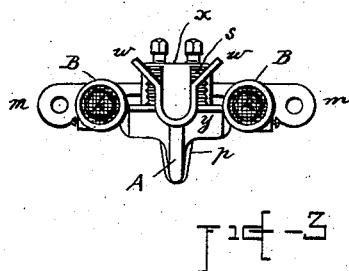
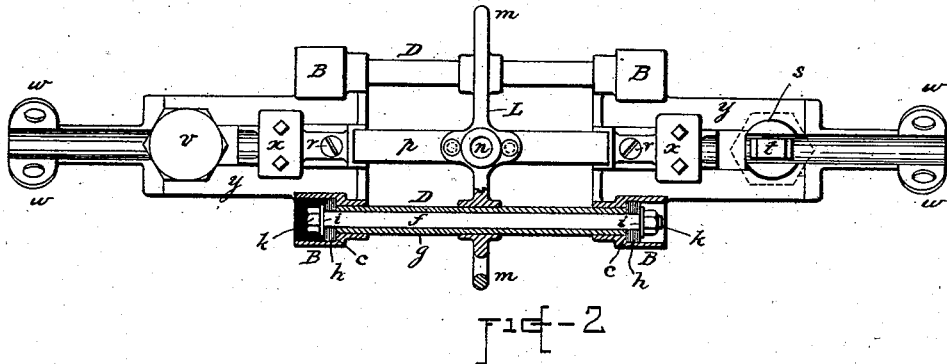
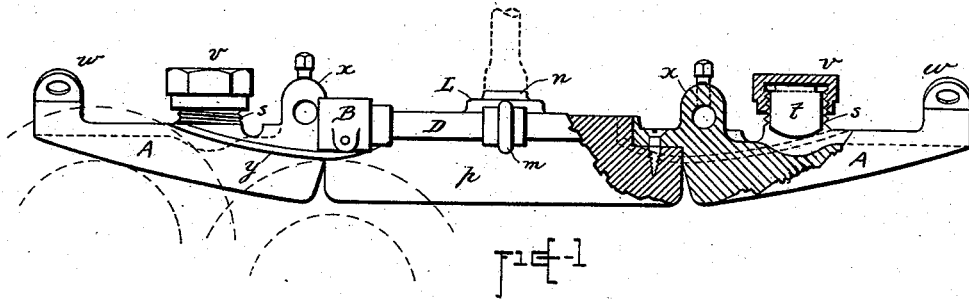


(No Model.)

T. J. McTIGHE & S. W. CHILDS.
TROLLEY WIRE CIRCUIT BREAKER.

No. 524,283.

Patented Aug. 7, 1894.



WITNESSES:

John F. Barry
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UNITED STATES PATENT OFFICE.

THOMAS J. MCTIGHE AND SUMNER W. CHILDS, OF NEW YORK, N. Y.,
ASSIGNORS, BY MESNE ASSIGNMENTS, TO FREDERICK K. FITCH, OF
SAME PLACE.

TROLLEY-WIRE CIRCUIT-BREAKER.

SPECIFICATION forming part of Letters Patent No. 524,283, dated August 7, 1894.

Application filed January 23, 1893. Renewed January 22, 1894. Serial No. 497,724. (No model.)

To all whom it may concern:

Be it known that we, THOMAS J. MCTIGHE and SUMNER W. CHILDS, citizens of the United States, and residents of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Trolley-Wire Circuit-Breakers for Electric Railways, of which the following is a specification.

This invention relates to an improved form of device known as "circuit breaker" or section insulator for the trolley-wire of electric railways, the object of such devices being to separate the trolley wire into any desired number of sections, each insulated from its adjacent section.

As the trolley wire is usually very tense, the circuit breaker requires to be very strongly made, and, as the swaying of the wire and the upward pressure of the trolley produces a variety of strains, it should be as stiff and well braced as possible.

Heretofore circuit-breakers have been made of various styles, but their general type has been the same, namely two castings adapted to grip the respective sections of trolley wire, and an intervening insulating connection, sometimes a plain bar of wood or fiber and sometimes an insulated metal rod. While these forms serve the intended purpose and are not herein criticised, nevertheless the liability always exists that, when an accidental failure of the insulation occurs, the consequent short-circuit can burn out the insulation and generally with it the bond of union between section and section, and the trolley wire is apt to fall into the street.

Our aim has been to construct a circuit breaker which while having the necessary insulating quality has its connecting parts in duplicate, each also bracing and stiffening the whole, and each insulated from the other, so that should a short-circuit or burn-out occur, it will be confined to one of these, and the other will keep the trolley-line intact.

To these and other ends, our invention consists in the combination and arrangement of parts, substantially as hereinafter fully described and claimed.

In the accompanying drawings which form

part of this specification, Figure 1 is a side elevation, partly sectional of our improved circuit-breaker. Fig. 2 is a plan view of same, also partly sectional; and Fig. 3 is an end elevation.

