C. H. KAYSER.

CIRCUIT CONTROLLING ELEMENT.

APPLICATION FILED JUNE 5, 1913.

1,143,969. Patented June 22, 1915.

Fig. 1

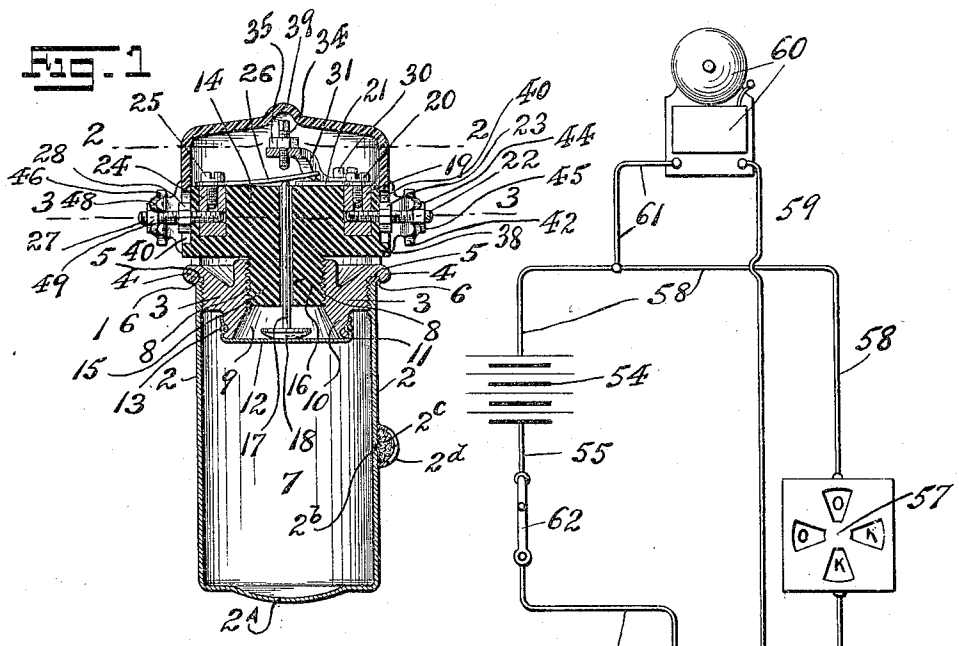


Fig. 3

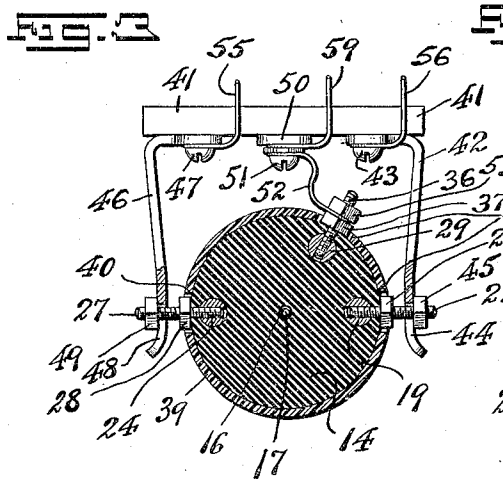
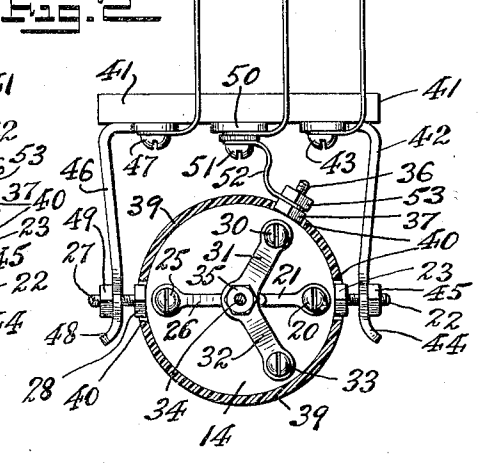


Fig. 2



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CIRCUIT-CONTROLLING ELEMENT.

1,143,969. Specification of Letters Patent. Patented June 22, 1915.

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To all whom it may concern:

Be it known that I, CHARLES H. KAYSER, a citizen of the United States, residing at West Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Circuit-Controlling Elements; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

The present invention relates, generally, to improvements in circuit controlling devices for use in automatic electric fire-alarm systems and the like; and the invention has reference, more particularly, to a novel construction of circuit controlling element adapted to be operated by the contact of abnormal heat therewith.

