

G. W. HART.
 SYSTEM FOR CONTROLLING ELECTRIC CIRCUITS.
 APPLICATION FILED JUNE 30, 1910.

988,093.

Patented Mar. 28, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

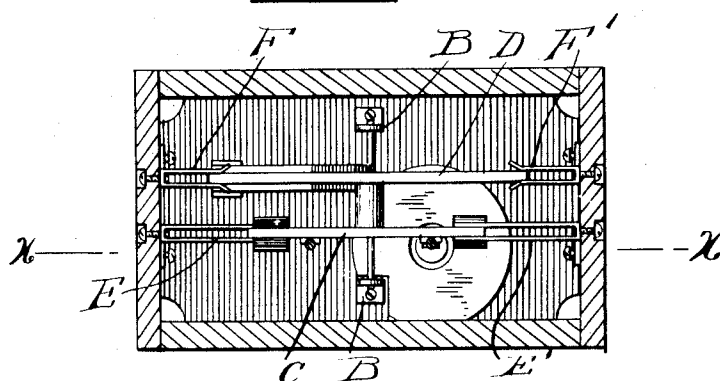
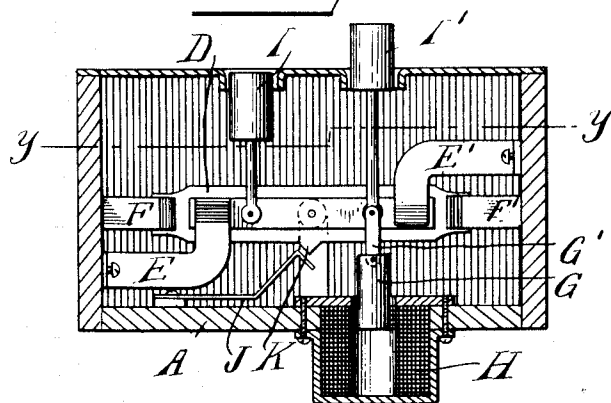


Fig. 2.



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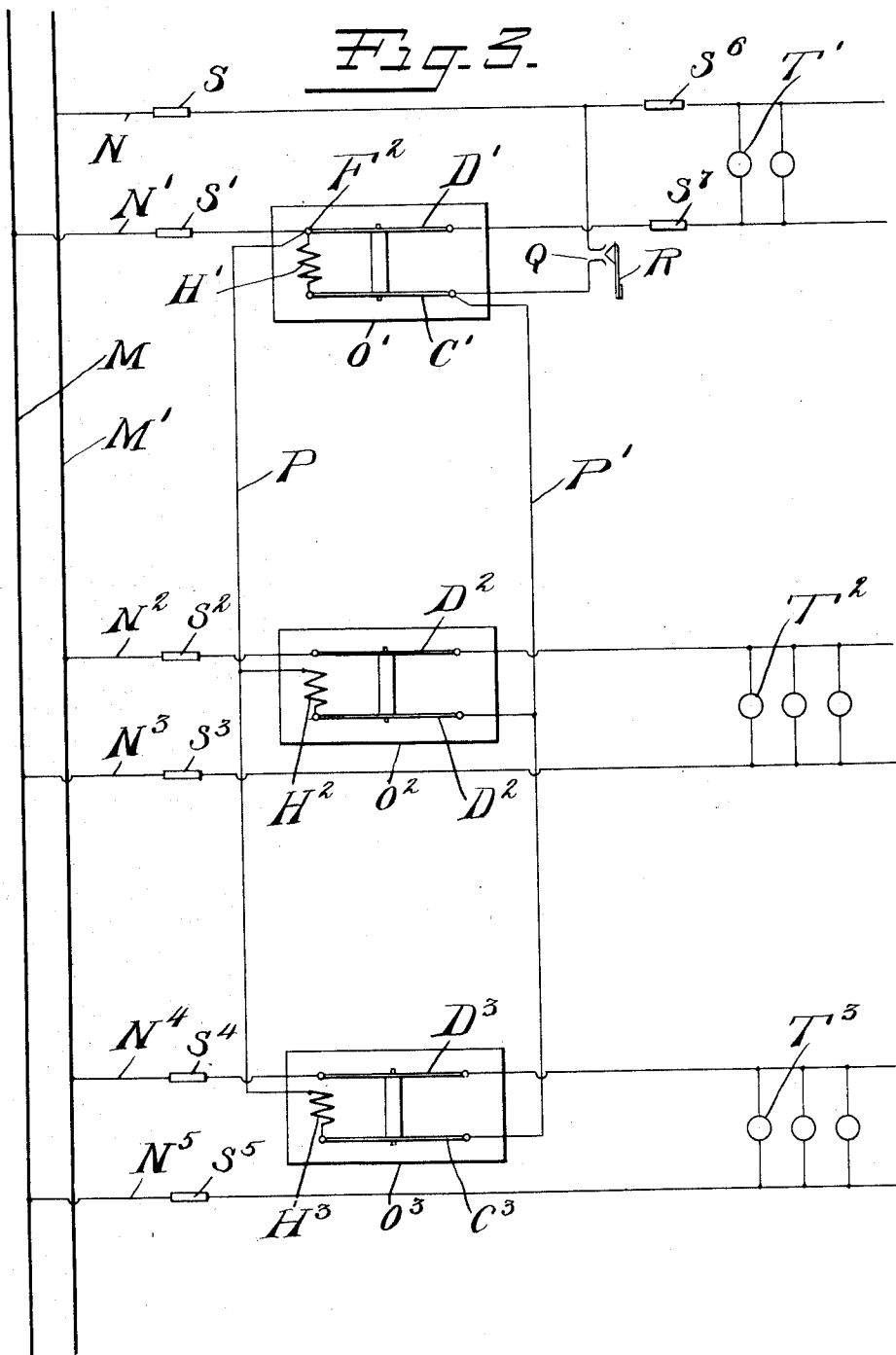
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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SYSTEM FOR CONTROLLING ELECTRIC CIRCUITS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GERALD W. HART, a citizen of the United States, residing at West Hartford, county of Hartford, State of Connecticut, have invented certain new and useful Improvements in Systems for Controlling Electric Circuits, of which the following is a full, clear, and exact description.

