

May 10, 1938.

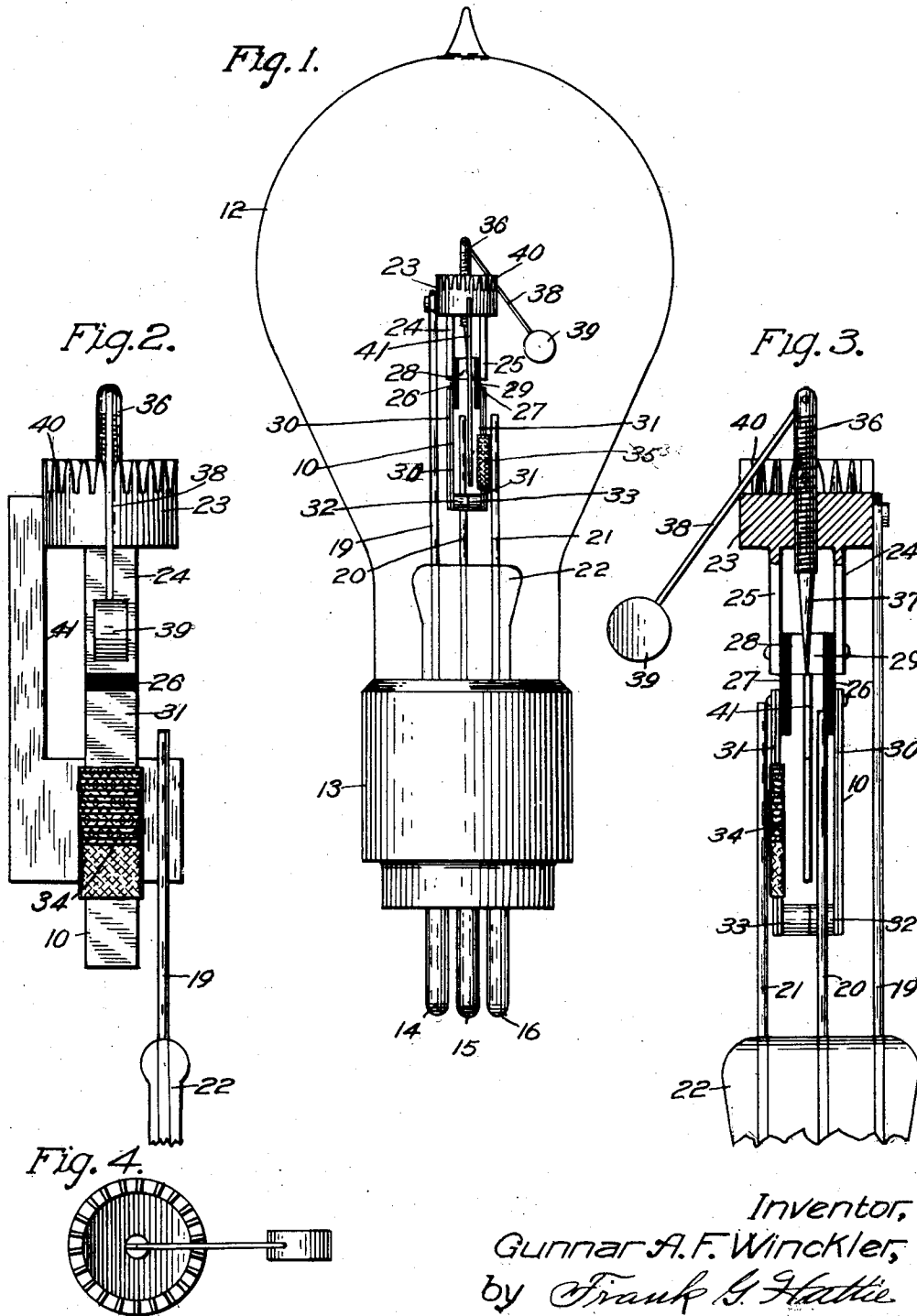
G. A. F. WINCKLER

2,116,858

THERMOSTAT SWITCH

Filed Nov. 23, 1933

2 Sheets-Sheet 1



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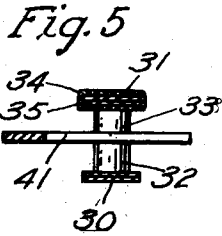
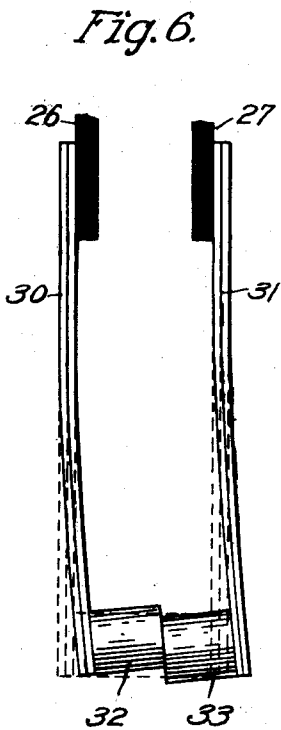
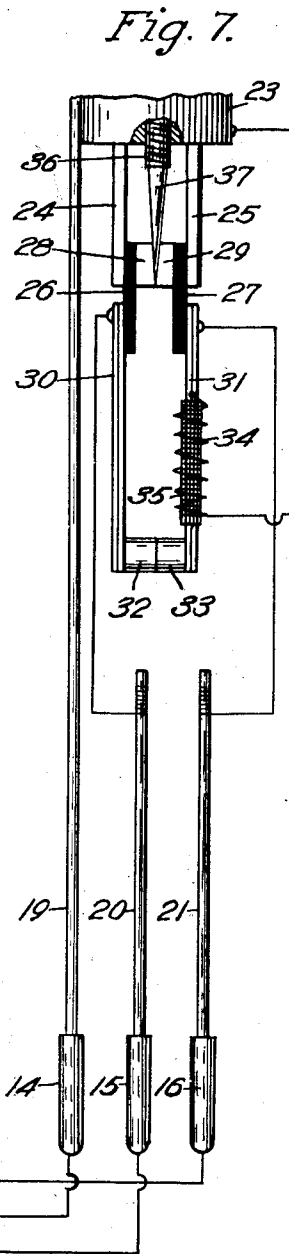
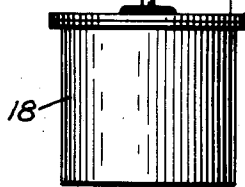
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,116,858

THERMOSTAT SWITCH

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Application November 23, 1933, Serial No. 699,304

24 Claims. (Cl. 200—122)

The invention relates to a thermostat switch for intermittently opening and closing an electrical circuit adapted for flashing lights in all types of traffic service.

5 The invention consists of a thermostatic switch made of two bi-metallic units having electrical contacts on their lower ends co-operating with each other to make and break an electrical circuit. The contacts are opened or deflected by an electrical heating coil encompassing one of the bi-metallic units which causes it to bend away from the opposite unit, thereby opening the contact, to make and break an electrical circuit.

15 The invention further consists of having two thermostatic units which will be relatively parallel when subjected to normal temperature changes, thereby maintaining the desired setting of the contacts when in operation irrespective of the said atmospheric temperatures.

20 The invention further consists of an adjusting device for setting the contact points in position to produce a predetermined cycle of operation within a certain range.

25 The invention further consists of a thermostatic switch having contact points operating in a hermetically sealed container having a non-corrosive atmosphere therein to prevent oxidation of the points and to permit varying the sensitivity of the thermostat switch by means of the kind of gas used and its pressure. It is well known that the various types of inert or non-corrosive gases have varying coefficients of heat conductivity. I prefer to select a gas of comparatively low thermal conductivity, and I can vary the rate of conduction and hence the sensitivity of the blades of my switch by adjusting the pressure of the gas filling which I employ to any selected value.

40 The invention further consists of an adjusting device whereby the thermostatic contact can be adjusted inside the container without breaking the seal. This is accomplished by inverting the container which causes a weighted arm to drop out of a locking device at which time the said arm can be swung around to operate a screw, the movement of which, is translated into an axial movement, thereby bringing about the desired adjustment. When the container is righted, the swinging arm drops back into said locking member, which secures it permanently in position when under normal working conditions.