The present invention has for its principal object to provide a novel construction of circuit controlling element, the same being constructed to be set in operation by the contact of abnormal heat therewith, and being arranged to maintain a normally closed circuit which, when the automatic operation by abnormal heat conditions occurs, is broken or interrupted, and subsequently another circuit is closed thereby to operate an alarm or annunciator, thus permitting the installation in the normally closed circuit of test mechanism for indicating the proper condition and constancy of flow of electric energy through the system thus showing by inspection, visual or otherwise, the normal or operative condition of the system in which such novel circuit controlling elements are connected.

Other objects of the present invention not at this time more particularly enumerated will be clearly understood from the following detailed description of the present invention.

With the various objects of the present invention in view, the same consists, primarily, in the novel construction of circuit controlling element for electric fire alarm systems hereinafter more fully specified; and the invention consists, furthermore, in the novel arrangements and combinations of the various devices and parts thereof, as well as in the details of the construction of the same, all of which will be fully described in the following specification, and then finally embodied in the clause of the claim which is appended to and which forms an essential part of this specification.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a longitudinal vertical section of the novel construction of circuit controlling element for governing the operation of an electric fire alarm system, the same being made according to and embodying the principles of the present invention. Fig. 2 is a detail transverse section of the same taken on line 2—2 in said Fig. 1 looking downward, and in connection therewith is shown in diagrammatic form a type of electric fire alarm system with which the same may be connected, to more clearly illustrate its operation and effect. Fig. 3 is another detail transverse section taken on line 3—3 in said Fig. 1 also looking downward.

Similar characters of reference are employed in all of the above described views, to indicate corresponding parts.

Referring now to the said drawings, the reference character 1 indicates the complete novel circuit controlling element for electric fire-alarm circuits embodying the principles of the present invention, the same comprising a hollow cylindrical body-portion 2 closed at its lower end. The open upper end of said body-portion 2 is internally threaded to receive a cap-member 3, said cap member being externally threaded to engage the internal threads of said body portion 2. Said cap-member 3 is provided at its upper-marginal edge with an outwardly extending annular flange 4 provided upon its under side with a depression 5 adapted to form a seat for a gasket member 6 which is interposed between the upper edge of said body-portion 2 and said annular flange 4, so that when said cap-member 3 is screwed home the gasket member 6 seals the jointure of the two parts to provide within said body-portion 2 an air-tight chamber 7. Said cap-member is provided with a centrally disposed internally threaded opening or passage 8 which is flared at its lower end in bell like form, as at 9, the lower or under side of said cap-member being further provided with a reduced extension or hub-member 10 having an externally located annular

groove or channel 11. Stretched across said reduced extension or hub-member 10, so as to extend over said flared mouth 9 of said passage 8, is a diaphragm member 12, the same being retained in place by forcing its marginal portions into said groove or channel 11 by means of a retaining ring, wire, cord or other suitable holding means 13. Said diaphragm may be made of any suitable flexible material, such as gold-beater's skin, parchment, oil-silk, rubber or any other suitable material.

