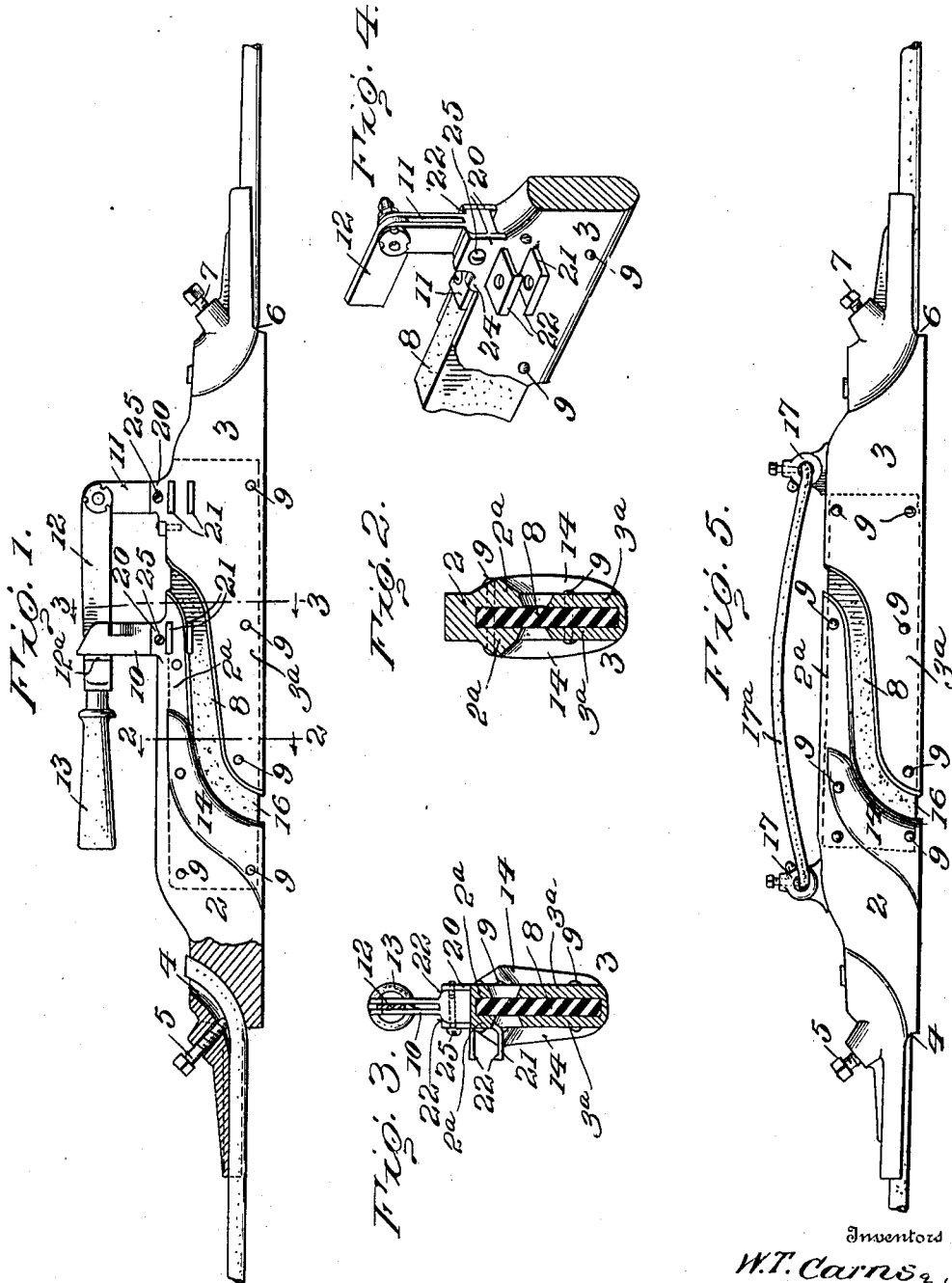


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SECTION BREAKER AND INSULATOR.
APPLICATION FILED MAY 6, 1909.

