

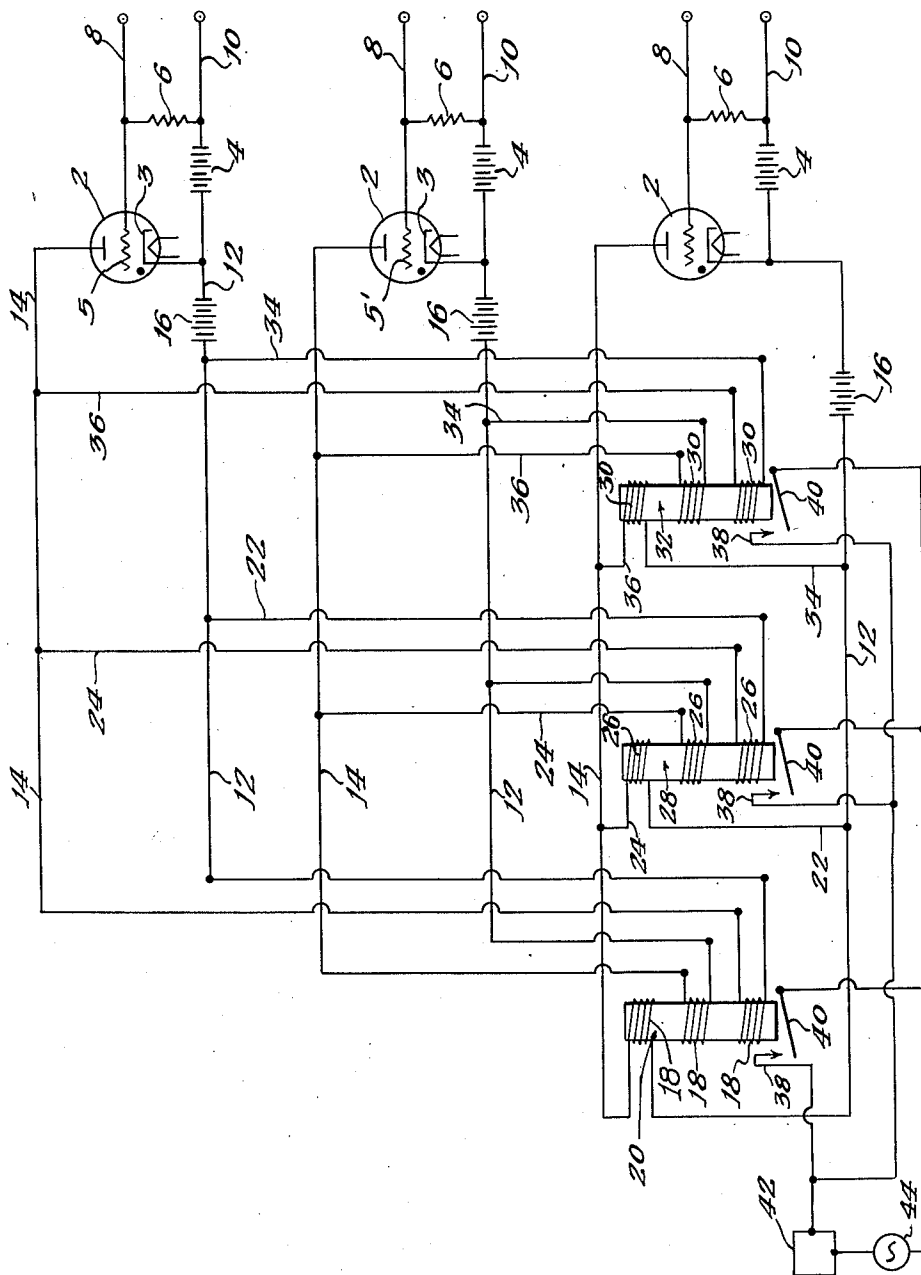
Feb. 9, 1954

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2,668,934

RELAY SYSTEM

Filed Oct. 31, 1946



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2,668,934

RELAY SYSTEM

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Application October 31, 1946, Serial No. 706,824

3 Claims. (Cl. 317-137)

1 This invention relates to relay systems, and more particularly to a novel electronic relay system for actuating an electrically operated device under desired conditions detected by any suitable condition-responsive means.

