H. GILLETTE.

THERMO ELECTRIC SWITCH.

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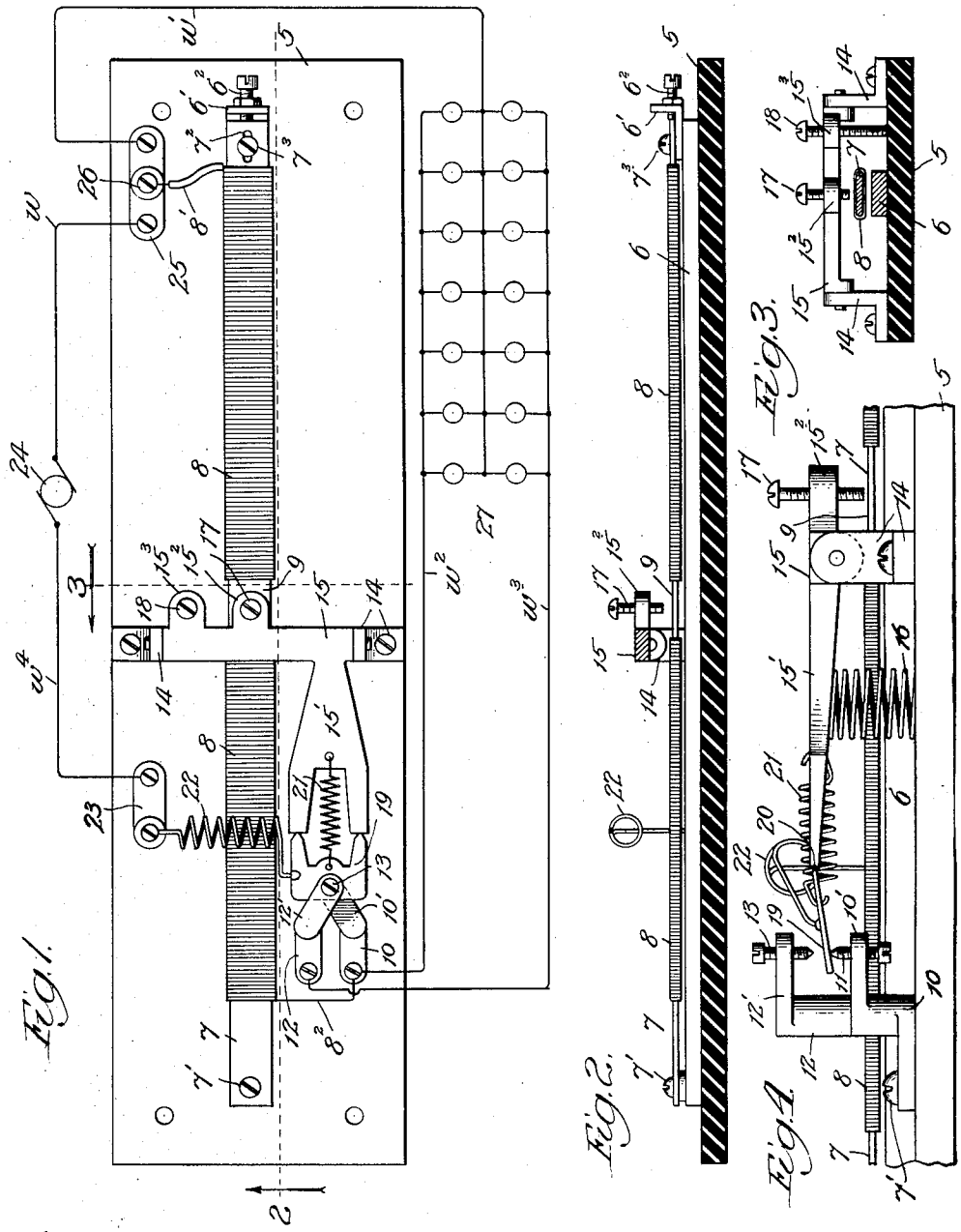
1,080,908. Patented Dec. 9, 1913.



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UNITED STATES PATENT OFFICE.

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THERMO-ELECTRIC SWITCH.