980,200.

Patented Jan. 3, 1911.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM T. CARNS AND TROY L. BROWN, OF RED JACKET, WEST VIRGINIA.

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Specification of Letters Patent.

Patented Jan. 3, 1911.

Application filed May 6, 1909. Serial No. 494,249.

To all whom it may concern:

Be it known that we, WILLIAM T. CARNS and TROY L. BROWN, citizens of the United States, residing at Red Jacket, in the county of Mingo and State of West Virginia, have invented certain new and useful Improvements in Section Breakers and Insulators, of which the following is a specification.

This invention relates to those devices which are used on trolley lines to connect a branch trolley line with the main trolley line, such devices under certain circumstances, as when they are used in mines, necessitating a means for electrically disconnecting the branch line from the main line, and therefore requiring that the branch line shall be separated from the main line by a section or strip of insulating material, but that the two lines shall be electrically connected by a switch or like device.

One object of our invention is to provide a section breaker for this purpose, so constructed that as the trolley wheel passes from one line to the other over the intermediate insulating section, the current from the trolley wheel shall not be interrupted.

Another object is to combine a section breaker of the kind above referred to with a knife switch on the same base, the base being of such character as to be readily attachable to the ends of a line wire, and the knife blade of the switch also acting as a means for holding the ends of the line wire in electrical engagement with each other and thus relieving the strip or section of insulating material from undue strain.

A further object is to provide a section breaker with a plurality of sockets projecting in different directions to permit the location of the knife switch to be changed to suit the exigencies of any special case.

For a full understanding of the invention and the merits thereof, and to acquire a knowledge of the details of construction, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a side elevation of our invention. Fig. 2 is a vertical section on the line 2—2 of Fig. 1. Fig. 3 is a vertical section on the line 3—3 of Fig. 1. Fig. 4 is a detail view showing the manner of attaching the pole pieces of the knife switch to the sockets. Fig. 5 is a side elevation of a modification.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to these figures, 2 and 3 represent terminal conductive caps of metal, and 8 an intermediate section or connecting strip of insulating material such as hard fiber. The cap 2 has at its outer extremity a passage 4 for the reception of one of the line wires which is held in place by a binding screw 5. The outer extremity of the other cap 3 is formed in like manner with a passage 6 for the reception of the other line wire which is held in place by means of a screw 7. Each cap is cleft to engage with the end of the section or strip 8, that is, each cap is formed with a vertical, longitudinally extending socket or recess at its inner end. The recess or socket in the cap 2 opens on the lower edge of the cap and on the inner end of the cap, while the recess in the cap 3 opens upon the upper edge of the cap and the outer end of the cap. Each cap is thus provided with spaced, parallel, longitudinally extending, side pieces 2^a and 3^a of relatively considerable length, between which the ends of the strip 8 are embraced, the upper edge of the cap 2 covering a considerable portion of the upper edge of the insulating section 8, while the lower edge of the cap 3 covers a considerable portion of the lower portion of the section 8.

The lower edge of the cap 2 at a point somewhat in advance of the rear wall of the recess or socket in the cap is cut away so that the lower edges of the side pieces 2^a of the cap 2 are downwardly curved from the end of the cap, thus extending approximately parallel to the upper edge of the cap, then again downwardly curved to the lower edge of the cap. The upper edge of the inner end of the cap 3 is also cut away, as before described so that the upper edges of the side pieces 3^a are upwardly curved from the end of the cap, then extended approximately parallel to the lower edge of the cap, and then upwardly curved to the upper face of the cap. It will thus be seen that the side pieces of the cap 2 extend from the upper portion of the cap, while the side pieces of the cap 3 extend from the lower edge of the cap, and that when the caps are in position the side pieces of one cap extend ver-

tically over and longitudinally overlap to a greater or less extent the side pieces of the other cap.

