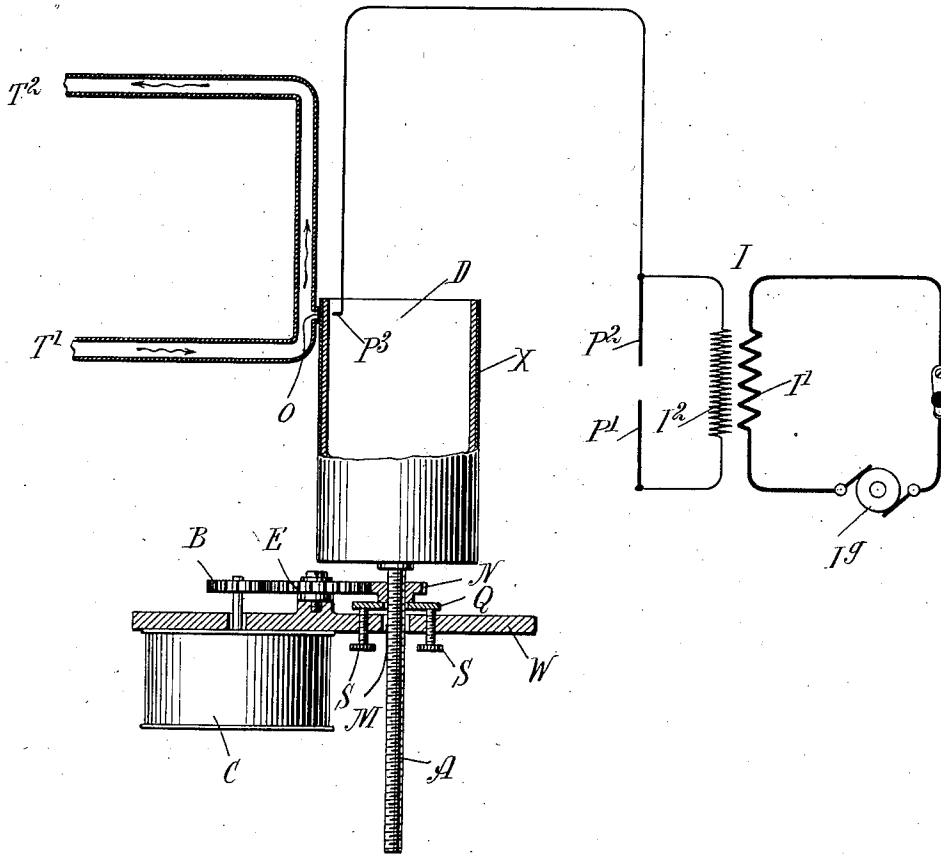


1,071,532.



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# UNITED STATES PATENT OFFICE.

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## SMOKE AND FUME RECORDER.

1,071,532.

Specification of Letters Patent.

Patented Aug. 26, 1913.

Application filed January 6, 1912. Serial No. 669,847.

*To all whom it may concern:*

Be it known that I, WILLIAM W. STRONG, a citizen of the United States, and a resident of Mechanicsburg, in the county of Cumberland and State of Pennsylvania, have invented a new and Improved Smoke and Fume Recorder, of which the following is a full, clear, and exact description.

My invention relates to an apparatus for recording the presence of smoke or fumes and the principal object of the invention is to furnish a simple, cheap, and effective mechanism suited to the purpose and which will afford a construction superior to such devices heretofore employed.

The particular method on which the use of the device herein described and claimed is based is more particularly set forth in my co-pending application, Serial No. 739,066 filed Dec. 28, 1912. This method or process is based on the fact that any medium containing solid and liquid particles may be ionized, or, as it is stated, broken up into ions possessing definite charges, the ions being in a state of rapid movement, which movement is imparted to the particles contained in such medium. It is known that such particles present in an ionized medium, when subjected to an electric field, tend to move toward the more intense regions of that field; the device herein described and claimed makes use of this phenomena for the purpose of recording the presence of such suspended particles, such as cinders or soot, in such a medium as furnace gases.

In the accompanying sheet of drawings wherein the preferred form of my device is shown in operative position, a clock C of any desired size or make is suitably supported on a platform W which may be carried in any suitable position, preferably vertical or horizontal.

A hollow cylinder D is provided with a screw A extending longitudinally therefrom and preferably from the under side thereof; the platform W is preferably provided with an opening M through which the screw A extends, there being a pinion N in screw-threaded engagement with the screw A, this pinion being carried by a suitable bearing Q supported on the platform W through the medium of adjusting screws S whereby the position of the cylinder may be determined.

