April 29, 1930. J. K. MABBS ET AL 1,756,793

HEAD FOR GAS DETECTORS

Filed Aug. 1, 1928

Fig. 1.

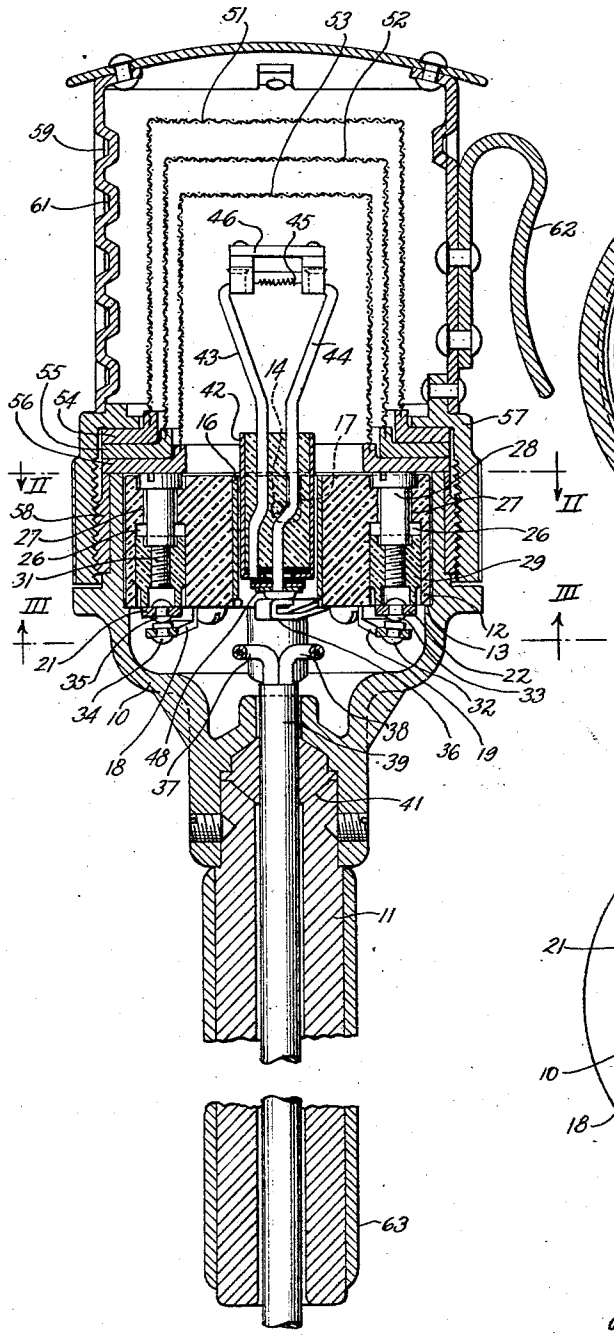


Fig. 2.

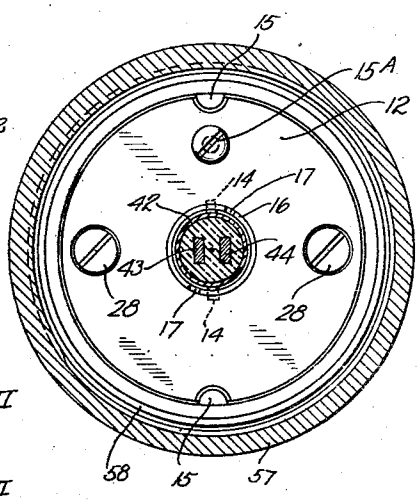
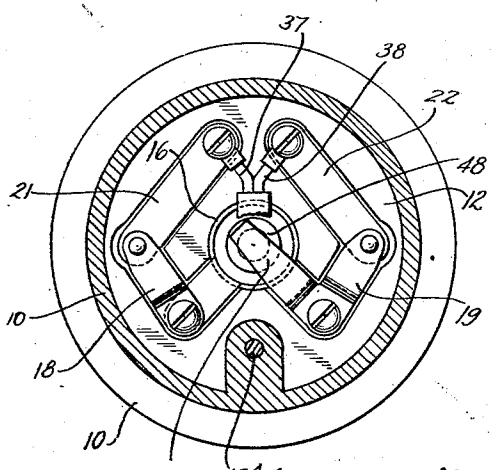


Fig. 3.