The insulating strip or section 8 is held in place between the spaced side pieces 2^a and 3^a by means of transverse rivets or screws 9 at a plurality of points. It will thus be seen that the insulating connecting strip which is of relatively weak material such as hard fiber, and which is unable to withstand great strain, is reinforced by the side pieces which extend along the greater portion of the length of the strip, and along the greater portion of its upper and lower edges.

In order to provide for an electrical connection between the two caps, the caps are provided with the terminals of a knife switch, the terminals being designated 10 and 11. The blade 12 of the switch is pivoted to one of the terminals 11, and its other end is received in the cleft extremity of the other terminal 10, the blade being provided with the usual handle 13. This blade is of the usual character except that it is provided with a shoulder 12^a located inward of the handle 13 so as to engage behind the cleft terminal 10 of the switch when the blade or movable member 12 is in the position shown in Fig. 1. The shoulder 12^a has the form of a lug projecting out at right angles to the blade 12 so disposed that it will engage behind the cleft terminal 10 when the blade is in the position shown in Fig. 1. By means of this construction the caps are normally connected to each other by means of the blade 12, not only electrically but mechanically, and thus the strain upon the circuit breaker will be partly resisted by the blade 12 and will not come entirely upon the insulating connector or section 8, as is ordinarily the case.

To prevent the trolley wheel being electrically disconnected from the feed wires when crossing the space between the inner extremity of the cap 3 and the adjacent portion of the cap 2, we form one or both sides of one of the caps, as the cap 2, with an outwardly projecting rib 14 which more or less conforms to the curved under edge of the inner extremity of the cap. In other words, this rib extends along the lower edge of the cap, and when the two caps are in their normal position this rib 14 arches over the space 16 between the lower edge of the cap 3 and the lower edge of the cap 2. This rib is for the purpose of contacting with the sides of a trolley wheel, even when the face of the wheel is passing across the insulated space 16 between the two sections, thus assuming that the trolley wheel is moved from the cap 3 toward the cap 2. Before the face of the wheel reaches the point 16 the side of the wheel will have engaged with the rib 14 and will thus be in electrical contact therewith, while the wheel is passing over the gap

between the two sections. This rib 14 is preferably raised above the face of the cap 2 from a quarter to three-eighths of an inch, and the length of the rib is governed by the distance that the caps are placed apart on the insulating strip. This distance is governed by the voltage that the switch is to carry. In ordinary section breakers used in mine trolley lines, the distance between the terminal caps which are separated by the fiber insulating sections is from eight to twelve inches. This gives considerable trouble as it causes the trolley wheel to break the circuit in coming in contact with the insulating section, and often causes the electric locomotive to stop on a hard pull, or, even if the momentum of the train is sufficient to carry the motor over the sudden cessation of power, the sudden flow of current through the windings of the motor are extremely hard on the electrical parts of the locomotive. Though connecting the ends of the line wires, we may dispense with the knife switch, and in that case we provide the two terminal caps with a pair of sockets or terminals designed for the attachment of a connecting wire 17^a. These terminals are shown in Fig. 5 and are numbered 17.

In many instances it is desirable that the terminals of the knife switch or other connecting member shall project, not from the top of the caps but from the side thereof. In order to provide for this construction, we form the caps with a plurality of pairs of ears, two pairs of ears for each of the caps, one pair projecting upward, as shown in Figs. 1 and 4, and the other pair projecting laterally. Thus the terminal posts of the switch may be attached so that the cap is vertically disposed, but the switch extends out laterally. The pairs of ears extending upward from the top of the caps are designated 20, and those extending laterally 21. The upper ends of the ears may be turned inwardly as at 22 to receive the bases of the switch terminals and hold them in place, thus permitting the switch terminals to be slid between the ears and yet prevent them from being pulled out. These terminals are held in place by means of screws 25. The downwardly turned lugs 24 which are formed by slitting the ears and then bending these slit portions inwardly, act as stops to prevent the inward movement of the terminals to hold them rigidly in place.

