

H. C. ALGER.
SMOKE RECORDER.
APPLICATION FILED APR. 6, 1914.

1,122,229.

Patented Dec. 22, 1914.

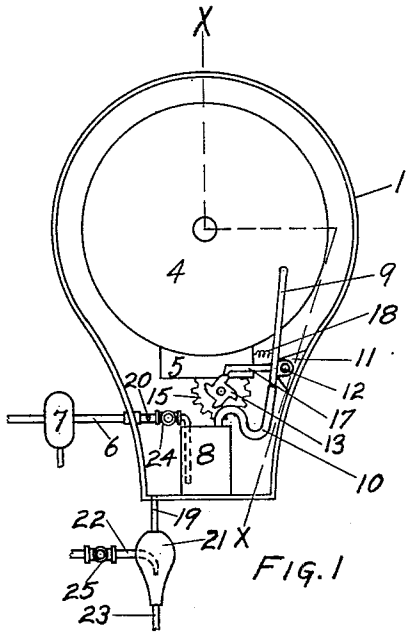


FIG. 1

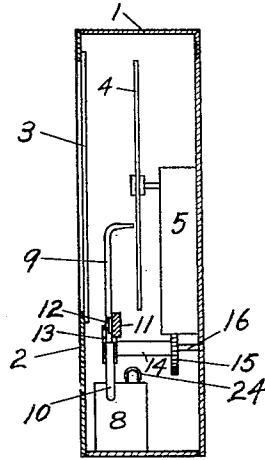


FIG. 2

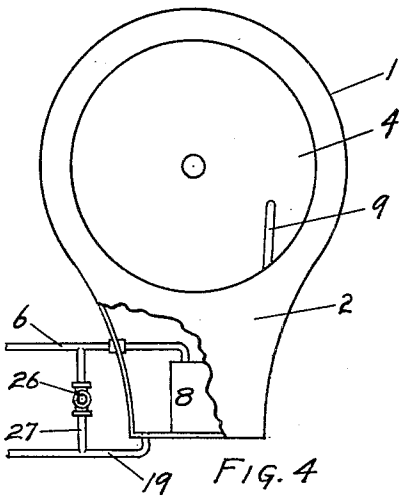


FIG. 4

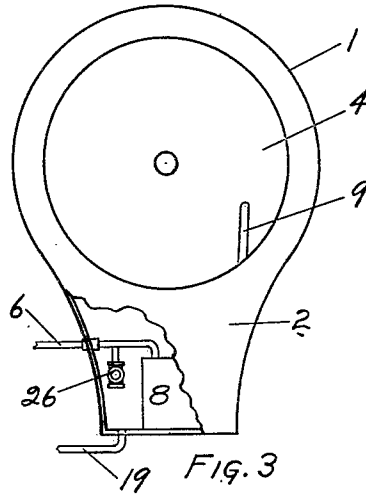


FIG. 3

WITNESSES

H. C. Alger
Emma J. Alger

INVENTOR

Harley C. Alger

UNITED STATES PATENT OFFICE.

HARLEY C. ALGER, OF CHICAGO HEIGHTS, ILLINOIS.

SMOKE-RECORDER.

1,122,229.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HARLEY C. ALGER, a citizen of the United States, and resident of Chicago Heights, in the county of Cook and State of Illinois, have invented new and useful Improvements in Smoke-Recorders, of which the following is a specification.

My invention relates to apparatus of the type described in United States Letters Patent Number 1,093,903 issued to me on April 21, 1914, which may be used for recording or indicating one or more of the constituents of smoke or other gases.

One object of this invention is to produce a smoke recorder which is simple, another object is to produce a device which gives a prompt and accurate record, while another object is to produce a device of this character which is compact in form and efficient in operation. These objects I accomplish by providing suitable mechanism for forcing a stream of smoke or gas from a nozzle or tube upon a recording member or chart which may be movable, by providing an opening for conducting or carrying away a portion of the smoke supplied to the device, thus allowing escape of a portion of the smoke without passing to the recording member and by providing mechanism which causes a series of line records to be made, side by side, which records may be radially located on the recording member or if desired may be spirally located, the former method being shown in the drawings as it is to be preferred in many cases.

Referring to the accompanying drawing, Figure 1 shows a front elevation of a recorder embodying my invention, Fig. 2 is a sectional view of Fig. 1 on the line X—X, while Figs. 3 and 4 show modifications of my invention.

In Fig. 1, my invention is shown mounted within the body 1 of a suitable case, which may have a door 2 with a glass window 3, Fig. 2. The door and glass may be fitted so as to form with the body 1, a substantially air-tight case. A recording member 4, of any preferred type, a recording member of the disk type being shown, rotatably mounted and driven by suitable means, as a clockwork 5, is positioned within the case. Smoke may be supplied to the recorder by a conduit or pipe 6 which may have a separator 7 therein for removing ashes or moisture. A valve 24 may be used to control the passage of smoke. The pipe 6 may lead or

