(No Model.)

G. X. GAST.

LIGHTNING ARRESTER AND MULTIPLE AUTOMATIC FUSE BLOCK.

No. 584,632. Patented June 15, 1897.

Fig. 1.

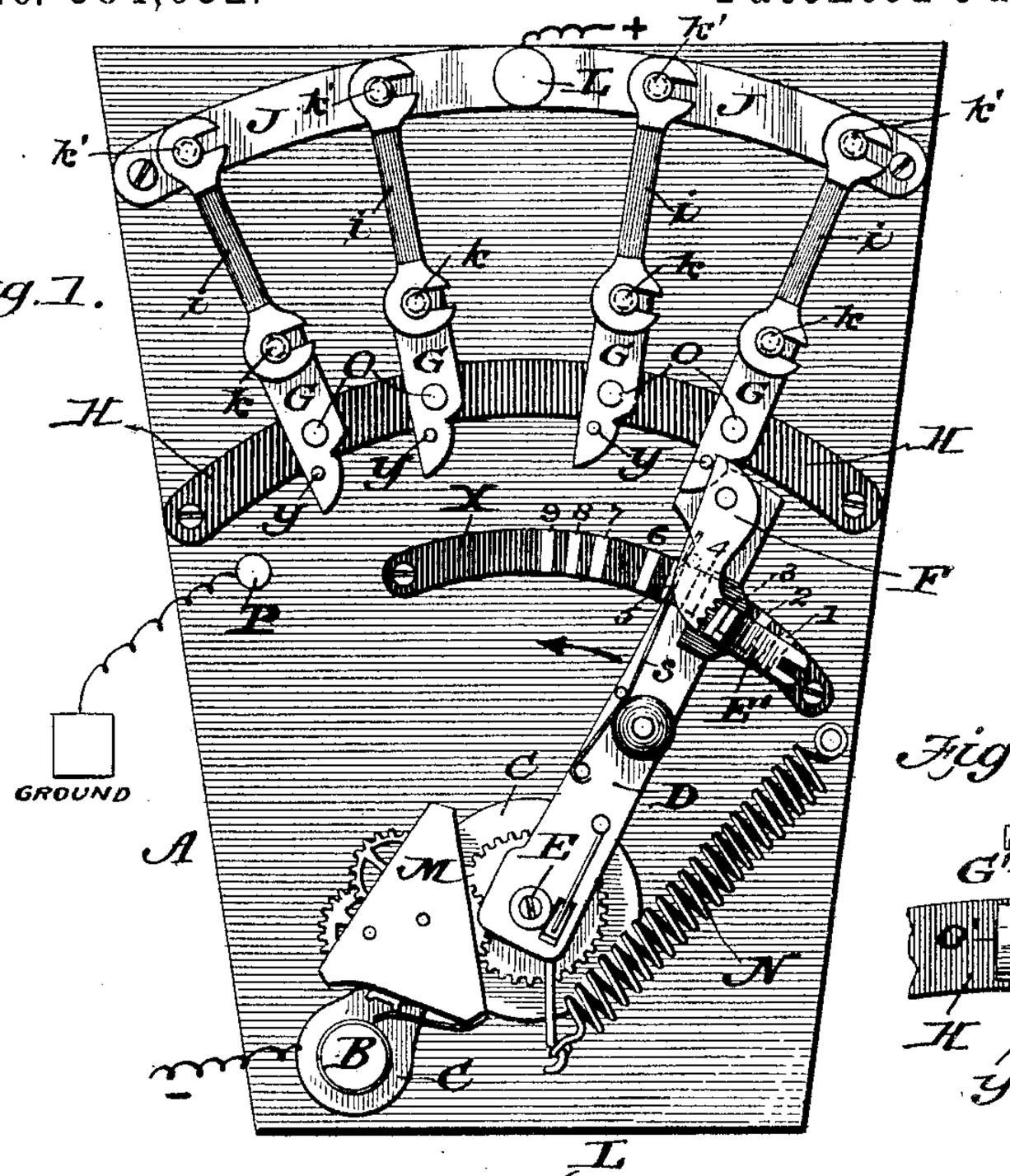


Fig. 3.

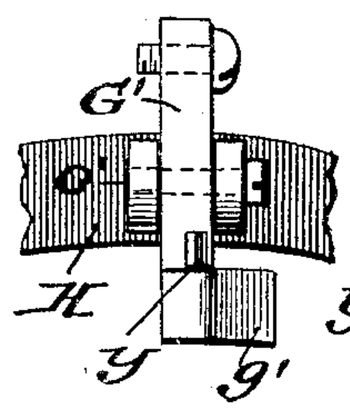


Fig. 4.

