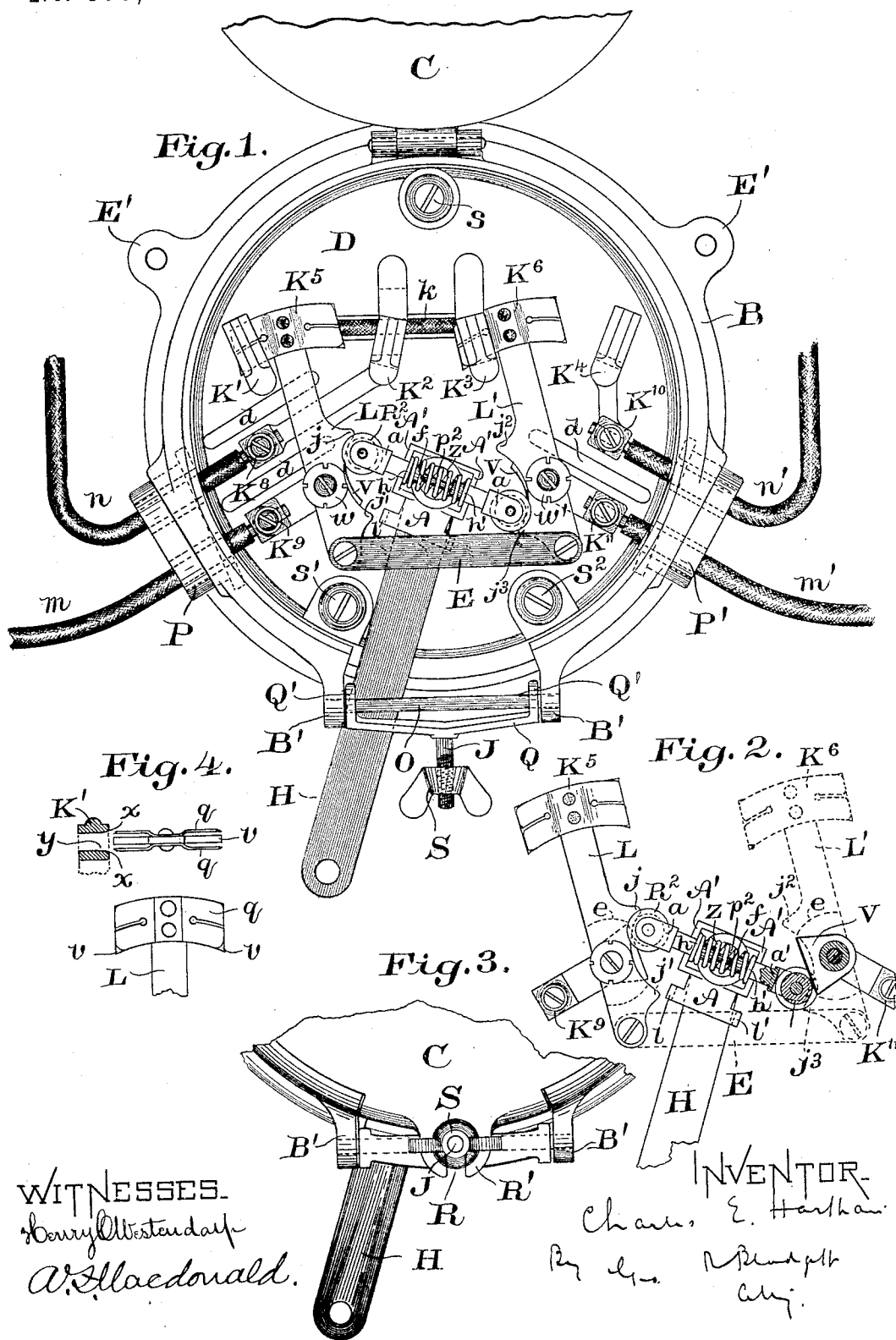


(No Model.)

C. E. HARTHAN.
ARC LIGHT CUT-OUT.

No. 579,268.

Patented Mar. 23, 1897.



WITNESSES.

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ARC-LIGHT CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 579,268, dated March 23, 1897.

Application filed October 14, 1896. Serial No. 608,796. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. HARTHAN, a citizen of the United States, residing at Lynn, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Arc-Light Cut-Outs, (Case No. 450,) of which the following is a specification.

This invention relates to improvements in arc-light cut-outs, and has for its object to provide an efficient and reliable mechanism for arc-light cut-outs which shall entirely disconnect the loop circuit or branch to which it is connected from the main circuit in its open position; that is to say, which will be an absolute cut-out and shall be definite in its movements to connect or disconnect such branch circuit with reference to the main circuit.