My invention relates to systems for controlling electric circuits, and has for its object to provide a plurality of branch circuits with electro-magnetically controlled switches so interconnected that all the switches can be controlled electro-magnetically from a single point, so as to open their respective branch circuits.

It further has for its object to provide means for cutting out the controlling solenoid of any switch by the action of that switch due to its solenoid.

It further has for its object to provide an arrangement such that if any circuit to which the local controlling circuit is connected is interrupted, between the switch and the mains, as for instance by the blowing of a fuse, the current flowing to the translating devices in that branch will be completely interrupted, although the switch remains closed.

The following is a description of my invention, reference being had to the accompanying drawings, in which—

Figure 1 shows diagrammatically a plan view of an electro-magnetically operated push button switch, the face plate and push buttons being removed, a simple form being selected for purposes of illustration. Fig. 2 shows an elevation of the mechanism of the same, the base being in section on the line $x-x$ Fig. 1. Fig. 3 shows circuit connections for embodying my invention with a number of such switches.

Referring more particularly to the drawings, A is a switch base carrying supporting bearings B—B, in which are mounted oscillating switch arms C—D insulated from one

another, D being the main switch arm and C being an auxiliary switch arm.

E—E' are contacts carried by the base and engaged and disengaged by the switch arm C, and F—F' are contacts carried by the base engaged and disengaged by the switch arm D.

G is a solenoid core connected by a link G' to a part of the moving system such as the switch arms C, and H is a solenoid winding acting upon said core.

I—I' are push buttons connected to the switch arm C.

J is a spring engaging a projection K to cause the switch arms to make a complete quick throw.

Referring to Fig. 3, M—M' are mains from which extend branches N—N'—N²—N³ and N⁴—N⁵, &c. O¹—O²—O³ are three switches, such, for instance, as shown in Figs. 1 and 2. H¹—H²—H³ are solenoids corresponding to the solenoid H of Fig. 1. P—P' constitute the sides of a local circuit to which the solenoids H¹—H²—H³ are connected in multiple. One side of this local circuit is connected to the main M, and the other side of the local circuit is connected to the main M', the connections being preferably through one pair of branch circuits N—N'. As shown, the side P is connected to the contact F². As shown, the other side P' of the local circuit is connected to the other side N of the same branch circuit, this being usually most convenient. This local circuit is interrupted at Q, and a local circuit controller R is provided for closing and opening this interruption. S—S'—S²—S³—S⁴—S⁵ are fuses between the switches and the mains M—M'. S⁶—S⁷ are fuses in series with the fuses S—S' and of smaller capacity than S—S'. T¹—T²—T³ are translating devices. The switch arms C¹—C²—C³ correspond to the switch arm C, and, together with their contacts, are connected to the sides P—P' so as to be in parallel with each other and in series with the solenoid windings H¹—H²—H³ respectively. The switch

arms $D'-D^2-D^3$ correspond to the switch arm D , and, together with their contacts, are in series with the conductors $N-N'$ and the translating devices thereon.

