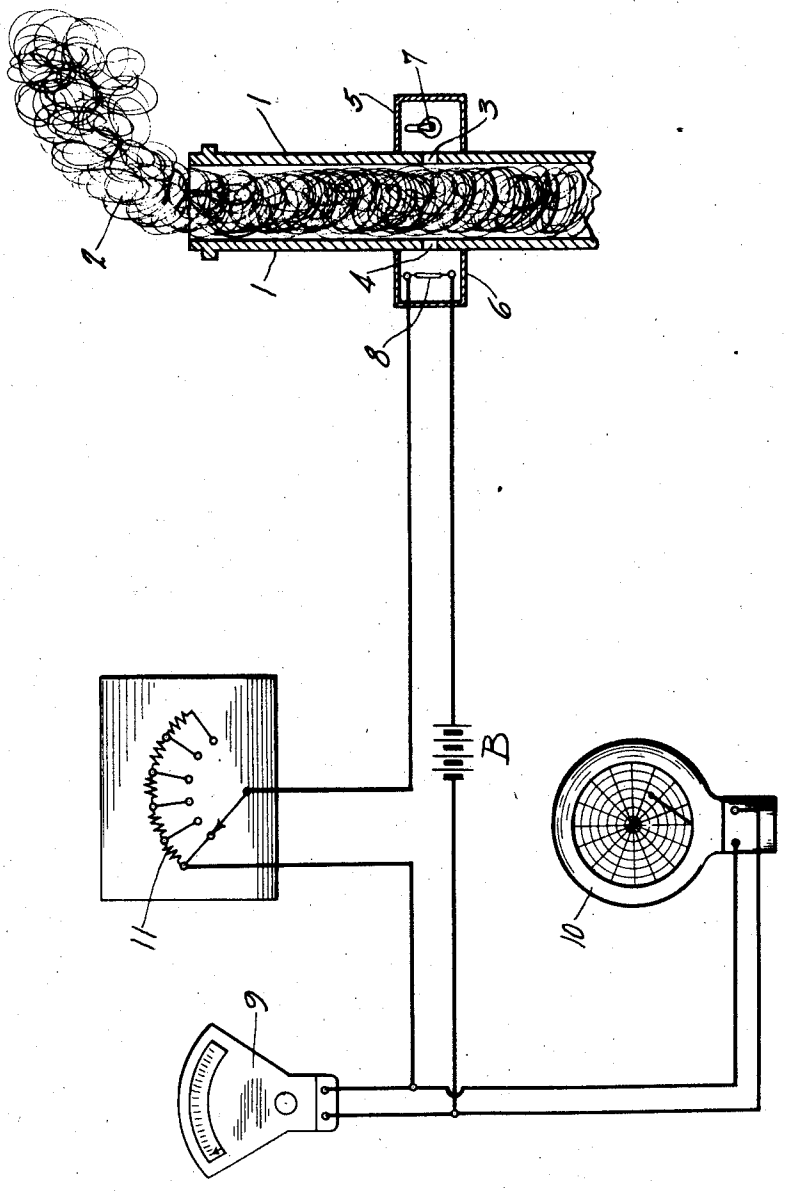
March 25, 1924. 1,487,898

R. C. STOLP

SMOKE INDICATING AND RECORDING DEVICE

Filed June 13, 1921



Inventor
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ROY C. STOLP, OF CHICAGO, ILLINOIS.

SMOKE INDICATING AND RECORDING DEVICE.

Application filed June 13, 1921. Serial No. 477,262.

To all whom it may concern:

Be it known that I, ROY C. STOLP, a citizen of the United States of America, and resident of Chicago, Cook County, and State of Illinois, have invented certain new and useful Improvements in Smoke Indicating and Recording Devices, of which the following is a specification.

My invention is for devices and circuit arrangements indicating at any and all times the density of smoke passing out through a smoke flue or the like. It is particularly applicable for use with heating plants of large office buildings, boiler units in industrial plants, locomotives, ships, and on all other furnaces and the like wherein coal or other fuel is utilized.

The object of my invention is to provide on one side of the smoke flue a source of light and an opening in the smoke flue such that the rays of light are directed across the path of the smoke, and on the opposite side of the smoke flue to provide an element which exhibits under the action of light a remarkable variation in electric conductivity and another opening on said opposite side of the smoke flue so that the rays of light pass through the first opening, across the path of the smoke, through the other opening, and strike said element. The variation in electric conductivity of said element is used to control the measuring instruments.

If the density of the smoke passing through the smoke flue is sufficient to prevent any of the light rays from passing through and striking the said element, then the current flow in the circuit of the instruments will be a minimum and the instruments will indicate maximum smoke density. If no smoke is passing through the smoke flue, a maximum number of light rays will strike said element and the current flow in the circuit of the instruments will be a maximum and the instruments will indicate minimum smoke density.