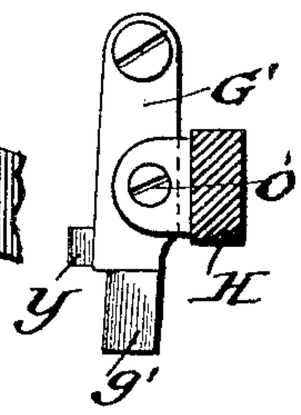


Fig. 2.

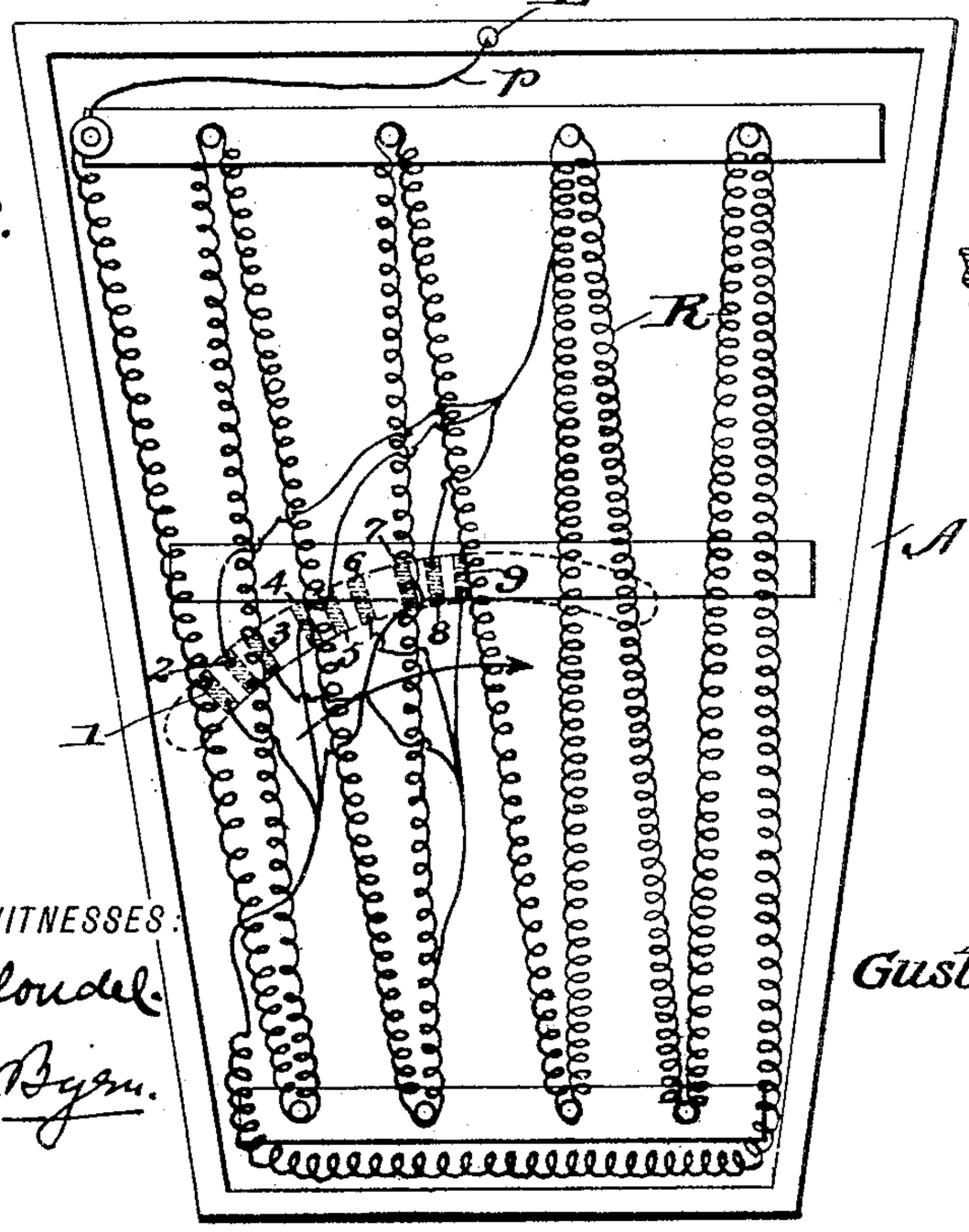
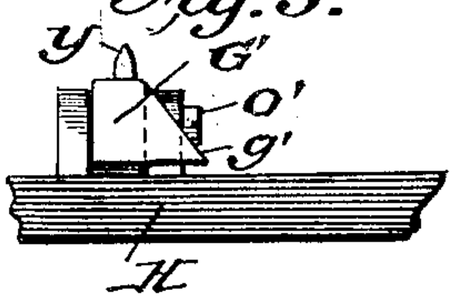


Fig. 5.