deliver smoke to a receptacle 8 which may be within the case and which may contain suitable substance such for example as sulfuric acid for further eliminating moisture or ashes. The pipe 6 may extend into the receptacle to a point near the bottom of the receptacle. A movable nozzle 9 is adapted to deliver smoke to the recording member 4 preferably in a continuous stream and a flexible tube 10 leads smoke from the receptacle 8 and delivers it to the lower end of the nozzle 9. The nozzle may be mounted on a support 11 extending from the body of the case, the nozzle being pivoted at 12 so that it may oscillate back and forth. A sleeve 14, Fig. 2, having a cam or star wheel 13 and a gear 15 secured thereto is rotatably mounted on a shaft 16 extending from the body of the case. The gear 15 extends inside of the clock work 5 by which it is driven thereby rotating the wheel 13. An arm 17 extends from the nozzle 9 and the end of the arm rests upon the wheel 13, with which it may be held in contact by its weight or a spring 18, in tension, may serve this purpose. The cams of the wheel 13 are of such shape that they give the desired motion to the nozzle 9 and may be of such shape that they lift the end of the arm 17 gradually and then let it fall so that as the wheel revolves, the nozzle 9 may be given a variable oscillating movement, that is, the delivery end of the nozzle, if the motion of the wheel is in a counter clockwise direction, will move at the desired rate or gradually from left to right and then return quickly from right to left as the arm falls. Smoke issuing from nozzle 9 will make a record showing its relative blackness upon the chart of the recording member and as the recording member revolves and the delivery end of the nozzle oscillates with variable movement as above described, a series of records side by side or substantially radially located upon the chart will be made. The records may be in curved lines due to the oscillation of the nozzle or the speed of the chart in a counter clockwise direction and the dimensions of the other parts may be made such that the records will be in radial lines. An outlet pipe 19 may serve to conduct from the case any excess smoke as well as the gas left after the constituent of the smoke has been recorded. In order that such an apparatus shall record properly the nozzle should have a relatively small opening for

delivering smoke against the chart and if all of the smoke supplied passes through this opening the amount of smoke delivered will be relatively small and considerable time may elapse after the smoke leaves the main flue or stack through which smoke may be passing before this smoke will be recorded, especially when the recorder is at some distance from the main flue. I overcome this disadvantage and give a more prompt record by providing an opening in the supply pipe or delivery pipe which allows the escape of a portion of the smoke supplied without passing to the recorder. By this construction a portion of the excess smoke supplied is continuously intercepted and delivered to the recording member and the remainder is conveyed away from the case which also insures that an accurate sample is obtained which represents more nearly the true average condition of the smoke.

Smoke may be supplied to the apparatus by a blower, steam pump or fan in the supply pipe or a vacuum may be created within the case by means of an exhaust fan, hydraulic pump, steam siphon or air ejector in the pipe line 19 which conveys smoke from the case. In Fig. 1 an ejector or siphon 21 is shown. Steam or air admitted at 22 draws smoke through the pipe line 19 and exhausts it through the pipe line 23 which may lead out of doors. A valve 25 may control the operation of the ejector. The opening 20 may be provided with a valve to control the proportion of smoke allowed to escape as shown at 26, Fig. 3. It should be noted that the valve 24 of Fig. 1 and the valve 26 of Fig. 3 are not both needed, as either one may suffice to control the proportion of smoke delivered through the nozzle or allowed to escape. The opening 20 need not be inside of the case but may take the form shown in Fig. 4 where a by pass line 27 leads from the opening or valve 26 to the pipe 19, without passing to the case.

It will be understood that the proportions of the device may be so made or various valves may be so adjusted that the record made may be of the correct shades or degrees of blackness to compare with the well known Ringlemann standards. Other constructions embodying my invention may be made and I do not confine myself to the exact constructions described.

What I claim as my invention and desire to protect by Letters Patent is:

1. A smoke recorder comprising a case, a recording member mounted therein, means for delivering smoke to the recording member, means for supplying smoke to the delivering means, said delivering means hav-

ing an opening for conducting a portion of the smoke to the case whereby only the remaining portion of the smoke supplied is delivered to the recording member and means for leading smoke from the case.

2. In a smoke recorder, means for supplying smoke thereto, a recording member, a tube for delivering smoke to the recording member, means for conveying smoke from the supplying means to the tube, said conveying means having an opening for the escape of a portion of the smoke for the purpose set forth and means for moving the tube.

3. In a smoke recorder, means for supplying smoke thereto, a recording member, a nozzle for delivering smoke to the recording member in a continuous stream, a flexible connection for conveying smoke from the supplying means to the nozzle and means for transmitting an oscillating movement to the nozzle.

4. In a smoke recorder, means for supplying smoke thereto, a recording member, a tube for delivering smoke to the recording member, a flexible tube for conveying smoke from the supplying means to the first mentioned tube and means for oscillating the delivery end of said first mentioned tube for the purpose set forth.

5. In a smoke recorder, means for supplying smoke thereto, a recording member, a nozzle for delivering smoke to the recording member, a flexible connection for conveying smoke from the supplying means to the nozzle and means for transmitting an oscillating movement to the nozzle, said movement being at a more rapid rate in one direction than in the opposite direction.

6. In a smoke recorder, means for supplying smoke thereto, a recording member, a nozzle for delivering smoke thereto, means for conveying smoke from the supplying means to the nozzle said conveying means having an opening for the escape of a portion of the smoke for the purpose set forth and means for regulating the proportion of smoke conveyed to the nozzle.

7. In a smoke recorder, a recording member, means for delivering smoke thereto, means for supplying smoke to the delivering means, said delivering means having an opening for carrying away a portion of the smoke whereby only the remaining portion of the smoke supplied is delivered to the recording member and means for regulating the amount of smoke passing through the opening.

HARLEY C. ALGER.

Witnesses:

N. P. CURTIN,
EMMA T. ALGER.