55 The principal object of my invention, therefore, is to provide an adjustable thermostatic interrupting switch supported inside a gas pres-

sure container to prevent corrosion and to permit control of heat radiation, and producing compensation for atmospheric temperature changes to facilitate the operation of the device, which device therefore lends itself to greater degree of dependability, infinite durability, safeness, and cheapness of manufacture.

Referring to the figures:

Fig. 1 is a front elevation of the switch located inside a sealed container.

Fig. 2 is a side elevation of the adjustable switch.

Fig. 3 is a side elevation of the switch at right angles to Fig. 1, with the adjusting head in cross-section.

Fig. 4 is a plan view of the adjusting head.

Fig. 5 is a cross-section of the thermostats with the heat shield between them.

Fig. 6 is a front elevation of the switch showing the latter as subjected to atmospheric temperatures and also showing the relation of the contacts at such times.

Fig. 7 is a diagram of connections.

Referring to the drawings, these illustrate the new intermittently operating thermostatic switch 10 for controlling the flashes of a signalling electric lamp 11 (Fig. 7). The switch is mounted in a sealed container 12 which is supported by a base 13. The base 13 is provided with three contact prongs 14, 15, and 16 which connect into the electrical circuit 17, this latter receiving its power from an electrical generator 18, the one shown being of the salt water type.

Contact prongs 14, 15, and 16 preferably are tubular in form and extend into and are supported by the base 13. The members 14, 15, and 16 in turn support the electrical conducting and switch rod supports 19, 20, and 21 respectively.

These rods extend upwardly into the container 12 and are sealed in the upwardly extending glass press 22 formed as an integral part of the container 12. The rods extend upwardly into the container 12 to support the switch 10 and the various mechanisms pertaining thereto.

Rigidly secured to the upper extremity of the rod 19 is a switch support and an annular adjusting head 23.

Formed integral with the supporting head 23 are the downwardly extending switch supporting lugs 24 and 25. Rigidly secured to the inside surface of the lugs 24 and 25 are secondary lugs 26 and 27 made of insulating material, together with the adjusting blocks 28 and 29.

Secured to the lower ends of the secondary lugs 26 and 27 are the bi-metallic thermostats 55

30 and 31 forming the switch 10. Secured to the lower ends of the thermostats 30 and 31 are the switch contacts 32 and 33 which open and close in accordance with the heat intensity, to break the electrical circuit to flash the light 11 (Fig. 7). Encompassing the thermostat 31 is an electrical heating coil 34 receiving its power from the electrical circuit 17 (Fig. 7). The coil 34 is insulated by a suitable cloth material 35 which builds up the heat sufficiently to determine a suitable time lag in its operation.

The contacts 32 and 33 can be mechanically adjusted by a novel mechanism forming part of the invention and which predetermines at the will of the operator the operation of the device for making and breaking the electrical circuit 17. The adjusting device consists of a screw 36 threaded into the supporting and adjusting head 23.

Formed integral with the screw 36 is a conical-shaped downwardly extending projection 37 which operates between the adjusting blocks 28 and 29. By turning the screw 36 in the head 23 the screw is raised or lowered in accordance with its direction of rotation and when the conical projection 37 operates downwardly between the sides of the blocks 28 and 29, they are forced outwardly in one direction and when the screw and projection move upwardly the spring tension of the lugs 24 and 25 return the blocks inwardly. By this construction the switch contacts are either moved away or brought towards each other to a predetermined position necessary for successfully operating the switch.

The switch 10 is enclosed in the sealed container 12 which is evacuated and filled with equilibrium temperature determining gases to prevent corrosion or oxidization of the contact points 32 and 33 and other parts of the mechanism. This allows a non-corrosive gas pressure to be injected into the container to control the radiation of the heat from the coil 34. Different gases have different time relation for controlling heat radiation, which in turn will cause a longer or shorter period of time between the flashes of light in accordance with the requirements. As the switch is enclosed in a sealed container, it is necessary that the contact points 32 and 33 be adjusted from the inside of the container, and this I do by a new and novel mechanism.