More particularly our invention is as follows:—We cast two similar end pieces consisting each essentially of the stem or runner A, and the two symmetrically arranged lateral arms B B, such parts being cast in one piece and of abundant strength for the purpose. The arms B B are cored or bored through, each having the internal shoulder c. The two castings are united by means of the insulated side bars D, each consisting of the inner metal rod f preferably of steel, surrounded by the closely fitting tube g of hard fiber or other suitable insulating material. Heavy insulating washers h are placed around the rods f so as to rest against shoulders c. Then metal washers i are placed to receive the strain and finally a nut or nuts k are screwed home so as to lie entirely within the cavity of the arms B, which is then filled up with any appropriate material, such as sulphur, pitch, or a mixture of pitch and rubber.

We prefer to use a tube g of such external diameter as to require slight milling to fit into arms B, so as to fully realize the bracing of all parts against all strains inherent to practical use. To further stiffen the structure we apply a metal bridge L across the center of the structure, the side bars D passing through perforations made to receive them. The bridge L is provided with the extended eyes m for attaching the span-wires, and a central socket n to enable it to be suspended directly from an insulator if desired. To further stiffen the construction and afford a smooth track for the trolley-wheel we apply between the end castings a central bar of hard wood or other non-conductor p, its ends being received in pockets formed in the castings and fastened therein by screws r.

The runner p receives the wear from the trolley wheel and can be renewed without disturbing the circuit breaker—a very important feature.

The trolley wire may be gripped in various ways, but we prefer that shown, which is the

same as described and claimed in the pending application, Serial No. 459,339, of T. J. McTighe, namely the slotted and threaded stud *s* cast on the ends *A*, and provided with the plug *t* and cap *v*. The extremities of the castings *A* have the perforated flaps *w* adapted to be folded inwardly over the trolley wire and riveted together.

The end of the trolley wire is laid in the slot on top of the wire, and the cap screwed down, causing the plug to jam the wire against the bottom of the slot and clamp it therein.

As described in the application above referred to the clamp is rendered more secure by curving the bottom of the slot and the lower edge of the plug, so as to force a bend or kink in the wire. The usual binding-block *x* is cast on each end for attachment of a feed wire or a jumper-wire when desired. Thus constructed, if a spark occurs when the trolley wheel is rolling off a runner *A* onto the central runner *p* it would take place between runner *A* and the wearing surface of the wheel, with detriment to the smoothness of the latter. To avoid this, we construct the curved apron *y* which extends on both sides of the runner *A*, the relations being such that as the wheel is about to reach the sparking point, its rim begins to ride on the apron *y*, and preserves contact therewith till after the working surface of the wheel has passed off the runner *A*, so that if any spark occurs it will be between the apron *y* and the edges of the trolley-wheel, thus preventing damage to the working surface of the latter.

We have found in practice that the use of the two independent side bars is of great benefit. One of them may get so badly short-circuited as to actually melt off, without impairing the mechanical efficiency of the circuit-breaker as a part of the trolley line, and hence the wire is safely upheld at all times. This being true, the damaged side can be repaired without removing the device from the line or interfering with traffic. Not only this advantage accrues from our invention, but the duplicating of the strain bars *D* has the most

desirable effect of stiffening the whole device. Wind strains, the grinding action of a badly mounted trolley wheel, the peculiar thrust of a distorted or bent trolley-pole, and the oscillation caused by bad track, are all provided against by the stiff bracing presented in our construction.

We claim as our invention—

1. A trolley-wire circuit-breaker composed of two end castings united by two lateral parallel insulated rods fixed in said castings but insulated therefrom.

2. A trolley-wire circuit breaker composed of two end castings united by two lateral parallel insulated rods fixed in said castings but insulated therefrom and a central runner or trolley-wheel-guide of non-conducting material.

3. A trolley-wire circuit breaker composed of two end castings united by two insulated rods and a central bar of non-conducting material, the rods being in tension and the bar in compression.

4. A trolley-wire circuit breaker having a metallic runner for the trolley-wheel and an apron extending beyond the runner, the relations being such that the rim of the wheel remains in contact with the apron until the surface of the wheel has got past the end of the runner, substantially as described, whereby the injury due to sparking is caused to take place on the apron and rim instead of on the runner and grooved wheel surface.

5. The trolley-wire circuit breaker composed of the castings *A B*, united by the bolts or rods *f*, covered with insulating tubing *g*, and braced apart by the non-conducting removable runner *p* suitably anchored in castings *A*, each of said castings having a clamp for the trolley-wire.

Signed at New York, in the county of New York and State of New York, this 20th day of January, A. D. 1893.

THOMAS J. MCTIGHE.
SUMNER W. CHILDS.

Witnesses:

MILLER A. SMITH,
JOHN F. BARRY.