig. 2; Fig. 5, a section on the line $y\ y$ in Fig. 6; Fig. 6, a plan of that end of either counterpart of the coupling which is in contact with the other counterpart of the coupling when said counterparts are coupled or united; Fig. 7, a plan of the locking-plate, showing the inner face thereof; Fig. 8, a vertical section of said plate on the line $y\ y$ in Fig. 7.

The coupling C consists of two counterparts, $c\,c'$, which are precisely alike in all respects, and the description of one applies to the other. The body B of each counterpart is of any suitable insulating material, as vulcanite. Through the body B extends one or more metallic strips, $b'\,b^2\,b^3$, (three being shown,) these strips being insulated from each other, and the outer ends of said strips being each connected with a separate wire or electrical conductor, $w'\ w^2\ w^3$. Each of the counterparts is provided with as many spring-plates $d'\ d^2\ d^3$ as there are strips $b'\ b^2\ b^3$, and these spring-plates are insulated from each other and from said strips, and their outer ends are connected with conductors or wires $v'\ v^2\ v^3$, which, with the wires $w'\ w^2\ w^3$, form complete metallic circuits through said strips, spring-plates, and metallic pins $e'\ e^2\ e^3$, each of which pins is in contact with one of said strips and projects toward one of said spring-plates, and is in contact therewith when the counterparts of the coupling are disunited.

The means of connecting the conductors $w'\ w^2\ w^3$ to the strips $b'\ b^2\ b^3$ and the conductors $v'\ v^2\ v^3$ to the spring-plates $d'\ d^2\ d^3$ is shown in Figs. 3 and 4, each conductor being provided near its end with a collar or shoulder, $s'\ s^2\ s^3$, and being tapered from said collar to its end, the tapering end of each conductor being inserted in a tapering opening in one of said strips $b'\ b^2\ b^3$ or spring-plates $d'\ d^2\ d^3$, as the case may be, and being retained therein by the locking-plate P, (shown in Figs. 7 and 8,) said locking-plate being of insulating material, as vulcanite, and having as many openings p as there are conductors, and these openings p being tapering and being pressed down over the shoulders on the conductors, as shown in Figs. 3 and 4, by an internal flange, e, in the case E, crowding the tapering points of the conductors into their seats. The case E is preferably cylindrical, as shown, and is preferably metallic, and incloses and protects from injury the insulating material, strips, spring-plates and locking-plates, and, not necessarily, but for convenience, is provided with removable ends or caps e^6, these caps being screw-threaded internally at e^5 to engage a corresponding screw-thread, e^4, on the outside of said case, the flanges above named being on the inside of the caps e^6. This construction allows the locking-plates P to be readily removed and replaced, and enables a sufficient pressure to be exerted on said plate P to force the points of the conductors into their seats in the conducting-strips and spring-plates, the wires and their insulating-covering fitting the orifices in the ends of the caps e^6 so loosely as to allow the caps to be turned without turning

or twisting said wires or their coverings. For convenience, also, the locking-plate P is made in three parts, $p' p^2 p^3$, as shown in Fig. 7, being twice divided through the centers of all the holes p on each side of the center of said plate P, to allow all or some of the conducting-wires to be easily removed or inserted, one dividing-line, $y\ y$, passing through the holes p, which receive the conductors $w' w^2 w^3$, and the other dividing-line, $z\ z$, passing through the holes which receive the conductors $v' v^2 v^3$.

The inner ends of the counterparts of the coupling are halved together, as shown in Figs. 1 and 2, at c^2—that is to say, the coupling is divided into two equal parts by two planes, $c^2 c^3$, at right angles to its axis, and by a third plane, c^4, passing through said axis at right angles to said first-named planes. The inner ends or ends of the strips and spring-plates nearest the middle of the coupling are bent or beveled toward the axial dividing-plane c^4 of the coupling, so that when the parts of the coupling are united, as shown in Figs. 1, 2, and 3, the strips of each counterpart pass between the axis of the coupling and the free ends of the spring-plates, making an electrical contact between each strip of each counterpart and the corresponding spring-plate of the other counterpart, and making this contact before the strips of each counterpart force the spring-plates of the other counterpart out of contact with the pins which connect said strips and spring-plates in the same counterpart when the counterparts are disunited, as above described.

The counterparts of the coupling or couplings, where several are used to unite the sections of sectional conductors, should all be wired alike—that is, the spring-plates in every counterpart should be connected to the same pole of the battery (or batteries, if a battery is used on more than one section of the conductors) and the conducting-strips to the other pole of the same.