The contact-adjusting device is shown as consisting of a lever 38 pivotally secured to the upper end of the screw 36 and to the opposite end is secured a weight 39. In their normal position the lever 38 and the weight 39 swing downwardly and rest between the teeth 40 formed in the head 23 whereby the switch is locked in position for its normal operation.

If it is found necessary to adjust the contact points 32 and 33, the container is placed in an inverted position which causes the lever 28 to drop out from between the teeth 40 and then when a circumferential jerk is imparted to the container, the weight causes the screw 36 to turn sufficiently to adjust the contact points by the co-operation of the screw projection 37 and the blocks 28 and 29.

To avoid any distortion of adjustment of the contact points 32 and 33 from changes in temperature of the surrounding atmosphere, the thermostats 30 and 31 are made of the same material and of such construction that if one of the thermostats is deflected by the surrounding temperature, the other one will be deflected in the same manner and to the same extent, so that the

contacts 32 and 33, mounted between them, will always be retained in the same relative position, subjected to the heating coil 34.

To prevent the heat from the coil 34 located on the thermostat 31 from affecting the opposite thermostat 30, a metal heat-absorbing shield 41 is provided. The shield lies in a mid-position between the thermostats and is rigidly secured to the supporting head 23.

In operation the thermostats 30 and 31 having electrical contacts 32 and 33 are subjected to the electrical coil 34 located on the thermostat 31. The heating coil 34 receives its electric current for heating from the electrical generator 18. The current from the generator also furnishes power for lighting the incandescent lamp 11. The current passes through the rod 21 and by a loose connection is connected to the thermostat 31 inside the container. From the same positive pole the current passes through the rod 19 inside the container to the head 23 and thence to the heating coil 34 located on the thermostat 31. This circuit is parallel to the main circuit. The lamp circuit is in series with the contacts 32 and 33 and is completed by a connection to the rod 20 and thence to the negative pole of the generator.

The switch is in series with the main circuit and the heating coil is in parallel with the main circuit. This is accomplished by insulating the thermostats 30 and 31, which allows the current to pass through the contacts 32 and 33 in the line heating coil. When the coil is heated it causes the thermostat to deflect and break the contact and vice versa, which intermittently causes the lamp to flash.

What I claim as new and desire to secure by Letters Patent in the United States is:

1. A thermostat switch for intermittently opening and closing an electrical circuit for flashing lights comprising two bi-metal thermostats, co-operating electrical contacts on one end of both units, a heating coil in circumferential relation to one of the thermostats and connected into the electrical circuit for separating the contact points, a heat-absorbing shield supported between the thermostats for shielding the heat from the heat of the operating thermostat from the opposite thermostat, a switch support, lugs on the support for supporting the thermostat, blocks secured to the lugs, a screw threaded into the main support operating vertically with the conical end interjacent to the sides of the block for adjusting the contact points.

2. A thermostat switch for intermittently opening and closing an electric circuit for flashing lights comprising a sealed container, three electric contact prongs secured to the container, three rods integral with the prongs and extending into the sealed container, an annular head supported on one of the rods, downwardly extending lugs integral with the annular head, secondary lugs secured to the lower inside ends of the first lugs made of insulating material, two bi-metal thermostat units secured to the lower end of the insulating material, co-operating contacts on the lower extremities of the thermostat, and means on one end of the thermostats for heating and opening the contacts.

3. A thermostat switch for intermittently opening and closing an electrical circuit for flashing lights comprising a sealed container, three electric contact prongs secured to the container, three rods integral with the prongs and extending into

the sealed container, an annular head supported on one end of the rods, downwardly extending lugs integral with the annular head, secondary lugs secured to the lower inside ends of the first lugs made of insulating material, two bi-metal thermostat units secured to the lower end of the insulating material, co-operating contacts on the lower extremities of the thermostat, a circumferential coil on one of the thermostats for heating and opening the contacts.

