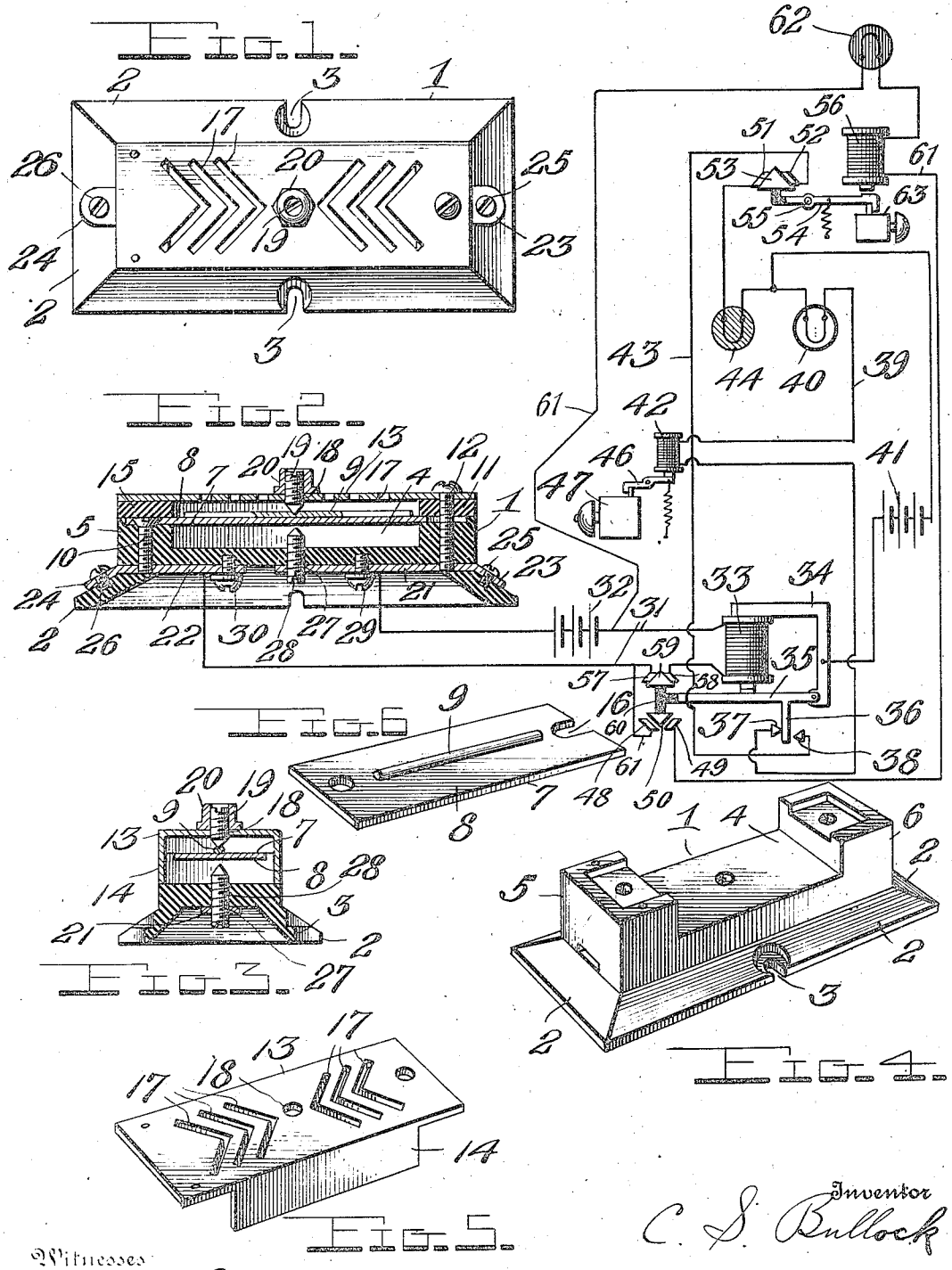
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FIRE ALARM SYSTEM INCLUDING A THERMAL CIRCUIT CLOSER.

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FIRE-ALARM SYSTEM INCLUDING A THERMAL CIRCUIT-CLOSER.