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LIGHTNING-ARRESTER AND MULTIPLE AUTOMATIC FUSE-BLOCK.

SPECIFICATION forming part of Letters Patent No. 584,632, dated June 15, 1897.

Application filed April 10, 1897. Serial No. 631,596. (No model.)

To all whom it may concern:

Be it known that I, GUSTAVE XAVIER GAST, of New Orleans, in the parish of Orleans and State of Louisiana, have invented a new and useful Improvement in Lightning-Arresters and Multiple Automatic Fuse-Blocks, of which the following is a specification.

The object of this invention is to provide an instrument in the nature of a lightning-arrester and multiple automatic fuse-block for automatically closing or restoring an electric circuit whenever it may have been accidentally broken by the fusion of the conducting-wire from a stroke of lightning or an unusually heavy current. Devices for this purpose have heretofore been patented in which a series of easily-fusible wires are connected at one end to insulated trip-levers and at the other end to a conducting-bar, and a spring-actuated arm is made to find lodgment against and bear upon one of the trip-levers until its fusible wire is melted, when the spring-arm trips and passes by the trip-lever and finds lodgment against the next trip-lever to reëstablish the circuit through its fusible wire.

My invention comprises certain improvements in this general form of device, and more especially in a shunt-circuit of variable or graduated resistance through which the current is directed as the spring-arm moves from one trip-arm when its fusible connection is broken to the next whose fusible connection is intact, so that a sudden shock is not thrown upon the second fusible connection, (which might melt it,) but it is enabled to resist and hold the spring-arm, as hereinafter more fully described.

Figure 1 is a plan view of the instrument. Fig. 2 is an inverted plan; and Figs. 3, 4, and 5 are top, side, and plan views, respectively, of a modified form of trip-lever.

In the drawings, A represents a base-plate which is of non-conducting material, preferably porcelain, and shaped either as shown or in the form of a round disk or plate.

B and L are the two binding-posts which connect with the ends of the main-line circuit, which is completed through the instrument, as will be hereinafter described.

C is a metal plate screwed to the base A and in electrical connection with the binding-post B. On the plate C there is a stem or pin E, about which swings a metal arm D, which is strained in the direction of the arrow by a spring N, and whose movement from the action of said spring is retarded and rendered uniform by an escapement M. Any ordinary clock spring and escapement may, however, be used in the place of the spring N and escapement M.

Near the end of arm D is a curved non-conducting bar H, and outside of this and parallel with it another curved bar J, made of metal, and in electrical connection with the binding-post L. Both these bars are firmly mounted upon the base A, and the non-conducting bar H has pivotally mounted upon it a series of trip-levers G, arranged to swing freely about their center screws O, parallel to the plane of the base. Connecting the trip-levers G with the metal bar J are a series of fusible strips *i*, which have at their ends non-fusible metal hook-plates which embrace at one end a set-screw *k'* on the bar J and at the other end a set-screw *k* on the end of the trip-lever.

Against the first of the series of trip-levers G the end of the arm D is allowed to rest with a spring-pressure, and when in this position the line-current passes from binding-post B to frame C and arm D, thence to trip-lever G, the first fusible strip *i*, the bar J, and binding-post L to line again. Whenever, however, a damaging current is thrown upon the line, the first fusible strip *i* melts, trip-lever G turns on its pivot O from the pressure of the arm D, and the arm D passes to the trip-lever G of the next fusible strip *i*, and the circuit is reëstablished in a well-known manner.

While the spring-arm is moving from the trip-lever of one fusible strip to the next I cause the current to be shunted through a graduated resistance decreasing in character until the arm touches the trip-lever of the next fusible strip, so that the shock of a heavy current does not come suddenly upon the second fusible strip, but is dissipated and the melting of the second fusible strip by the same charge that melted the first is avoided. For this purpose I employ a commutator-plate X under the swinging arm D, which has three groups of plates 1 2 3, 4 5 6, 7 8 9, which groups correspond in number to the spaces existing between the fusible strips. The first plate

1, 4, and 7 of each group is connected with a rheostat below the base, so as to cause the current to pass through the entire amount of resistance. The second plates 2 5 8 of each group are connected to pass through one-half the resistance, and the third plates 3 6 9 are connected to pass through one-third the resistance.