It is well known in the art to provide an electronic relay circuit operable by condition-responsive means to actuate a mechanical or electromagnetic relay, thereby closing an electric circuit through the associated device to be actuated; and it is also known in the art to provide a plurality of mechanical relays connected in parallel, as well as a plurality of associated electronic relays, to insure operation of the device despite accidental inoperativeness of one of the relays.

In relay systems of the above-described type, however, actuation of the associated device sometimes occurs under improper conditions due to the fact that one of the electronic relays, as the result of changed characteristics thereof, improperly actuates the associated mechanical relay to close a circuit through the device. According to the present invention, the novel relay system incorporates a plurality of mechanical relays and a plurality of electronic relays operatively associated therewith for the purpose of insuring actuation of the associated device under the proper conditions, and moreover the novel system is so designed that actuation of the associated device under improper conditions is substantially eliminated.

A general object of the invention is, therefore, to provide a system such as above-described, which will insure dependable actuation of the associated device under the proper conditions.

Another object of the invention is to design a novel relay system which prevents actuation of the associated device under improper conditions as the result of accidental change in the characteristics of one of the electronic relays.

The foregoing, and other objects and advantages of the invention, will become apparent from a consideration of the specification and the accompanying drawing which is a schematic circuit diagram of a relay system embodying the invention.

Describing the invention in detail and referring to the drawing, the novel system comprises a plurality of electronic trigger tubes, such as thyratrons, indicated at 2 in the drawing. The cathode 3 and grid 5 of each tube are connected respectively to the positive and negative terminals of a bias battery 4, a grid resistor 6 being disposed between the negative terminal of the battery and the associated grid. Leads 8 and

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10 are connected to opposite ends of each resistor 6 and are adapted for connection to the positive and negative terminals of an associated condition-responsive device (not shown) adapted to produce or vary a voltage across the resistor 6 in response to changes in conditions, such as, for example, temperature, humidity, atmospheric pressure, or radioactivity.

In the illustrated embodiment of the invention, each tube 2 is adapted to be actuated or "fired" by independent condition-responsive means, thus insuring proper operation of the system, as hereinafter discussed in detail, despite failure of the means associated with one tube; however, it will be understood that, if desired, the tubes 2 may be connected, in parallel, to a single condition-responsive means for developing a voltage across the grid resistors 6.

The cathode and anode of each tube 2 are connected by leads 12 and 14 to a voltage supply 16 through a coil 18 of an associated mechanical or electro-magnetic relay, generally designated 20, and are also connected by leads 22 and 24 through a coil 26 of a mechanical relay, generally designated 28; and the cathode and anode of each tube are also connected by leads 34 and 36 through a coil 30 of a mechanical relay, generally designated 32. Leads 12 and 14, 22 and 24, and 34 and 36 are connected in parallel. Thus, each mechanical relay has three coils operatively connected to the respective trigger tubes 2, and each trigger tube 2 together with the associated bias battery 4 and grid resistor 6 forms a trigger circuit or electronic relay adapted upon "firing" to close a circuit, as hereinafter described, through one coil 18, one coil 26, and one coil 30, arranged in parallel.

Each of the mechanical relays comprises a fixed contact 38 and a movable contact 40 adapted to be actuated by the associated coils to engage the contact 38, thereby closing a circuit which includes an electrically operated device 42 and a voltage supply such as a generator 44. Each of the mechanical relays 20, 28 and 32 is so constructed that at least two of its coils must be energized under the above conditions to actuate the movable contact thereof. The construction of such relays is known to persons skilled in the art and constitutes no part of this invention.

In normal operation of the novel system above-described, the predetermined condition causes the condition-responsive device (not shown) to produce or vary a voltage across each of the resistors 6 until the grid of the associated trigger tube 2 reaches a predetermined potential with