The reference character 14 indicates an insulated contact base, which is preferably made of some suitable insulating material, such as vulcanite, fiber, porcelain or any other desirable material. Connected with the lower end of said contact base 14 is a reduced extension or hub 15 which is externally threaded to screw into the internally threaded upper end of said passage 8 of said cap-member 3, thereby properly connecting and associating said contact base 14 with said cap-member, and said body-portion 2. Said contact base 14 and its hub 15 is provided with a centrally disposed vertical opening or perforation 16, in which is slidably disposed a push-rod 17 provided at its lower end with a foot-piece 18 adapted to rest upon said diaphragm 12 so as to be operatively associated therewith. Embedded in said contact base 14 is a metallic contact piece 19, and connected both mechanically and electrically with said contact-piece 19, by means of a screw 20, or any other suitable fastening means, is a metallic contact-finger 21, which is arranged to lie upon the upper surface of said contact base 14. The reference character 22 indicates a screw-threaded arm which passes horizontally into the side of said contact-base 14 so as to screw into the lower portion of said contact-piece 19, the same being secured against accidental displacement by means of a lock-nut 23, thus securing said arm 22 in both mechanical and electrical connection with said contact-piece 19. Also embedded in said contact base 14 is another metallic contact piece 24, the same being located diametrically opposite the said contact piece 19. Connected both mechanically and electrically with said contact piece 24 by means of a screw 25, or any other suitable fastening means, is a metallic movable contact-finger 26, the same being adapted to extend over the upper surface of said contact base 14 so as to pass over the upper end of said opening or perforation 16 of the same and in the path of movement of said push-rod 17. The free end of said movable contact-finger 26 rests upon the end of said contact-finger 21 so as to maintain therewith a normally closed electrical contact. The reference character 27 indicates a screw-threaded arm which passes horizontally into the side of said contact base 14 so as to screw into the lower portion of said contact-piece 24, the same being secured against accidental displacement by means of a lock-nut 28, thus securing said arm 27 in both mechanical and electrical connection with said contact piece 24. Also embedded, in a convenient location, in said contact base 14 is another contact-piece 29. Connected mechanically and electrically with said contact piece 29, by means of a screw 30, or any other suitable fastening means, is one leg 31 of a metallic bridge-member, the other leg 32 of which is secured, by means of a screw 33, or any other suitable fastening means, to the upper surface of said contact base 14. Carried by said bridge-member 32 is an adjustable contact-screw 34; the same being located above said movable contact-finger 26 but normally out of contact therewith, but adapted to receive the electrical circuit closing contact of said movable contact-finger 26 when the latter is moved upwardly by said push-rod 17, in the manner and for the purposes to be subsequently described. The reference character 35 indicates a lock-nut connected with said adjustable contact screw 34 for securing the same in a desired adjusted position with relation to its distance from said movable contact-finger 26. The reference character 36 indicates a screw-threaded arm which passes horizontally into the side of said contact-base 14 so as to screw into the lower portion of said contact-piece 29, the same being secured against accidental displacement by means of a lock-nut 37, thus securing said arm 36 in both mechanical and electrical connection with said contact piece 29. The said contact-base 14 is provided at its lower marginal edge with an outwardly projecting annular flange 38 which serves as a rest upon which is seated the flange of a cover-cap 39 adapted to telescope over said contact base 14, so as to inclose the contact mechanism above described, and thus to protect the same from dust or contact with other foreign matter adapted to impair their proper operation. The flanges of said cover-cap being further provided with cut-away portions 40 adapted to receive or pass over the respective lock-nuts 23, 28 and 37 above mentioned.

The reference character 41 indicates the base-portion of a bracket-arrangement for removably supporting the circuit controlling element above described in electrically connected relation to the circuit of the novel fire-alarm system, the same being made of a suitable insulating material. Mounted on said base-portion 41 is a bracket-arm 42, the same being secured by means of a screw and washer 43, and the outer end of said bracket-arm 42 is forked, as at 44, so that the same will straddle and support the arm 22, and at the same time electrically connect the same in the fire-alarm circuit. A suitable

nut member 45 is arranged upon the free end of said arm 22 so as to engage said bracket-arm 42, and thus hold the parts in proper assembled relation. Mounted upon the other end of said base-portion 41 is another similar metallic bracket-arm 46, the same being secured by means of a screw and washer 47, and the outer end of said bracket-arm 46 is also forked, as at 48, so that the same will straddle and support the arm 27, and at the same time electrically connect the same in the fire-alarm circuit. A suitable nut-member 49 is arranged upon the free end of the said arm 27 so as to engage said bracket-arm 46, and thus hold the parts in proper assembled relation. Also connected with said base-portion 41 is a contact-plate 50, secured by means of a screw and washer 51, and a wire or other conductor 52 connects said plate 50 with said arm 36, being secured against the latter and the lock-nut 37 by means of a holding nut 53. The connection of the electrical circuit wires with the bracket-arrangement above described will be understood from the detail drawings by reference to Fig. 2 thereof.

The said body-portion 2 may be provided in its bottom end with a bulging portion 2^A which when pressed inward so compresses the air that the diaphragm will be operated to in turn operate the movable contact-finger 26 to carry the same into circuit closing contact with said adjustable contact-screw 34, thus affording a simple means for testing the alarm apparatus connected in the fire-alarm system. It is also desirable to provide in said body-portion 2 a compensating vent for exhausting the air from within the same when expanded by ordinary and gradual increase of temperature acting upon the device, thus preventing the operation of diaphragm and consequently the circuit break and make device during normal temperature changes. This vent comprises a small opening 2^b in the wall of said body-portion, the same being further restricted against the rapid passage of air therethrough by a stuffing or wad 2^c of cotton, or other fibrous material, which is held in place against the opening 2^b by a suitable cage 2^d.