What we claim is:

1. A section breaker for the purpose described, comprising oppositely disposed metallic terminal caps, the inner extremities of said caps being bifurcated, forming spaced extended side pieces, said caps being provided with means at the outer ends for engaging the ends of the line wires, an interposed connecting section of insulating material, the lower and upper edges respectively

of the extended side pieces of the caps being oppositely inclined so that one pair of side pieces shall overlap the other pair, and attaching devices passing through each pair of side pieces and through the interposed insulating section, one of said caps being provided with a laterally projecting rib extending parallel with the inclined lower edges of the side pieces and arching over the lower end of the space between said caps, said rib being adapted to contact with the flanges of a trolley wheel when the face of the wheel is in contact with the edge of the insulating section.

2. A circuit breaker having an insulating connecting section, terminal conductive caps disposed at opposite ends of the insulating section, one of said caps having a longitudinally extending, vertically disposed recess extending upward from its lower edge and opening at one end of the cap to receive and embrace one end of the insulating section, the other cap having a longitudinally extending, vertically disposed recess extending downward from its upper edge and open at one end of the cap to receive and embrace the other end of the insulating section, the lower edge of the first named cap being upwardly inclined toward its open end, the upper edge of the second named cap being downwardly inclined toward its open end so that the ends of the caps overlap and extend beyond each other, and attaching devices passing through the sides of the caps and through the insulating section.

3. A section breaker for the purpose described, including two opposed separated terminal caps having means at their outer extremities for engaging with the ends of line wires, and an interposed section of insulating material attached to the caps and separating the same, the inner ends of both of the caps being provided each with a pair of spaced extensions adapted to embrace respectively the upper and lower edges of the connecting member, the lower edges of one pair of extensions being inclined upwardly and outwardly, the upper edges of the pair of extensions on the opposed socket being inclined downwardly and outwardly, whereby the extensions of one of said socket members will project over the extensions of the other socket member and over the gap between the two at the lower edges thereof, a plurality of attaching devices passing through each pair of extensions and through the interposed insulating section, and ribs extending laterally outward from that socket member which projects over the other, and extending along the lower edges of the spaced extensions and adapted to contact

with the flanges of the trolley wheel when the face of the trolley wheel is in contact with the edge of the insulating member.

4. A section breaker for the purpose described, including two opposed caps having means at their outer extremities for engaging with the ends of line wires, an interposed insulating section attached to the socket members but electrically separating the same, a projecting terminal on one of said socket members, and a projecting cleft terminal on the other of said socket members, a switch blade pivoted to the first named terminal and adapted to engage in the cleft of the second named terminal, the end of said switch blade being provided with a lateral enlargement adapted to engage behind the second named terminal when the blade is in its closed position.

5. A section breaker for the purpose described, composed of two opposed separated terminal caps, each having a longitudinal vertical socket formed therein for the reception of an insulating section, one of said caps having spaced extensions projecting from its upper portion, the other of said caps being formed with spaced extensions projecting from its lower portion, the extensions of one member being adapted thereby to longitudinally overlap the extensions of the other member, the outer ends of the caps being provided with means for engaging line wires, a section of insulating material adapted to be received in the sockets of said caps and between the spaced extensions of the caps, fastening devices passing through the said spaced extensions and through the insulating section, a rib on each side of the first named cap projecting laterally out therefrom and extending along said spaced extensions parallel to the lower edge thereof, said ribs being adapted to contact with the flanges of a trolley wheel when the face of said wheel is in contact with the edge of the insulating member, upwardly projecting switch terminals mounted on the respective caps, one of said terminals being cleft, and a switch blade pivoted to one of the terminals and engaging in the cleft of the other terminal, said blade at its extremity being formed with a lateral enlargement adapted to be engaged behind the cleft terminal when the switch blade is in its closed position.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLIAM T. CARNS. [L. s.]
TROY L. BROWN. [L. s.]

Witnesses:

JOE HALL,
WILLARD ADKINS.