In order to shunt the current through the graduated resistance as the arm D passes from one trip-lever G to the next, an automatic switch F is pivoted to arm D and is in electrical contact therewith. A metal brush E′ is also mounted upon this arm opposite the end of the switch, but is insulated therefrom and also from the arm by a non-conducting block. This brush sweeps over the face of the commutator-plates and, through the agency of the switch F, is made to shunt the current through these plates.

Normally when the instrument is set a pin Y on each of the trip-levers G presses against the switch F and breaks contact between the same and the brush E′, but when the first fusible strip *i* melts and trip-lever G turns out of the way and arm D begins to move in the direction of the arrow then switch F, acting from the pressure of its spring *s*, closes contact against brush E′, and the current is shunted through one group of plates 1 2 3 as the arm passes to and is stopped by the next trip-lever G. When the passage is made over any one of the three groups of plates, it meets with a graduated resistance—the full amount when the brush touches the first plate of each group, half the amount when it touches the second plate of each group, and one-third the amount when it touches the last plate of each group. This will be better understood from Fig. 2, in which the connections of the rheostat with the several plates of the commutator are shown. The three groups of plates 1 2 3, 4 5 6, 7 8 9 are shown in dotted lines, and the arrow indicates the direction of the sweep of the spring-arm.

R is the rheostat, consisting of coils of wire or other suitable resistance, one end of which, *p*, is connected to the binding-post L and the other end to the first plates 1 4 7 of each series. About midway the resistance of the rheostat the plates 2 5 8 are connected, and about one-third the resistance of the rheostat the plates 3 6 9 are connected, so that as the brush passes over any one group of the three groups it successively shunts the current through first the whole of the resistance, then one-half the resistance, and then one-third of the resistance, so that at the time the arm D is making contact with the trip of the second fusible strip most of the current is passing through the lowest proportion of resistance between the binding-posts, and when the arm D finally sends the current through the second fusible strip there is less probability of melting it from the remnants of the heavy charge that melted the first fusible strip.

When the arm D has passed all of the trip-levers and all the fusible strips are destroyed by successive charges, the arm finally takes up against a pin P, which is connected to the ground.

In making use of my invention I do not confine myself to the shape of the base and bars J H, nor the arrangement of the trip-levers G, as these may be changed without departing from my invention. Thus, for instance, instead of having the trip-levers G pivoted to swing parallel with the base, they may be pivoted to tilt in a plane at right angles to the base, as shown in Figs. 3, 4, and 5, in which the trip-levers are pivoted upon an axis O′ and tilt at right angles to the bar H by the action of the spring-arm D on a cam-face *g*′ of said trip-levers.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a lightning-arrester and multiple automatic fuse-block, the combination with the series of fusible strips, and the swinging arm making connection through the fusible strips successively; of a resistance and an automatic switch placed substantially as described to throw the current through the resistance during the passage of the swinging arm from the melted fusible strip to the next fusible strip as and for the purpose set forth.

2. In a lightning-arrester and multiple automatic fuse-block, the combination with the series of fusible strips, and the swinging arm making connection through the fusible strips successively; of a resistance, a commutator connected at different points along the resistance, an automatic switch and brush carried by the arm and making connection successively with different proportions of resistance to throw the current through it as the swinging arm moves from the melted fusible strip to next fusible strips as and for the purpose described.

3. In a lightning-arrester and multiple automatic fuse-block, the combination with the series of fusible strips, and the swinging spring-arm D making connection through the fusible strips successively; of the spring-actuated switch F mounted on the arm and in electrical connection therewith, the brush E′ mounted on said arm and insulated as described, the commutator X having insulated groups of plates, and a rheostat connected to the commutator-plates of each group at different points along the resistance of the rheostat substantially as and for the purpose described.

4. In a lightning-arrester and multiple automatic fuse-block, the combination of a base, the metal bar J connected to one binding-post, the insulating-bar H with pivoted trip-levers having stop-pins Y, the series of fusible strips with hooked ends connected detachably to bar J and to the trip-levers, the spring-actuated arm D in electrical connection with the other binding-post and bearing automatic spring-switch F in electrical

connection with the arm, and brush E′ insulated therefrom, the commutator X having insulated plates arranged in groups, a rheostat arranged beneath the base and connected along its length at different points of resistance with the several plates of each group, said plates being arranged for the shunting of the current through the same with a diminished resistance as the swinging arm passes from fusible strip to fusible strip substantially as described.

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