1,179,276. Specification of Letters Patent. Patented Apr. 11, 1916.

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To all whom it may concern:

Be it known that I, CHARLES S. BULLOCK, a citizen of the United States, residing at Stratford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in a Fire-Alarm System Including a Thermal Circuit-Closer, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to an improved fire alarm system including a thermal circuit closer.

The object of the invention is to provide an improved fire alarm system having a normally closed main circuit in which the thermostatic member of the circuit closer is included, and which controls closed and open signal circuits adapted to give an alarm of fire and to indicate any break in the main circuit.

With the above and other objects in view, the invention consists of the novel construction, combination and arrangement of parts, hereinafter fully described and claimed, and illustrated in the accompanying drawings in which:—

Figure 1 is a plan view of my improved thermal circuit closer; Fig. 2 is a longitudinal section through the same and showing diagrammatically my improved fire alarm system; Fig. 3 is a cross section through the circuit closer; Fig. 4 is a perspective view of the body of the same; Fig. 5 is a similar view of the cap or cover; and Fig. 6 is a perspective view of the thermostatic member.

My improved thermostat comprises a body 1 preferably constructed of fiber or other non-conducting material and of rectangular shape, the body having a flanged and recessed base 2 which may be notched at opposite points on its sides, as shown at 3 for the reception of attaching screws or similar fastenings, but it will be understood that the device may be otherwise secured to a wall or other support on which it is mounted. The upper or outer portion of the body 1 has a transversely extending recess 4 which provides at the ends of said body transverse ribs 5, 6, in which are depressions to receive and support a thermostatic member 7. This member consists of a strip or plate 8 of metal, and a strip of wire 9, the latter being secured centrally and longitudinally on the outer face of the plate 8, and the two parts being constructed of two metals which are adapted to expand unequally under the influence of heat, whereby the thermostatic member will bow longitudinally. The thermostatic member 7 has one of its ends secured to the rib 5 by a screw 10 arranged in said rib and having its head countersunk in the strip or plate 8 so as to have electrical contact therewith, as shown in Fig. 2. The other end of the member 7 is clamped on the other rib 6 by a strip or block of non-conducting material 11 arranged on top of the strip or plate 8 and having an opening for a screw 12 which passes through the rib 6 and is adapted to secure a cap or cover 13 on the top or outer side of the body. The cover 13 consists of a rectangular plate of the same dimensions as the body 1 and having upon its side edges inwardly extending or depending flanges 14 adapted to enter the recess 4 in the body whereby the thermostatic member will be inclosed and protected. The cover 13 has one of its ends supported by a strip or block of non-conducting material 15 arranged over the screw 10 so that the cover will be insulated from the member 7 at that end; and the other end of said cover rests upon the non-conducting block 11 and is retained thereon by the head of the screw 12, which latter has electrical contact with the cover but is not in electrical contact with the thermostatic member by reason of a notch or opening 16 being formed in the plate 8 of said member for the passage of the screw 12. The cover 13 has formed in its top an opening, or openings, 17 adapted to permit heat to enter the recess 4 and thereby render the device more sensitive to variations in temperature. Formed centrally in the cover plate 13 is a screw threaded opening 18 for a contact screw 19, the inner end of which engages and is normally in electrical contact with the central portion of the thermostatic member 7 and the outer end of which carries a lock nut 20.

21 and 22 denote two terminal strips arranged longitudinally in the base of the body 1 and having threaded openings for the screws 10, 12, whereby they are in electrical contact with the latter. The ends of the strips 21, 22, project through the end

walls of the body and rest on its flanged base, as shown at 23, 24, and these projecting ends are formed with threaded openings for the reception of screws 25, 26, whereby the circuit closer may be put in series for closed circuit work or between two parallel wires of an open circuit. The inner portion of the strip 21 extends across the center of the body 1 and has a threaded opening 27 for an electrical contact screw 28, the inner end of which is normally out of contact with the central portion of the thermostatic member 7 but so positioned that said member will engage it when the member is bowed under the influence of heat.

29 and 30 denote binding screws arranged in the strips 21, 22, and to which the electric circuit wires may be connected when the binding screws 25, 26, are not employed.