4. A thermostat switch for intermittently opening and closing an electrical circuit for flashing lights, comprising a sealed container, three electric prongs secured to the container, three rods integral with the prongs and extending into the sealed container, an annular head supported on one of the rods, downwardly extending lugs integral with the annular head, secondary lugs secured to the lower inside ends of the first lugs made of insulating material, two bi-metal thermostat units secured to the lower end of the insulating material, co-operating contacts on the lower extremities of the thermostat, a circumferential coil on one of the thermostats for heating and opening the contacts, and means for shielding the heat of the coil on the thermostat from the opposite thermostat.

5. A thermostat switch for intermittently opening and closing an electrical circuit for flashing lights comprising a sealed container, three electric contact prongs secured to the container, three rods integral with the prongs and extending into the sealed container, an annular head supported on one of the rods, downwardly extending lugs integral with the annular head, secondary lugs secured to the lower inside ends of the first lugs made of insulating material, two bi-metal thermostat units secured to the lower end of the insulating material, co-operating contacts on the lower extremities of the thermostat, a circumferential coil on one of the thermostats for heating and opening the contacts, a metal shield secured to the annular head and enlarged at its lower end which is located between the thermostats to shield the heat from one coil on the thermostat from the opposite thermostat.

6. A thermostat switch for intermittently opening and closing an electrical circuit for flashing lights, comprising a sealed container, three electric contact prongs secured to the container, three rods integral with the prongs and extending into the sealed container, an annular head supported on one of the rods, downwardly extending lugs integral with the annular head, secondary lugs secured to the lower inside ends of the first lugs made of insulating material, two bi-metal thermostat units secured to the lower end of the insulating material, co-operating contacts on the lower extremities of the thermostat, a circumferential coil on one of the thermostats for heating and opening the contacts, a metal shield secured to the annular head and enlarged at its lower end which is located between the thermostats to shield the heat from one coil on the thermostat from the opposite thermostat, electrical wire connections from the thermostat to the rods, electrical connections from the head to a coil on one thermostat for heating purposes in parallel with the light circuit.

7. A thermostat switch for intermittently opening and closing an electrical circuit for flashing lights, two bi-metal thermostat members comprising a sealed container, three electrical contact prongs secured to the container, three rods integral with the prongs and extending into

the sealed container, an annular head supported on one of the rods, downwardly extending lugs integral with the annular head, secondary lugs secured to the lower inside end of the lugs of the first instance made of insulating material, co-operating contacts on the lower extremities of the thermostats, and means for adjusting the contacts.

8. A thermostat switch for intermittently opening and closing an electrical circuit for flashing lights, two bi-metal members comprising a sealed container, three electrical contact prongs secured to the container, three rods integral with the prongs and extending into the sealed container, an annular head on one of the rods, downwardly extending lugs integral with the annular head, secondary lugs secured to the lower inside end of the lugs of the first instance made of insulating material, co-operating contacts on the lower extremities of the thermostats, a screw threaded into the head, a conical lower end on the screw, blocks between the lugs with the point of the screw interjacent for spreading the contact.

9. A thermostat switch for intermittently opening and closing an electrical circuit for flashing lights, two bi-metal thermostat members comprising a sealed container, three electrical contact prongs secured to the container, three rods integral with the prongs and extending into the sealed container, an annular head supported on one of the rods, downwardly extending lugs integral with the annular head, secondary lugs secured to the lower inside end of the lugs of the first instance made of insulating material, co-operating contacts on the lower extremities of the thermostats, a screw threaded into the head, a conical lower end on the screw, blocks between the lugs with the point of the screw interjacent for spreading the contact, and means for turning the screw.

10. A thermostat switch for intermittently opening and closing an electrical circuit for flashing lights, two bi-metal thermostat members comprising a sealed container, three electrical contact prongs secured to the container, three rods integral with the prongs and extending into the sealed container, an annular head supported on one of the rods, downwardly extending lugs integral with the annular head, secondary lugs secured to the lower inside end of the lugs of the first instance made of insulating material, co-operating contacts on the lower extremities of the thermostats, a screw threaded into the head, a conical lower end on the screw, blocks between the lugs with the point of the screw interjacent for spreading the contact, teeth on the head, a weighted lever pivotally secured to the screw and held by the teeth under normal conditions, by inverting the container and releasing the weighted lever from the teeth, it can be swung around sufficiently to turn the screw for adjusting the contact.