John K. Mabbs,
Hermann C. Stelling.
INVENTORS.

By Bruce Townsend & Brickenstein,
ATTORNEYS.

Patented Apr. 29, 1930 1,756,793

UNITED STATES PATENT OFFICE

JOHN K. MABBS, OF BAYSIDE, AND HERMANN C. STELLING, OF ORANGEBURG, NEW YORK, ASSIGNORS TO OXWELD ACETYLENE COMPANY, A CORPORATION OF WEST VIRGINIA

HEAD FOR GAS DETECTORS

Application filed August 1, 1928. Serial No. 296,857.

This invention relates to an improved head for detectors of combustible gases of the type in which a heated filament is exposed to the atmosphere which is to be tested. If the filament be heated to such a temperature that the combustible gas will oxidize, it has been found that the temperature of the filament is increased and this increase in temperature can be measured in any desired manner, preferably by noting the change in electrical resistance of the filament. While we have found that a platinum filament is suitable, the inventon is not limited to the use of platinum for filament material.

An object of our invention is to provide a head surrounding the filament which shall be so constructed and arranged that the heated filament can never be heated except when surrounded by protective gauze. This prevents the propagation of flame from within the gauze to the surrounding atmosphere with consequent danger of an explosion. To this end we provide a series of gauze jackets around the filament. These jackets when forced into place engage a switch closing mechanism and permit the current to flow to the filament. When the gauze jackets are removed or merely loosely held in place, the switch is forced open by any suitable means and the circuit to the filament is broken. Another object of our invention is to provide means for giving an indication of the position of the filament that shall be visible, and sensible to the touch, even though the filament be concealed within the protective screens.

These and other objects of our invention will be evident from the following description having reference to the accompanying drawings in which:

Fig. 1 is a vertical section through a gas detector head illustrating one embodiment of our invention.

Fig. 2 is a horizontal cross section taken on line II—II of Fig. 1, and

Fig. 3 is a similar section on line III—III.

In this drawing we show a gas detector head comprising a base 10 which is mounted on a pole 11 in a manner to be described hereafter. The mounting of the head on the pole permits the detector head to be inserted into crevices or the like or into high places where it would be difficult, if not impossible, for an operator to carry the head if unprovided with this pole. This pole may be of any convenient length. Within the base 10 is an insulating block 12 which rests upon a shoulder 13 in the base. The insulating block 12 is held against rotation with respect to the base 10 by ridges 15—15 and a suitable screw 15A. Within the insulating block 12 is a cylindrical shell 16 which is provided with J-shaped slots 17 which engage pins 14 on the base of a filament holding unit which will be described below. If desired the insulating block may be cut away opposite the slots, but if the shell be of sufficient thickness this will not be necessary. On the under side of the insulating block are four conductors 18, 19, 21 and 22. The insulating block is provided with holes 26—26 each having a restricted portion 27—27. Plungers are provided in these holes for closing the circuit to the filament. In order that the plungers may be inserted past the constricted portion 27 of the holes, these are conveniently made in two pieces 28 and 29. At least one of these pieces should be made of insulating material in order to prevent short circuiting through the screens which engage the upper portion of the plungers. When only one of said portions is made of insulating material we prefer that it shall be the lower one. The two pieces are held together by threaded portion of part 28 fitting into the lower portion 29. Insulating part 29 is provided with a depression in the lower portion so that the bottom of the screw does not come in contact with contact members 33 and 35 on the conductors 22 and 21 respectively. The conducting pieces 21 and 22 are resilient and tend to force the plungers upwardly. Below the contacts 33 and 35 are contacts 32 and 34 carried by the conducting members 19 and 18 respectively. The construction of these conducting members 18 and 19 is such that the contact pieces 32 and 33 and 34 and 35 are normally separated. The conductor 18 is electrically connected to the shell 16 and the conductor 19 terminates in a contact member 36 which is spaced be-

low the opening in the shell and adapted to engage the lower portion of the filament holding unit. Conductor members 21 and 22 are connected to wires 37 and 38 of a cable 39 which is attached to a Wheatstone bridge or other apparatus for measuring the resistance in the filament. The cable 39 is led through the base 10 and the pole 11. At the junction of the base and the pole an annulus is formed in which may be disposed suitable packing 41 for the purpose of rendering the joint gas tight and thus preventing propagation of flame through the handle. This packing is preferably trapezoidal in cross section and also serves to grip the cable, thus preventing strain from being put on the wires 37 and 38.