5 The action of the arrangement is as follows: The switches may be opened and closed independently by the push buttons $I-I'$. When any of the push buttons $I-I'$ of the switches $O'-O^2-O^3$ are actuated so
10 as to close their switches, the local circuit, except for the interruption at the local circuit controller R , is completed through the corresponding solenoids $H'-H^2-H^3$. When the local circuit controller R is closed
15 so as to complete the local circuit $P-P'$, all of the solenoids $H'-H^2-H^3$ whose switches are closed, are energized, and each acts to move its respective switch so as to cause it to open its branch circuit, and also disconnect its solenoid from one of the sides $P-P'$
20 of the local circuit.

The action of the several switches is not necessarily simultaneous, and as any switch operates, the part of the local circuit
25 passing through its solenoid is automatically broken. The arrangement can be used with two switches, or with a greater number as desired. The manual opening of any switch does not interfere with the electro-magnetic operation of any that are closed.

In the preferred arrangement shown, the blowing of any of the fuses $S^2-S^3-S^4-S^5$ does not interfere with the electro-magnetic operation of any of the switches. The blowing
35 of either fuse $S-S'$ interferes with the electro-magnetic operation of all the switches, but completely cuts off all current from the translating device T' of the switch O' without affecting the flow of current in
40 the other branch circuits. If desired, the fuses S^6-S^7 of smaller capacity than $S-S'$ may be used, so that an overload will blow them instead of the fuses $S-S'$, and thus cut out the overload without interfering
45 with the circuit $P-P'$.

The arrangement is simple and efficient and permits of various modifications, but the arrangement shown and described is the arrangement which I prefer to use.

50 What I claim is:

1. In a system for controlling electric circuits, the combination of a pair of mains, a plurality of branch circuits including pairs of conductors and translating devices, connected in parallel to said mains, a plurality
55 of electric switches controlling said branch circuits respectively, each switch having a solenoid whereby it may be controlled, a local circuit to which said solenoids are connected in parallel, said local circuit having its sides connected to the two mains respectively, a local circuit controller in said local circuit, and means for cutting any of said

solenoids out of the local circuit when its switch has been controlled thereby. 65

2. In a system for controlling electric circuits, the combination of a pair of mains, a plurality of branch circuits including pairs of conductors and translating devices, connected in parallel to said mains, a plurality
70 of electric switches controlling said branch circuits, each having a solenoid whereby it may be controlled, a local circuit to which said solenoids are connected in parallel, said local circuit having its sides connected to
75 the two mains respectively through two branch conductors of opposite polarity, a local circuit controller in said local circuit, and means for cutting any of said solenoids out of the local circuit when its switch has
80 been controlled thereby.

3. In a system for controlling electric circuits, the combination of a pair of mains, a plurality of branch circuits including pairs of conductors and translating devices, connected in parallel to said mains, a plurality
85 of electric switches controlling said branch circuits, each having a solenoid whereby it may be controlled, a local circuit to which said solenoids are connected in parallel, said local circuit having its sides connected to
90 the two mains respectively through two branch conductors of opposite polarity constituting portions of one branch circuit, a local circuit controller in said local circuit, and means for cutting any of said solenoids out of the local circuit when its switch has
95 been controlled thereby.

4. In a system for controlling electric circuits, the combination of a pair of mains, a plurality of branch circuits including pairs of conductors and translating devices, connected in parallel to said mains, a plurality
100 of switches controlling said branch circuits, each switch having a main switch-arm in series with said translating devices, an auxiliary switch-arm, and a controlling solenoid, said solenoids being connected in series with said auxiliary switch-arms respectively,
105 and a local controlling circuit connected across the mains and to which the solenoids and auxiliary switch-arms of each switch are connected in parallel to the solenoids and auxiliary switch-arms of the other switches, and a local circuit controller in
110 said local circuit.

5. In a system for controlling electric circuits, the combination of a pair of mains, a plurality of branch circuits including pairs of conductors and translating devices, connected in parallel to said mains, a plurality
120 of switches controlling said branch circuits, each switch having a main switch-arm in series with said translating devices, an auxiliary switch-arm, and a controlling solenoid, said solenoids being connected in
125

series with said auxiliary switch-arms respectively, a local controlling circuit connected across the mains and to which the solenoids and auxiliary switch-arms of each
5 switch are connected in parallel to the solenoids and auxiliary switch-arms of the other switches, the connection of one side of said local circuit to said mains being

through a branch circuit, and a fuse located in said last named branch circuit between 10 said connection and said main, and a local circuit controller in said local circuit.

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Witnesses:

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