11. A thermostat switch for automatically opening and closing an electric circuit for flashing lights comprising two bi-metal thermostats, co-operating electrical contacts integral with the lower ends of the said thermostats, a support for the thermostat members enclosed in a glass container which is evacuated and filled with gases selected dependent upon their specific heat conductivities and means for regulating and adjusting the thermostat members and a second means for operating and adjusting the device inside the container.

12. A thermostat switch for automatically opening and closing an electric circuit for flashing lights comprising two bi-metal thermostats co-operating with two electrical contacts integral with the lower ends of the thermostats, a support for the thermostat members enclosed in a glass container which is evacuated and filled with gases selected according to their specific heat conductivities, a screw device in the head support for adjusting the thermostats and the electrical contacts, teeth in the support, a radial swinging and rotating weighted arm secured to the screw and co-operating with the teeth members on the support for operating and adjusting the screw.

13. A thermostat switch for automatically opening and closing an electric switch for flashing lights comprising two bi-metal thermostats, co-operating electrical contacts integral with the lower ends of the thermostats, a support for the thermostat members, downwardly extending lugs integral with the support, secondary lugs made of insulating material secured to the lower ends of the lugs of the first instance, a screw threaded into the support, a conical end extending downwardly from the screw, blocks on both sides co-operating with the conical end of the screw for adjusting the electrical contacts secured to the thermostat members in accordance with the rotary movement of the screw.

14. A thermostat switch, comprising a support, bi-metallic thermostats, insulating means on said support for supporting said thermostats in insulated manner from one end of said support, cooperating contacts on said thermostats, heat storing material disposed around one thermostat, and a heating coil disposed around said heat-storing material.

15. A thermostat switch, comprising a support, a supporting head on said support, lugs depending from said supporting head, secondary insulating lugs depending from said first lugs, bi-metallic thermostats depending from said secondary lugs, cooperating contacts on said thermostats, electric leads connected to said thermostats, and heating means disposed in close proximity to one of said thermostats.

16. A thermostat switch, comprising a support, a supporting head on said support, lugs of the same length depending from said supporting head, secondary, insulating lugs of the same length as each other depending from said first lugs at the same relative points, bi-metallic thermostats of the same length as each other depending from said secondary lugs at the same relative points, cooperating contacts disposed on said thermostats at the same relative points, electric leads connected to said thermostats, and heating means disposed in close proximity to one of said thermostats.

17. A thermostat switch, comprising a support, a supporting head on said support, bi-metallic thermostats suspended from said supporting head, cooperating contacts on said thermostats, means threaded through said head and serving to move the thermostats sidewise relative to each other, means for rotating said threaded means, electric leads connected to said thermostats, and heating means disposed in close proximity to one of said thermostats.

18. A thermostat switch, comprising an envelope, a filling of gas therein, the kind and pressure of which depends on the desired sensitivity of the switch, a support, a supporting head on said support, lugs depending from said sup-

porting head, secondary insulating lugs depending from said first lugs, bi-metallic thermostats depending from said secondary lugs, cooperating contacts on said thermostats, means threaded through said head and serving to move the thermostats sidewise relative to each other, means pivoted to said threaded means for rotating the latter, electric leads connected to said thermostats, and heating means disposed in close proximity to one of said thermostats.

19. A thermostatic switch, comprising an envelope, a filling of gas therein, the kind and pressure of which depends on the desired sensitivity of the switch, a support in said envelope, a supporting head on said support, teeth formed on said head, lugs depending from said supporting head, secondary, insulating lugs depending from said first lugs, bi-metallic thermostats depending from said secondary lugs, cooperating contacts on said thermostats, a rod threaded through said head and serving to move the thermostats sidewise relative to each other, a weighted lever pivoted to said rod, and normally depending downwardly and being retained in fixed position by said teeth, thus locking the switch in its adjusted position, inversion of the envelope throwing the lever outwardly, whereupon rotation of the envelope will cause rotation of the threaded means and consequent adjustment of the thermostats, electric leads connected to said thermostats, and heating means disposed in close proximity to one of said thermostats.