1,080,908. Specification of Letters Patent. Patented Dec. 9, 1913.

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To all whom it may concern:

Be it known that I, HARLEIGH GILLETTE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Thermo-Electric Switches, of which the following is a specification.

My invention relates to an improvement in thermo-electric switches of the kind used for flashing electric signs.

The object of my invention is to provide an improved construction of double-circuit and snap-contact therein for effecting quick make-and-break.

In the accompanying drawing, Figure 1 is a plan view of a thermo-electric switch embodying my improvement and shown to be contained in a double incandescent electric-lamp circuit, illustrated diagrammatically; Fig. 2 is a section on line 2, Fig. 1; Fig. 3 is a section on line 3, Fig. 1, and Fig. 4 is a broken side view of the device showing the make-and-break mechanism in elevation.

On a bed-plate 5, of insulating material, is secured a metal bar 6, along the top of which extends a flexible metal thermostat-bar 7 preferably of brass, spaced between its ends from the bar 6, and wound with insulated wire 8, as a resistance-coil, the winding being interrupted midway between the ends of the flexible bar to bare a section of its surface at 9. The bar 7 is permanently fastened at one end to the adjacent end of the bar 6, as by a screw, at 7′, passing through an interposed brass washer; but the opposite end of the bar 6 has secured to it a brass bearing 6′ for a set-screw 6^2 to engage the adjacent end of the bar 7 containing a longitudinal slot 7^2, through which it is adjustably fastened, as by a screw at 7^3, to the bearing. This construction enables the bar 7 to be more or less slightly warped lengthwise, to set it for regulating its operation, by properly turning the set-screw. Adjacent to the permanently-fastened end of the bar 7 an angular brass bracket 10 is secured to the bed-plate, this bracket having a raised finger-like horizontal extension 10′, in the end-portion of which works an upwardly-projecting contact-screw 11. Another bracket, 12, is similarly secured to the bed-plate adjacent to the bracket 10, and has a raised finger-like extension 12′ overhanging the extension 10′ and carrying a downwardly-projecting contact-screw 13 in vertical alinement with the screw 11.

In bearings 14, 14 on the bed-plate at opposite sides of the bar 6, and adjacent to the bare section 9 on the thermo-bar, is journaled to extend transversely across the latter a rocker-bar 15 having an arm 15′ extending at a right-angle from it at one end, this arm expanding toward its free end, which is bifurcated, as shown. A coiled spring 16 forms a post under the arm 15′ between its ends for resiliently propping it. A bearing 15^2 extends centrally from the rocker-bar for a set-screw 17 depending over the bare section 9, and a similar bearing 15^3 extends from the rocker-bar near one end for a depending set-screw 18 to cooperate with the surface of the bed-plate in limiting the extent of rocking in one direction of the bar 15. Between the contact-points 11 and 13 extends a U-shaped or bifurcated contact-head 19 having the ends of its prongs pointed, as shown, to work in grooves 20 (Fig. 3) in the extremities of the bifurcated arm 15′, this head being held to the arm, to work pivotally against it, by a coiled spring 21 extending between the prongs of the opposing forks. A coil of conducting-wire 22 connects the head 19 with a terminal 23 on the bed-plate.

The double circuit containing the device, as thus described, may be traced on Fig. 1 as follows: From one side of an electric generator, represented at 24, a wire w to a terminal 25 on the bed-plate, which is also connected at a binding-post 26, by a branch-wire 8′, with the adjacent end of the coil 8. A wire w' leads from the terminal 26 and forms the feed-wire for the two rows of incandescent electric lamps 27 connected in multiple, as indicated in Fig. 1, the return-wire w^2 of one row leading to the bracket 10, with which the adjacent end of the coil 8 is also connected by a branch-wire 8^2. The return-wire w^3 for the other row of lamps leads to the bracket 12; and the opposite side of the generator is connected with the head 19 by a wire w^4 leading to the terminal 23, and the wire 22, leading therefrom to the head.