The filament holding unit consists of a base 42 upon which are mounted supports 43 and 44. The filament 45 is mounted on the supports in any suitable manner and a link 46 prevents these supports from changing their relative positions. The support 43 is electrically connected to the base and the support 44 is connected to a bottom contact 48. The base 42 is adapted to be placed in electrical contact with the shell 16 and the bottom contact 48 is adapted to engage the contact 36. The pins 14, heretofore referred to, are mounted on the base 42 of the filament holding unit and engage the J-shaped slots 17 forming a bayonet joint for holding the filament-holding unit in place against the pressure of the conductor 19.

For the purpose of preventing propagation of flame of gas ignited by the heated filament 45 to a surrounding combustible atmosphere and at the same time permitting the atmosphere to be tested to have ready access to the filament we provide a series of gauze jackets 51, 52 and 53. These jackets are assembled in coaxial relation and are provided with flanges 54, 55 and 56. The flange 56 is adapted to engage the top members 28 of the plungers to force them downwardly and to complete the circuit between the contacts 34 and 35 and 32 and 33. However, the weight of these screens and flanges is not sufficient to close this circuit, but the flanges are forced downwardly and held in position by a locking ring 57 which engages with the outer portion of the base 10. In case both the base 10 and the locking ring 57 are made of aluminum for the sake of lightness, we prefer to interpose an intermediate member 58 of some other material to prevent any danger of binding between the base and the locking ring. Surrounding the gauze jackets 51, 52 and 53 and preferably mounted upon the locking ring 57 is a protective bonnet 59 which is provided with a number of apertures 61 to permit the passage of atmosphere to the filament. If it is desired to provide means for supporting the head other than by the pole a hook 62 may be secured to the bonnet.

It is known that the position and axial direction of the filament has some effect on the temperature produced with a given current and a given composition of the surrounding atmosphere, the temperature being lower with the filament horizontal than with the filament vertical. For this reason it is essential to maintain the longitudinal axis of the filament in a horizontal position as deviations from this position will indicate a higher percentage of combustible gas than is registered in the horizontal position and thus a safety factor is insured. However, it is desired that the readings shall be as accurate as possible and for this reason we desire that some indication shall be available as to the direction of the filament even when the screen jackets and the protective bonnet are in place. If this is known the filment can be maintained horizontally not only when the device as a whole is vertical, but when it is rotated about an axis parallel with the axis of the filament. Moreover, it is desirable that this indication shall be tangible as well as visible, a tangible indication is provided by suitable ridges or other means 63 on the side of the pole. While we have shown these ridges as separate strips attached to the pole they may be integral therewith. Moreover, we do not wish to limit ourselves to any particular shape but contemplate the use of any cross sectional shape which shall give a distinct indication as to the direction of the filament. In order to insure that the strips and filament are in predetermined relation, webs 64 are provided on the base 10, these webs having predetermined relation to the screw 15A for locking the insulating block which in turn is in predetermined relation to the J-shaped slots 17. These slots establish the position of the filament holding unit and accordingly the filament is always in a predetermined position with respect to the webs 64. In attaching the pole 11 to the base 10 care is taken to align the strip 63 with the webs 64 thus insuring the correct relative position of the filament 45 and the strip 63.

The operation of our device is as follows. The pole and base being assembled and the insulating block in position in the base, the filament holding unit is inserted into the center of the insulating block and located and held by the bayonet joint formed between the pins 14 and the J-shaped slot 17. The gauze jackets 51, 52, 53 are then put in place and the locking ring 57 screwed on which forces the flanges 54, 55 and 56 downwardly toward the insulating block. This closes the circuit between the contacts 32 and 33 and 34 and 35 and renders it possible to heat the filament when current from an external source is supplied when properly assembled. But if any one of the gauzes is not in place screwing down the ring to the limit of its travel will not depress plungers 28 sufficiently to close

the above contacts. The circuit remains open and therefore no current can flow through the filament. The device is then taken into the atmosphere to be tested and observations made of the temperature of the filament 45 in any suitable manner but preferably by noting the change in electrical resistance of said filament.