The invention consists in an improved arc-light cut-out and in details thereof, as hereinafter set forth and claimed.

Referring to the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a plan view of the invention, disclosing the parts in their operative or assembled position. Figs. 2, 3, and 4 are details thereof.

In carrying out the invention a box or casing B, preferably of cast-iron, is provided, having laterally-extending lugs E' E' for attaching the box to a suitable support by screws or other means.

P P' indicate porcelain bushings located in suitable openings in the lower side of the box B, through which bushings P P' enter the main-line conductors *m n*. The box B is provided with a cover C, preferably of cast-iron, hinged at its upper side and secured in closed position by any suitable means, preferably by the following device: A wing-nut S is mounted on a stud J, projecting from the frame Q, having at its ends bent portions Q', mounted upon and hinging the frame Q to a rod O, mounted in lugs B', projecting from the lower side of the box B. The cover C is provided at its outer or swinging end with a projection R', having an open slot R, by means of which, when the cover C is closed, the stud J can be swung into the slot R, and upon screwing the wing-nut S down against the top

of the projection R' the cover C may be tightly secured in closed position.

Within the box B is located a porcelain base-piece D, secured to the box by screws *s s' s''*, and secured to the base-piece D are contact-pieces K' K² K³ K⁴. The pieces K² K⁴ are formed with extensions integral therewith to form binding-posts K⁸ K¹⁰ for the branch line *n n'*, while binding-posts K⁹ K¹¹ for the main line *m m'* are provided with extensions directed toward the center of the base-piece D and carrying studs which form pivot-supports for the switch-levers L L' at *w w'*. The remaining contact-pieces K' K³ are joined by a wire or connection *k*. Between the binding-posts, having considerable difference of potential, are located raised portions or projections *d d d'* of the base-piece D, which serve to increase the length of surface or leakage-space between said binding-posts, as is clearly evident. The lower ends of the switch-levers L L' are joined by an insulating tie-piece E. These levers are given a parallel motion in one direction or the other to open or close the switch by means of the following mechanism:

II is an operating-handle of non-conducting material, mounted upon a pivot *p*², on which is also centered a cast head A at the inner end of the handle II, and this head A is adapted to engage with the handle II in its movements by means of downwardly-extending projections *l l'* of said head, (indicated by dotted lines in Fig. 2,) there existing some lost motion between the handle II and the projections *l l'*, whereby a limited independent play of the handle or lever II and head-piece is permitted.

The head-piece A is provided with slotted uprights or extensions A' at each end, which extensions A' receive the forked metal supports *a a'*, said supports being adapted to slide on a rod *f*, extending transversely through the head A, and are held apart outwardly by a spring Z, sleeved upon the rod *f* and located between and pressing against the shoulders *h h'* of the supports *a a'*, said shoulders serving to restrain or limit the outward movement of the supports *a a'* by engagement with the side portions A' of the head A.

Located in the forked pieces or supports *a*

a' are rollers $R^2 R^2$, made of insulating material, preferably porcelain, and having curved surfaces, as indicated by the dotted lines.

The levers $L L'$ are made with curved bearing-surfaces between the points $j j' j^2 j^3$ for a distance each side of their pivotal points $w w'$, and are made of such thickness that they will easily fit the grooves in the insulating-rollers $R^2 R^2$. Upon the pivots $w w'$ immediately below the levers $L L'$ are pivoted also independent pieces V , having a bearing edge for the rollers R^2 , which edge is straight or at least does not conform to the curve between the points $j j'$, &c., and which edge takes the thrust of the rollers R^2 when they pass centers. The levers $L L'$ are preferably milled to receive the pieces V , as indicated by the dotted lines e .

The position of the switch-levers, as shown in Fig. 1, is that position in which the switch is open and the branch line is cut out. The path of the current is then by way of $m K^9 L K^5 K' L K^6 L' K^{11}$ and out at m' . If the switch-handle H be now forced to the right, so as to operate the switch to its closed position for the branch or loop circuit, the rollers R^2 will ride over the curved surfaces of the levers $L L'$, compressing the spring Z , thereby forcing the rollers toward each other, since the said curved surfaces are not concentric with the pivot p^2 . When the rollers R^2 have nearly reached the neutral position, that is to say, when they are nearly in line between the pivots $w w'$, they no longer ride on the levers $L L'$, but upon the pivoted pieces V , which the instant pressure is exerted to one side of a line extending between the pivots $w w'$ will swing freely about the said pivots and guide the rollers R^2 to the curved surfaces of the levers $L L'$ at a distance from the center, said levers having been before stationary, and then the spring Z exerts itself to quickly throw the levers to their other position, in the present instance to a closed position for the branch circuit $n n'$, inasmuch as the lost motion allowed between the handle H and the head-piece A renders the former ineffective to any longer restrain or control the latter in its movements. The course of the current is now $m K^9 L K^2 K^3 n$ and back by n' , the other conductor of the branch or loop circuit, $K^{10} K^4 L' K^{11}$, and out at m' ; that is, the local branch circuit is now connected in series with the main-line circuit, as desired.