31 denotes a normally closed main circuit which includes a battery 32 or other source of electrical supply, the coil of an electromagnet 33, a normally closed switch having spaced contact members 57, 58, and the thermostatic circuit closer, the two branches of the circuit being connected to the terminal strips 21, 22. The electromagnet 33 has a suitable supporting frame 34 on which is pivotally mounted the armature 35 of the magnet, said armature having a depending contact arm 36 adapted to engage either of two contact points 37, 38. The contact 37 is included in a normally closed indicating and signaling circuit 39, which latter also includes an electric light 40, a battery 41 or other source of electrical energy, an electromagnet 42, the frame 34 and the armature 35. The electromagnet 42 has its armature 46 adapted to control a mechanically actuated bell 47 or other signaling or alarm device. The other contact 38 is included in a normally open indicating and signaling circuit 43, which latter also includes a green or otherwise distinguished lamp 44, the battery 41, the frame 34, the armature 35 when said circuit is closed, and a normally closed switch, which latter includes spaced contact members or springs 51, 52, which are engaged by a removable contact 53. The contact 53 is provided at one end of a lever 54 which is pivoted intermediate its ends at 55 and has its other end serving as the armature of an electromagnet 56, which latter is included in a normally open third circuit 61 which I will term the fire alarm circuit and which is a shunt or branch circuit from the main circuit 31 and includes a red light or equivalent visual signal 62, and a normally open switch consisting of spaced contact members or springs 48, 49, and a movable contact 50, the latter being carried by an insulated portion 60 of the armature 35. This insulated portion 60 of said armature also carries a movable contact 59 of the switch which includes the contacts 57, 58. The lever or armature 54 is also adapted to control a mechanically actuated bell 63 or other signaling or alarm device which will be sounded when there is a fire. Instead of the lights 40, 44 and 62, other electrical signaling or alarm devices may be employed.

In operation, assuming the parts to be in normal position shown in Fig. 2, and the thermostatic circuit closer arranged at a suitable point in the building, ship or other structure in which the system is installed, and the signaling and alarm devices 40, 44, 62, 47 and 63, are arranged where they may be observed by the proper attendant, while the thermostatic member 7 engages the screw 19, the main circuit 31 will be closed, the current passing from the battery 32, through screw 29, strip 21, screw 12, cover 13, screw 19, member 7, screw 10, strip 22, switch parts 57, 59, 58, magnet 33, and from the latter to the battery. The magnet 33 being thus energized will cause the arm 36 of its armature to engage the contact 37 and thereby maintain the light or signal circuit 39 closed, the current of said circuit passing from the battery 41, through frame 34, armature 35, contact 37, magnet 42, light 40, and from thence to the battery. Should the main circuit 31 be broken from any cause the magnet 33 will become deënergized and its armature 35 will drop and remain away from the core of the armature until it is manually replaced and said circuit 31 reestablished. This movement of the armature 35 causes its arm 36 to leave contact 37 and engage contact 38, thereby breaking the circuit 39 and closing the circuit 43; and at the same time said movement of the armature 35 will cause the circuit 31 to be broken at the switch composed of the parts 57, 58, 59, and also cause the fire alarm circuit 61 to be closed at the switch composed of the parts 48, 49, 50. The circuit 61, however, is broken at a second point which is in the thermostatic circuit closer, since the member 7 will be out of contact with the screw 28, said parts being included in the circuit 61 which is a shunt or branch circuit, as will be readily understood on reference to the drawings. When the circuit 39 is broken the light 40 (which when illuminated indicates the normal condition of the system) will become extinguished and at the same time the magnet 42 will become deënergized and its armature 46 will release the alarm bell 47, which latter will notify the attendant of the imperfect conditon of the system. When the circuit 43 is closed the green light 44 will become illuminated to indicate some defect in the system and said light will continue to burn until the trouble is remedied. If, however, the break in the normally closed circuit 31 is due to the bowing of the thermostatic member 7 and its separation from the con-