We claim:

1. In a head for gas detectors of the class described, the combination of a supporting member, a filament mounted on said supporting member, gauze jackets surrounding said filament, means for holding said jackets against said supporting member, conductors for supplying current to said filament, said conductors including a resilient portion normally in a position to open the circuit, and means actuated by said jackets when held against said supporting member to force the resilient portion of said conductor to a position to close said circuit.

2. In a head for gas detectors of the class described, the combination of a supporting member of insulating material, means for mounting a filament holding unit on said supporting member, a plurality of gauze jackets surrounding said filament, means for holding said jackets against one side of said supporting member, conductors for supplying current to said filament, said conductors including a switch normally in a position to open said circuit and means cooperating with said jackets to close said switch when said jackets are held against said supporting member.

3. A device as claimed in claim 2 in which the switch is formed by a resilient portion of said conductors and an adjacent portion of said conductors and said switch closing means comprises a plunger extending through said supporting means.

4. In a head for gas detectors of the class described, the combination of a base, an insulating block mounted on said base, a filament holding unit secured to said insulating block, a cylindrical gauze jacket surrounding said filament, said jacket having a flanged base, a locking ring engaging the base of said head and the base of said jacket to force the base of the jacket against said insulating block, conductors on said insulating block for supplying current to said filament, said conductors including a switch, and switch actuating means engaging said jacket base to close said switch when said jacket base is forced against said insulating block.

5. In a gas detector head, an insulating supporting block, a shell of conducting material extending through said block and adapted to receive a filament holding unit, plungers extending through said block and adapted to be engaged by gauze jackets surrounding said filament, two pairs of conductors, the conductors of each pair extending past the lower end of each of said plungers in normally spaced relation, one conductor of each pair being adapted to be connected to an external circuit, the other conductor of one pair being connected to said shell and the remaining conductor having a portion disposed opposite the opening of said shell.

6. A device as claimed in claim 5 in which at least a portion of the plungers is composed of insulating material.

7. A device as claimed in claim 5 in which the conductors are provided with enlarged contacts opposite the lower ends of the plungers and the lower ends of the plungers are of insulating material and provided with recesses opposite the enlarged contacts.

8. A device as claimed in claim 5 in which the shell is provided with J-shaped slots extending downwardly from the upper edge, the filament holding unit is provided with pins adapted to engage said slots and the conductor opposite the opening in said shell is resilient whereby said pins are held in engagement with said slots.

9. A gas detector head comprising a base provided with a socket to receive a pole and an opening within said socket, means for supporting a filament on said base, screens surrounding said filament and engaging the base with a gas tight fit, a pole fitting in said socket, said pole being provided with an aperture in communication with an aperture in the base, a conductor extending through both said apertures, and packing between the pole and base and surrounding the conductor.

10. In a head for gas detectors, the combination of an insulating block, a filament mounted on said block, a gauze jacket surrounding said filament, said jacket being provided with a flanged base adapted to engage said block, means for holding said base against said block, said block being provided with an opening extending therethrough and having a restricted intermediate portion, a two part plunger extending through said opening and having enlargements above and below said restricted portion and conductors for supplying current to said filament on the lower portion of said block, said conductors including a switch, said plunger being in operative engagement with the base of said screen and said switch.

11. A gas detector head including a horizontal filament and a protective covering surrounding said filament, a handle for said head and means on said handle sensible to touch in fixed relation to said filament for indicating the position of said filament.

12. A device as claimed in claim 11 in which the head is provided with indicia having a fixed position relative to the direction of the filament whereby the handle and head may be assembled in correct relative position.

13. A gas detector head comprising a base, a filament mounted on said base, means sur-

rounding said filament and in gas tight engagement with said base for preventing the propagation of flame from said filament, a socket on said base for receiving a handle, said base being provided with an aperture within said socket, a handle having an aperture engaging said socket, said socket and said handle being provided with recesses surrounding said aperture, a conductor extending through said apertures, and a packing member in said recesses.

14. A gas detector head comprising a block, a shell in said block to receive a filament holding unit, a plunger extending through said block and insulated from said shell, a screen having a flanged base adapted to surround the filament of said filament holding unit, said base engaging said plunger, conductors, including a switch in operative relation to said plunger, on said block, and means for holding the base of said screen against said plunger and block.

In testimony whereof, we affix our signatures.

JOHN K. MABBS.
HERMANN C. STELLING.