20. A thermostatic switch, comprising an envelope, a filling of gas therein, the kind and pressure of which depends on the desired sensitivity of the switch, a support in said envelope, a supporting head on said support, teeth formed on said head, lugs depending from said supporting head, secondary, insulating lugs depending from said first lugs, abutting blocks also depending from said first lugs, bi-metallic thermostats depending from said secondary lugs, cooperating contacts on said thermostats, a rod threaded through said head and terminating in a pointed projection adapted to penetrate between and separate said blocks, and thereby serving to move the thermostats sidewise relative to each other, a weighted lever pivoted to said rod, and normally depending downwardly and being retained in fixed position by said teeth, thus locking the switch in its adjusted position, inversion of the envelope throwing the lever outwardly, whereupon rotation of the envelope will cause rotation of the threaded means and consequent adjustment of the thermostats, electric leads connected to said thermostats, and heating means disposed in close proximity to one of said thermostats.

21. A thermostat switch comprising an envelope having non-corrosive gasfilling the character and pressure of which is dependent on the sensitivity desired for the switch, a press in said envelope, conductive rod supports embedded in said press, an adjustment head, having teeth therein, carried by one rod support, lugs depending from said head, secondary lugs of insulating material and adjusting blocks secured to said lugs, bi-metallic thermostats connected one to each of said secondary lugs, cooperating contacts on the free ends of said thermostats, leads extending from each of two other rod supports to respective ones of said thermostats, a heating element about one of said thermostats, and electrically connected at one end to said thermostat, a lead connecting said head with the other end

of said heating element, an adjusting screw threaded through said head and having a conical end projecting between said adjusting blocks, and a weighted lever pivoted to said adjusting screw and normally lying vertically, so as to engage the teeth of the head, inversion of the envelope and subsequent rotation thereof causing the weighted lever to rotate the screw and to produce the adjustment of the thermostats relative to each other.

22. A thermostat switch comprising an envelope having non-corrosive gasfilling the character and pressure of which is dependent on the sensitivity desired for the switch, a press in said envelope, conductive rod supports embedded in said press; an adjusting head, having teeth therein, carried by one rod support, lugs depending from said head, secondary lugs of insulating material and adjusting blocks secured to said lugs, bi-metallic thermostats connected one to each of said secondary lugs, cooperating contacts on the free ends of said thermostats, leads extending from each of two other rod supports to respective ones of said thermostats, a heating element about one of said thermostats, and electrically connected at one end to said thermostat, a lead connecting said head with the other end of said heating element, a heat-absorbing shield depending from said head to a region between said thermostats to shield the one from the heat of said heating element about the other, an ad-

justing screw threaded through said head and having a conical end projecting between said adjusting blocks, and a weighted lever pivoted to said adjusting screw and normally lying vertically, so as to engage the teeth of the head, inversion of the envelope and subsequent rotation thereof causing the weighted lever to rotate the screw and to produce the adjustment of the thermostats relative to each other.

23. A thermostat switch, comprising an envelope, having a fluid filling of a selected gas at a selected pressure, a support in said envelope, bi-metallic thermostats, means on said support for supporting said thermostats in insulated manner, cooperating contacts on said thermostats, weighted means in said envelope for adjusting said thermostats relative to each other, and heating means disposed in close proximity to one of said thermostats.

24. A thermostat switch, comprising an envelope, having a fluid filling of a selected gas at a selected pressure, a support in said envelope, bi-metallic thermostats, means on said support for supporting said thermostats in insulated manner, cooperating contacts on said thermostats, a weighted arm in said envelope for adjusting said thermostats relative to each other, and heating means disposed in close proximity to one of said thermostats.

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