tact 19, as would be the case should there be a fire in the vicinity of the circuit closer, the same operation of the parts would take place as I have above described but the continued bowing of the thermostatic member 7 under the influence of the excessive heat would cause said member to engage the contact screw 28 within a very short period and thereby complete the fire alarm circuit 61 so that the red light 62 would be illuminated to indicate fire and the exact location of the fire, it being understood that one of said lights or signals being provided for each of the thermostatic circuit closers used in the system. When the circuit 61 is closed the magnet 56 will be energized and will attract the armature or lever 54, thereby causing the latter to release the fire alarm bell 63. This bell is preferably of a peculiar tone which is distinguishable from that of the other bell 47. The said movement of the armature 54 will cause the circuit 43 to be broken at the switch composed of parts 51, 52, 53, thereby extinguishing the green light 44 to indicate to the attendant that the cause of the trouble is fire and not some defective condition of the system.

It will be understood that the thermostatic circuit closers are located at different points in the building, ship or the like, and that when one of them is closed the corresponding light 62 will become illuminated to indicate the exact location of the fire. It will be further noted that should the normally closed circuit 39 be broken in any way the light 40 will be extinguished and the gong or bell 47 sounded, thus indicating to the attendant that there is trouble in said circuit 39. It will be understood that electric relays for controlling bells or other signals placed in position at remote points may be used intsead of the mechanically actuated bells above mentioned.

From the foregoing it will be seen that my improved circuit closer is exceedingly simple in construction and therefore may be produced at a small cost and will be strong and durable. The peculiar arrangement of the thermostatic member and the contacts, together with the other parts of the system causes the device to first indicate any break in the circuit whether by parting of wire, working loose of connections, or failure of battery, and secondly that there is a fire or a dangerous condition in the vicinity of one of the circuit closers, and then indicate the particular location of the circuit closer thus operated.

While the preferred embodiments of the invention have been shown and described in detail, it will be understood that I do not wish to be limited to the precise construction set forth, since various changes in the form, proportion and arrangement of parts, and in the details of construction, may be resorted to within the spirit and scope of the invention.

Having thus described the invention what is claimed is:

1. The combination with a circuit closer having a body, a thermostatic member thereon, and contacts on opposite sides of said member, one contact being normally engaged therewith and the other normally out of engagement, of a normally closed main circuit having one branch connected to said member and its other branch connected to both of said contacts, said circuit including an electromagnet and a switch controlled by the armature of said magnet, a normally closed indicating circuit controlled by the armature of said magnet and including a signal, a normally open indicating circuit controlled by the armature of said magnet and including a signal and a switch, and a normally open alarm circuit shunted into said main circuit and including a signal, a switch controlled by the armature of said electromagnet, and an electromagnet included in said normally open indicating circuit.

2. The combination with a circuit closer having a body, a thermostatic member thereon, and contacts on opposite sides of said member, one contact being normally engaged therewith and the other normally out of engagement, of a normally closed main circuit having one branch connected to said member and its other member connected to both of said contacts, said circuit including an electromagnet and a normally closed switch controlled by the armature of said magnet, a normally closed indicating and signaling circuit controlled by the armature of said magnet and including an indicating means and an electromagnet for controlling an alarm device, a normally open indicating and signaling circuit controlled by the armature of said electromagnet and including an indicating means and a normally closed switch, and a normally open indicating and signaling circuit shunted into the main circuit and including an indicating means, a normally open switch controlled by the armature of said electromagnet, and an electromagnet which controls an alarm device, and said switch in the normally open indicating and signaling circuit.

3. The combination of a main circuit including an electromagnet and source of current supply, a circuit opening and closing means, and a switch controlled by the armature of said magnet, a normally closed circuit suitably connected with said opening and closing means controlled by the armature of said electromagnet and including an indicating means and an alarm controlling means, a normally open circuit controlled by the armature of said magnet and including

an indicating means and a normally closed switch, and an alarm circuit shunted into the main circuit and including an indicating means, a normally open switch controlled by the armature of said magnet, an electromagnet which controls the switch in said normally closed circuit and an alarm device.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

CHARLES S. BULLOCK.

Witnesses:
HENRY F. WHITE,
J. A. FRIESBAUER, Jr.