In the construction shown, of my improved make-and break device, involving the arm-member 15′ and the contact-head member 19, the spring 21 connecting the pair of these members tends to hold them in alinement, but is double-acting in the sense that when the two members are only slightly turned at their abutting extremities out of such alinement toward the lower con-

tact-screw 11, or toward the upper contact-screw 13, the recoil-force of the spring, then pulling, as it were against a dead-center, will act to quickly snap the member 19 into engagement with one or the other contact-screw. With one branch of the circuit closed, say at the contact-point 11, as shown in Fig. 4, one row of the lamps 27 is lighted, and the current heats and thereby warps the bar in an upward direction between its ends until its section 9 engages the set-screw 17 and tilts the rocker-bar 15 to depress its arm 15′. This depression slightly depresses the head 19 toward its pointed ends, whereupon the spring 21 quickly snaps it against the contact-point 13, thereby closing the other branch of the circuit to light the other row of lamps, and cutting out of circuit the coil 8 to permit the flexible bar to straighten by cooling. In thus straightening, the bar 7 separates from the set-screw 17, permitting the spring 16 to restore the rocker-bar 15 to normal position and thereby tilt the head 19 in the opposite direction slightly beyond a dead-center with the arm 15′ and permit the spring 21 to snap it against the lower contact-point 11, thus again closing the first-named circuit-branch to include the coil 8 and prepare the device for a repetition of the described operation.

While the operation of the device embodying my improvement is, in a general way, like that of other devices of the same type, the principle upon which my snap-contact mechanism operates, which is the gist of my invention, renders it sensitively responsive in a high degree and exceptionally quick-acting in performing its make-and-break function; and besides, as will be seen, the head 19, is separating by the buckling action from a point 11 or 13, momentarily moves thereon and is thereby cleaned of any foreign matter that may be upon it to impair its conductivity.

The principle referred to lies in what may be characterized as the resilient buckling action of a contact making and breaking head superinduced by the heating and cooling of the thermostat-bar; and while the construction shown and described as embodying that principle is the best known to me for the purpose, I realize that considerable variation in the details thereof is possible and therefore do not intend limitation thereto, my intention being in the following claims to claim protection upon all the novelty there may be in my invention as broadly as the state of the art will warrant.

What I claim as new and desire to secure by Letters Patent is—

1. In a thermo-electric switch, a make-and-break device comprising, in combination with opposing electric contact-points, two members with a spring connecting them in end-to-end abutment to work pivotally at their abutting junction, one member forming a contact-head extending between said points, and movable by the other member in turning in either direction to snap said head, by the recoil of the spring, against a contact-point in its path in the opposite direction.

2. In an electric switch of the character described, a make-and-break device comprising, in combination with opposing contact-members, a rocker-bar having a spring-supported bifurcated arm, a bifurcated contact-head extending between said members, and a spring connecting said arm and head with their bifurcated extremities in pivotal abutting engagement with each other.

3. In an electric switch of the character described, a make-and-break device comprising, in combination with opposing contact-members, a rocker-bar having a spring-supported bifurcated arm having grooves in its extremities, a bifurcated contact-head extending between said members and having pointed extremities, and a spring connecting said arm and head with the points of the latter pivotally confined in said grooves.

4. In a thermo-electric switch, the combination with an electric circuit and a contact-point therein, of a wire-wound thermostat-bar, a rocker-arm actuated by warping and straightening said bar, and a contact making-and-breaking head spring-connected with said arm, in abutting end-to-end pivotal engagement therewith, to be snapped into and out of contact with said point by the rocking movements of said arm in tensioning and releasing said spring-connection therewith.

5. A device of the character described, comprising, in combination, a double electric circuit, a base with a metal bar secured thereon, a wire-wound thermostat-bar secured at its ends to said bar and included in one branch of said circuit, a contact-member in said branch, a second contact-member in the other branch of said circuit, a rocker-bar crossing the thermostat-bar and having a stop depending over the rocker-bar between its ends, a bifurcated spring-supported arm extending from the rocker-bar, a bifurcated contact-head extending between said contact-members, and a spring connecting said arm and head pivotally together with their bifurcated extremities in abutting engagement, for the purpose set forth.

HARLEIGH GILLETTE.

In presence of—
NELLIE B. DEARBORN,
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