The clock movement comprises a suitable pinion B in engagement with an intermediate pinion E, the intermediate pinion be-

ing also in mesh with the pinion N carried by the screw A of the cylinder D; from what has been set forth it is obvious that the clock movement, when running, will turn the spindle B and will also rotate the screw A through the medium of the pinions E and N, thereby causing the cylinder D to travel in a lengthwise direction.

The electric field necessary to the operation of my device is preferably set up by means of a transformer I having the usual primary and secondary windings I<sup>1</sup>, I<sup>2</sup>, the primary winding I<sup>1</sup>, being excited from any suitable source of power I<sup>3</sup>. The ends of the secondary winding I<sup>2</sup> are connected to suitable electrodes P<sup>1</sup>, P<sup>2</sup>, the third electrode P<sup>3</sup> being connected to either of the electrodes P<sup>1</sup> or P<sup>2</sup>; T<sup>1</sup>, T<sup>2</sup> is a suitable tube which contains the ionized gas in which the solid and liquid particles are suspended, there being a small opening O in the tube, the opening O being adjacent the electrode P<sup>3</sup>. The cylinder D is made of a suitable dielectric so that the field of the electrode P<sup>3</sup> can extend through the opening O and will cause the solid or liquid particles present in the gas in the tube to pass through the opening O and be deposited on the cylinder D; the outside of the cylinder is preferably covered with a piece of paper or any other material which is suitable for receiving the deposit.

The tubes T<sup>1</sup>, T<sup>2</sup>, are preferably of flexible construction whereby they may be utilized with a mechanism for indicating the pressure, velocity, temperature, or some other property of the gas and suspended matter present in the tube T<sup>1</sup>, T<sup>2</sup>. The density of the deposit on the paper or other covering will depend on the density of the suspended particles in the gas in the tube, the width of the deposit (due to the shape of the opening O) or the ordinate of the deposit in the direction of A can be made proportional to some other property of the gas, liquid, or solid matter in the tube T<sup>1</sup>, T<sup>2</sup>.

The operation of the device which has been set forth generally in connection with the construction thereof is as follows. The electric field having been set up by the transformer I, and the opening O and the electrode P<sup>3</sup> being relatively positioned, and the cylinder A being provided with the covering X, the clock C is started, the gas with the suspended matter therein being passed through the tube T<sup>1</sup>, T<sup>2</sup>; as the clock continues to operate, the cylinder D is moved

past the opening O, the deposit being formed on the covering X by reason of the electric field co-acting with the particles present in the gas, which particles are in a state of motion; the medium in which the particles are present consists of positive and negative ions in a state of motion which impart motion to the said particles.

The particular form of the device as illustrated in the drawings is typical of the relation of the parts, it being obvious that many departures may be made from the particular forms of the elements used without departing from the spirit and scope of the invention as defined in the appended claims.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent:—

1. The combination of a movable member, a tube through which the gas is adapted to be passed having an outlet therein and an electrode for setting up an electric field, the electrode being opposite the opening with the said member between the opening and the electrode whereby solid and liquid particles present in the gas will be deposited on the said member under the influence of the said field.

2. The combination of a suitable tube with an opening therein, a gas passing through the tube, an electrode providing an electric field, with a member positioned between the electrode and the said opening whereby the presence of the field will deposit the particles present in the gas on the said member.

3. The combination of a movable dielectric, a member provided with an opening ad-

jacent the dielectric, the opening communicating with a gas supply, an electrode for setting up an electric field, the dielectric being positioned between the electrode and the opening, whereby particles present in the gas will be deposited on the said dielectric under the influence of the said field.

4. The combination of a member provided with an opening which communicates with a supply of gas, an electrode providing an electric field, the electrode being adjacent the opening, a dielectric between the electrode and the opening, the dielectric being movable, and a member carried on the dielectric and adjacent the openings, the particles present in the gas being deposited on the member under the influence of the electric field.

5. The combination of an electrode for producing an electric field, a dielectric movably mounted in position, a source of gas, the dielectric being between the said source of gas and the electrode, and a member carried on the dielectric and adjacent the source of gas, whereby when the dielectric is moved in order to bring fresh portions of the said member adjacent the said source of gas the particles therein will be deposited on the member under the influence of the electric field.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM WALKER STRONG.

Witnesses:

C. T. MARSH,  
WALTER BRUBACH.