The counterparts of the coupling are held together by a spring-latch, L, secured to each counterpart and hooking over a projection, l, on the other counterpart, the spring-latches being guided by longitudinal ribs l', arranged on the counterparts, respectively; and said counterparts may be readily drawn apart endwise after lifting the spring-latches L out of engagement with the projections l.

For convenience of illustration, suppose that lines $w' v'$ form a telephonic circuit, that lines $w^2 v^2$ form, with suitable instruments, an electric-lighting circuit, that lines $w^3 v^3$ form a signal-circuit or station-indicating circuit, and that the coupling be used to unite sections of these circuits upon engines and cars of a railway-train. If a single car is used, the circuits will be completed through a counterpart of the coupling at the rear of the train; but if two cars are used and the counterparts of the coupling (one counterpart being carried by one car and the other by the other car) are united, as shown in the first three figures, the lines will then be complete through the wires $w' w^2 w^3$ in one direction and by the return-wires $v' v^2 v^3$—only one of the counterparts in any case being used at the end of the train, the wires out and the return-wires being connected in this case through the strips, pins, and spring-plates of the same counterpart, as above described.

It will be seen that if the dividing-plane c^4 be continued through the coupling, each counterpart will consist of two unlike halves, and that each half of each counterpart will be precisely like one of the halves of the other counterpart, and that the counterparts when coupled have their longitudinal axes in the same straight line, and that, when properly connected, as above described, they are capable of connecting like sectional conductors, and that when uncoupled each counterpart is capable of automatically continuing the electric connection of each section of the conductors.

By the use of the coupling above described several complete independent circuits, each containing its own generator, may be united so as to be worked simultaneously without interfering with the working of any of them.

I claim as my invention—

1. An electric coupling consisting of two like counterparts, each provided with one or more conducting-strips and with one or more conducting spring-plates, each strip of each counterpart making connection with a corresponding spring-plate of the other counterpart when said counterparts are coupled, as and for the purpose specified.

2. The coupling herein described, consisting of two counterparts, each provided with a conducting-strip having its inner end bent or beveled toward the middle of the coupling and with a conducting spring-plate, said strip being provided with a conducting-pin or contact-point, against which said spring-plate rests when said counterparts are disunited, said spring-plate being adapted to be forced out of contact with said contact-point by the bent or beveled inner end of the conducting-strip of the other of said counterparts upon the uniting of said counterparts, the strip of each counterpart making connection with the spring-plate of the other counterpart, as and for the purpose specified.

3. the electrical coupling herein described, consisting of two counterparts, substantially as described, and each provided with one or more conducting-strips having their inner ends bent or beveled toward the middle of the coupling and insulated from each other and with a corresponding number of conducting spring-plates insulated from each other, each of said strips being provided with a conducting-pin or contact-point, against which one of said spring-plates rests when said counterparts are disunited, but otherwise insulated from said spring-plates, said spring-plates being adapted to be forced out of contact with said contact-points by the adjacent beveled inner ends of

the strips of the other counterpart on the uniting of said counterparts, as and for the purpose specified.

4. The combination of the conducting spring-plates and conducting-strips provided with holes and the conductors provided with ends adapted to enter and fit said holes, and provided, also, with collars near said ends, a locking-plate of insulating material provided with holes to receive said conductors, a case surrounding said spring-plates and conducting-strips and provided with an external screw-thread, and a cap having an internal screw-thread to engage the screw-thread on said case to press said locking-plate against said collar and to crowd said ends of said conductors into the holes in said spring-plates and strips, as and for the purpose specified.

5. The combination of the conducting strips and the conductors provided near their ends with collars, a locking-plate of insulating material provided with holes to receive said collars and conductors, the holes in said locking-plate tapering away from the ends of said conductors and being smaller at their smaller ends than said collars, a case surrounding said strips and provided with an external screw-thread, and a cap provided with an internal screw-thread adapted to engage the screw-thread on said case and to press said locking-plate toward said strips, thereby bringing said ends of said conductors in contact with said strips, as and for the purpose specified.

6. The combination of the conducting-strips and the conductors provided near their ends with collars, a locking-plate of insulating material provided with tapering holes to receive said conductors and said collars, and divided through the middle of said holes into sections, the case containing said strips and provided with an external screw-thread, and a cap provided with an internal screw-thread to engage said thread on said case and provided with an internal flange adapted, when said cap is screwed upon said case, to press upon said locking-plate and to force the ends of said conductors against said strips, as and for the purpose specified.

CHARLES RUNELS.

Witnesses:
ALBERT M. MOORE,
GERTRUDE M. DAY.