Referring now to Fig. 2 of the accompanying drawings I have illustrated in diagrammatic form an electric fire-alarm system in which the above described novel circuit controlling element is connected. The reference character 54 indicates a battery set, or any other suitable source of electrical energy for supplying the system with operating power. Connected with one pole of the battery 54 is a wire conductor 55 which is connected electrically with the movable contact-finger 26 of said circuit controlling element through the bracket-arm 46 and intermediate contact mountings above described. The current of the battery passes through said contact-finger 26 into said contact-finger 21, and thence through the wire conductor 56 into and through the coils of a magnetic test device 57, of any suitable type and operation which will, visually, or otherwise, indicate the proper flow of current through the circuit or line. From said test device 57 the current is returned to the opposite pole of said battery set 54 through the return wire conductor 58. A wire conductor 59 is connected electrically with said adjustable contact-screw 34, through the intermediate contact mountings and connections above described, and the same extends to a suitable electric alarm or annunciator device 60, and from thence extends the wire conductor 61 which connects said alarm or annunciator device 60 with the return wire 58 leading back to said battery set 54. A suitable cut-off switch 62 may be conveniently connected in any part of the main battery line. As will be apparent from an inspection of the drawings that the current generated by the battery set 54 is normally flowing through the closed circuit established through the normally contacting contact-fingers 26 and 21 of the novel circuit controlling element, but since the test device 57 possesses magnet coils of high resistance the amount of current consumed is comparatively slight. This normal operative condition of the electric circuit is visually ascertained by a glance at the indicator of the test device 57. While the circuit is thus normally closed, the branch or shunt wire 59 leading to the alarm or annunciator 60 remains uncharged or dead, since the movable contact-finger 26 is normally disengaged or out of contact with the contact-screw 34, therefore the alarm or annunciator is not operated by the normally closed circuit. When, however, abnormal heat strikes the body-portion 2 of the circuit controlling element, the air within the chamber 7 thereof is suddenly expanded faster than it can escape through the vent device, and consequently the diaphragm 12 is pressed upward, thereby giving an upward thrust or movement to said push-rod 17, which carries the latter into lifting engagement with said movable contact-finger 26. As the contact-finger 26 is thus lifted it is carried away from contact with the contact-finger 21, and is carried into contact with the contact-screw 34, thus admitting the current from the battery-set 54 into the branch or shunt wire 59 leading to the alarm or annunciator, setting the latter in operation, and giving warning of the fire or abnormal heat condition adjacent to the locus of said circuit controlling element.

I am aware that some changes may be made in the general arrangements and combinations of the various devices and parts of the above described circuit controlling element, as well as in the details of the con-

struction of the same, without departing from the scope of my present invention as set forth in the foregoing specification and as defined in the claim which is appended to said specification. Hence, I do not limit my invention to the exact arrangements and combinations of the said devices and parts as described in said specification, nor do I confine myself to the exact details of the construction of said parts as illustrated in the accompanying drawings.

I claim:—

A circuit controlling element for fire-alarm systems comprising a chambered body containing air and having an internally threaded end, an externally threaded flanged cap-member having a central opening the upper portion of which is internally threaded, a diaphragm member stretched over the lower end of said central opening, a sealing gasket interposed between the flange of said cap-member and the edges of said chambered body to seal the latter, a contact-base of insulating material provided with a vertically disposed opening, an externally threaded neck connected with said contact-base adapted to screw into said cap member, a pair of normally closed contact members mounted on said contact base, a normally separated contact mounted on said contact base, and a push-rod mounted in said opening of said contact-base and interposed between said diaphragm and one of said normally closed contact members whereby the outward pressure of said diaphragm separates said normally closed contact-members and carries one of the same into contact-closing engagement with said normally separated contact-member, substantially as and for the purposes set forth.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 3rd day of June, 1913.

CHARLES H. KAYSER.

Witnesses:
GEORGE D. RICHARDS,
FREDK. H. W. FRAENTZEL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."