In the event of the spring Z breaking, as will sometimes happen notwithstanding the utmost care exercised in the selection of the same, the switch will still be positively actuated by the handle H in its movements, and the switch is not therefore rendered wholly ineffective. This is largely due to the tie-piece E , which compels a simultaneous and equal movement of the levers $L L'$, while the pivoted pieces or riders V act to give a quick impulse to the levers in directing the pressure instantaneously to points on the levers

$L L'$ at some distance from the pivots $w w'$. Further, in the event of the spring Z breaking the parts of it remaining cannot escape from their position around the rod f , but still compress, though to a less extent than before, upon the operation of the handle H .

An additional valuable feature, which is thought to be novel in the invention, is found in the peculiar construction of the contact-terminals of the levers $L L'$, (illustrated in Fig. 4,) and which is designed to prevent the ill effects of arcing at such terminals. Leaves $q q$, of good conducting highly-resilient metal, such as phosphor-bronze, are riveted upon each side of the T-shaped ends of the levers L , as shown in this figure. The ends of the T-shaped portion on the contact sides are at an angle, so that the lower portion of said ends is the last to leave the contacts $K' K^2$, &c., and the said lower portion also projects slightly beyond the metal leaves $q q$, as indicated at v , Fig. 4. The effect of this construction is that upon the rupture of the circuit when the levers L leave the contacts K , &c., the are which would otherwise naturally develop between the leaves $q q$ and the edges $x x$ of the contact-pieces K , &c., with which said leaves engage, is shifted to exist between the heavy point v and the bottom of the contact K at y . In this manner any burning or roughening of the edges will not interfere to prevent the proper working of the switch or prevent the leaves $q q$ from passing between the arms $x x$ of the pieces K , &c., as would be the case were the arc to remain in the position where it is first formed.

Besides the novel construction heretofore described, in which the operating mechanism provides an absolute cut-out, the device has the following advantages: Being largely composed of pieces of stamped metal, it is cheap to build, and having porcelain parts for the support of the switch structure proper and the binding-posts and contacts, and having also an inclosing case of metal, it is well insulated and not subject to leakage of current when installed out of doors or in positions where it is liable to get wet. The porcelain parts are likewise given a configuration which extends the leakage-space should the apparatus get wet or damp, while by removing the outer box or casing the porcelain base or support proper of the switch mechanism may be readily attached to a ceiling or wall for use indoors.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a quick-action switch, two levers of the first class, each having a rider at its pivotal point, with a roller-bearing edge not conforming to the edge of the adjacent lever, in combination with an actuating part comprising rollers bearing yieldingly against and movable along said levers and said riders to the opposite sides of their fulcrums, and a pivotal lever for operating said rollers, said

lever and said rollers having a limited independent play from the lever, as herein set forth.

2. In a quick-action switch, a pair of levers of the first order, with curved roller-bearing edges extending on either side of their pivotal points, and movable riders mounted at said pivotal points and having roller-bearing edges not conforming to the edges of the levers, in combination with an actuating part comprising rollers yieldingly bearing against and movable along said levers and said riders, and a swinging lever for operating the rollers and connected therewith so as to afford lost motion during the throw of the lever, as set forth.

3. In a quick-action switch, a pair of switch-levers of the first order, connected together to move simultaneously and each having a curved roller-bearing edge, and a rider pivoted on the pivotal bearings of said levers and having a roller-bearing edge not conforming to the edge of the adjacent lever, in combination with an actuating part, comprising outwardly - spring - pressed rollers bearing against said levers and mounted in a swing-

ing or pivoted head, said rollers being movable along said levers, and a lever for operating the rollers pivoted to said head and adapted to have lost motion in reference thereto, as set forth.

4. In a quick-action switch, a pair of switch-levers of the first order connected by a bar and each having a curved edge extending on either side of their pivotal points, a swinging piece or rider mounted on the pivot of each switch-lever and having a straight roller-bearing edge, in combination with a pair of yielding rollers, each bearing against one of the switch-levers, a pivoted head in which said rollers are mounted, and a spring holding said rollers outwardly, and an actuating-lever handle having its inner end pivoted in said head and movable in said head to have lost motion relatively thereto, as set forth.

In witness whereof I have hereunto set my hand this 12th day of October, 1896.

CHARLES E. HARTMAN.

Witnesses:

JOHN W. GIBBONEY,

HENRY O. WESTENDARP.