Referring to the drawing, 1 represents the wall of the smoke flue, and 2 the column of smoke passing therethrough. Small openings 3 and 4 are provided on the opposite sides of the smoke flue. Surrounding these openings and on the outside of the chimney there is provided the light proof receptacles 5 and 6. A source of light 7, such as an incandescent electric lamp is contained within the receptacle 5. An element 8 which exhibits under the action of light a remarkable variation in electric conductivity, as for example, a selenium cell is contained within the receptacle 6. The two terminals of this element are connected in an electrical circuit with a battery B, an indicating instrument 9, and a recording instrument 10. Also in this circuit is a selective compensating resistance 11. The purpose of this resistance is to adjust the current flow through the instruments 9 and 10 depending principally upon the distance of their location from the element 8. It may well be that in some instances this resistance 11 will be unnecessary.

The operation of the device is as follows: The rays of light from the source 7 in the absence of smoke passing out through the chimney will strike with their full intensity upon the element 8 and this will cause the maximum flow of current in the circuit of element 8 and instruments 9 and 10. The instruments will indicate at that particular time that there is a minimum of smoke passing out through the smoke flue. If the density of smoke is great enough to prevent any of the light rays from the source 7 passing through the opening 4 and striking the element 8, there will be a minimum current flow, and the instruments will record a minimum deflection indicating a maximum of smoke passing through the smoke flue. The instruments 9 and 10 may be located at any place desired, but I have particularly in mind locating the indicating instrument, which registers on a dial the density of the smoke, accessible to the engineer who has charge of firing the furnace or boiler, and the recording instrument 10 in the office of the superintendent. The instrument 9 will indicate at the particular moment the density of the smoke in the smoke flue. The instrument 10 is a recording device and will plot a curve on a tape or ribbon indicating the density of the smoke passing out of the chimney at any time throughout a certain period, for instance, one day. This record will indicate the efficiency of the burning of the fuel.

Having fully described and ascertained the features of my invention what I consider to be new and desire to have protected by Letters Patent will be pointed out in the appended claims.

What I claim is:

1. The combination with a smoke flue of a source of light, a receptacle opening into the flue and operatively associated with said source of light, a second receptacle opening into the flue in alignment with said first receptacle, and an element which exhibits under the action of light a remarkable variation in electric conductivity associated with said second receptacle.

2. In combination with a smoke flue having aligning openings in its walls, receptacles communicating with said openings, and a source of light and an element which exhibits under the action of light a remarkable variation in electric conductivity associated with said receptacles.

3. In a smoke indicator, the combination with a flue having aligning openings therein separated by the smoke path, receptacles communicating with said openings, a source of light associated with one of said receptacles, and an element which exhibits under the action of light a remarkable variation in electric conductivity associated with the other said receptacle.

4. The combination with a smoke flue provided with openings between which the products of combustion pass, of receptacles communicating with and open to the interior of the flue and axially aligning with each other, lighting means arranged within one of said receptacles, and an element which exhibits under the action of light a remarkable variation in electric conductivity associated with the other said receptacle.

5. The combination with a smoke flue of a source of light, a receptacle opening into the flue and operatively associated with said source of light, a second receptacle opening into the flue in alignment with said first receptacle, an element which exhibits under the action of light a remarkable variation in electric conductivity associated with said second receptacle, a measuring instrument, a source of current, and a circuit containing therein said element, said instrument, and said source of current.

6. In combination with a smoke flue having aligning openings in its walls, repectacles communicating with said openings, a source of light and an element the capacity of which to conduct an electrical current varies under the action of light associated with said receptacle, a measuring instrument, a source of current, and a circuit containing therein said element, said instrument, and said source of current.

7. In a smoke indicator, the combination of a source of light and an element the capacity of which to conduct an electrical current varies under the action of light, said source of light and said element being separated by the smoke path.

8. In a smoke indicator, the combination of a source of light and an element the capacity of which to conduct an electrical current varies under the action of light, said source of light and said element being separated by the smoke path, a measuring instrument, a source of current, and a circuit containing therein said element, said instrument, and said source of current.

9. The combination with a smoke flue of a source of light, a receptacle opening into the flue and operatively associated with said source of light, a second receptacle opening into the flue in alignment with said first receptacle, an element which exhibits under the action of light a remarkable variation in electric conductivity associated with said second receptacle, and an apaque substance for controlling the action of said source of light on said element.

10. In a smoke indicator, the combination with a flue having aligning openings therein separated by the smoke path, receptacles communicating with said openings, a source of light associated with one of said receptacles, an element which exhibits under the action of light a remarkable variation in electric conductivity associated with the other said receptacle, and hydro-carbon gas for controlling the action of said source of light on said element.

11. In a smoke indicator, the combination of a source of light and an element of the capacity of which to conduct an electric current varies under the action of light, a source of current, a measuring instrument, a recording device, said source of light and said element being separated by a smoke path, a circuit containing therein said element, said source of current, said measuring instrument and said recording device, and the variable density of smoke in said smoke path controlling the variable operation of said instrument and said device.

In witness whereof, I hereunto subscribe my name this 9th day of June A. D., 1921.

ROY C. STOLP.