(No Model.)

A. SEYFERTH.

PYROMETER AND PRESSURE GAGE COMBINED.

No. 301,397. Patented July 1, 1884.

Fig 1.

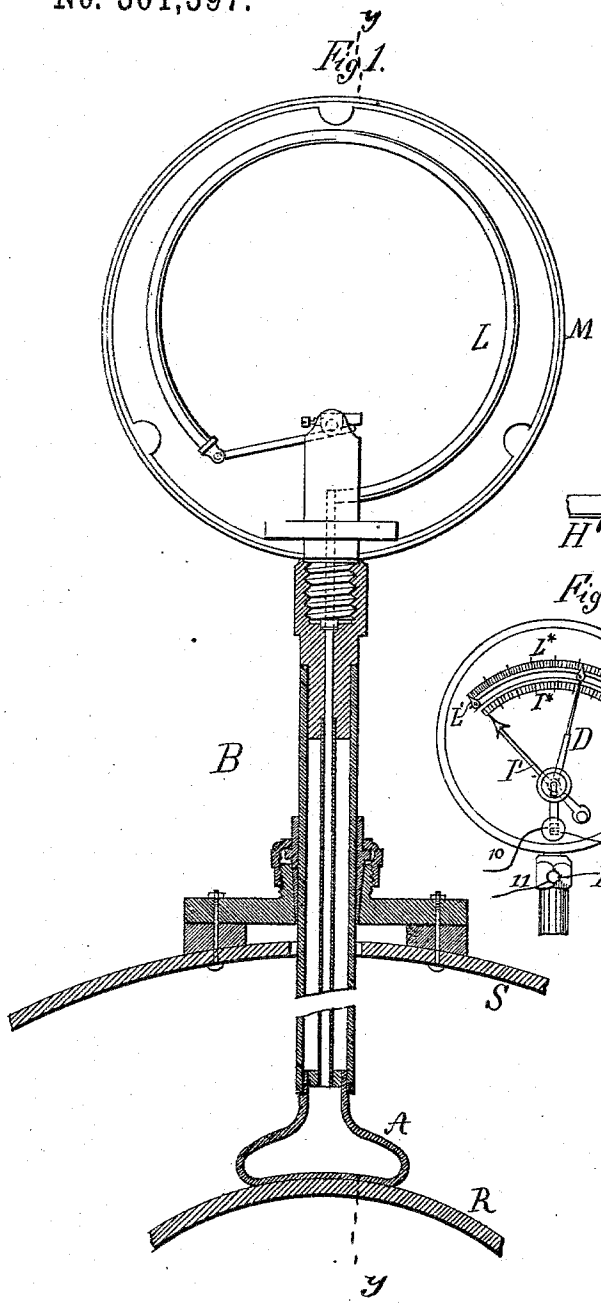


Fig 2.

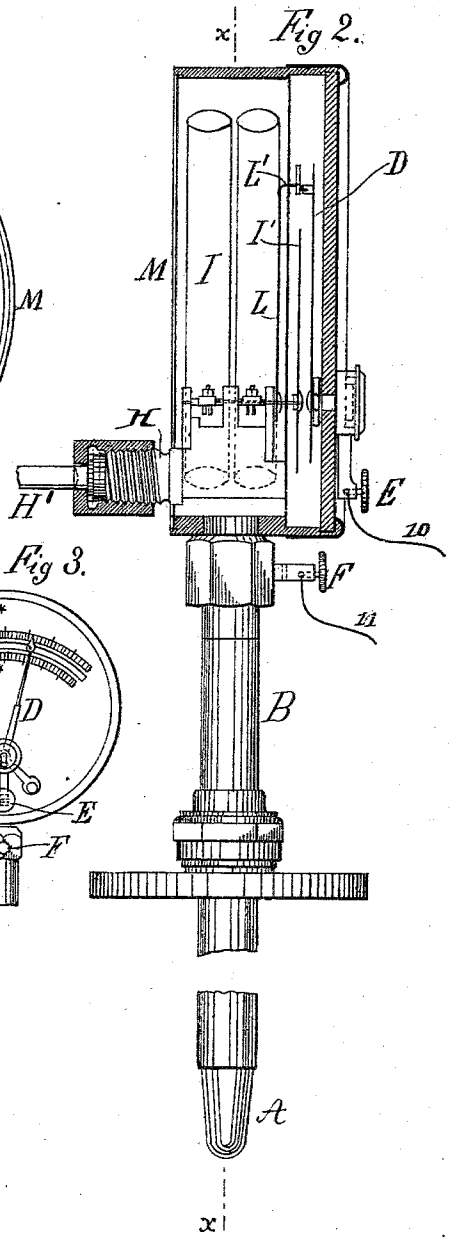
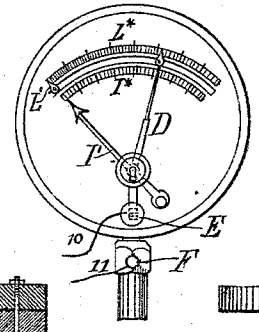


Fig 3.



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UNITED STATES PATENT OFFICE.

AUGUSTUS SEYFERTH, OF AUERBACH, HESSE, GERMANY.

PYROMETER AND PRESSURE-GAGE COMBINED.

SPECIFICATION forming part of Letters Patent No. 301,397, dated July 1, 1884.

Application filed January 31, 1884. (No model.) Patented in Germany June 26, 1883, No. 25,915.

To all whom it may concern:

Be it known that I, AUGUSTUS SEYFERTH, a citizen of the German Empire, residing at Auerbach, in the Grand Duchy of Hesse, German Empire, have invented new and useful Improvements in Pyrometer and Pressure-Gage Combined, of which the following is a specification.

This invention relates to an improvement in a combined pyrometer and pressure-gage of that class which I have described in Letters Patent No. 217,822, granted to me July 22, 1879.

My present improvement consists in the combination of a contact-hand with the index-hand of a pyrometer or thermostat, said contact-hand being in the circuit of an electric battery, which circuit includes one or more alarm-signals, so that by the ordinary hand of the instrument the temperature existing in the interior of a steam-boiler or other space can be observed, and at the same time, when the temperature reaches a certain point, which may be termed the "maximum" point, the alarm or alarms are set in motion. The sensitiveness of the apparatus is increased by a hollow foot, which contains the liquid—such, for example, as mercury—and which offers an enlarged surface to the heat acting on the liquid.

In the accompanying drawings, Figure 1 represents a vertical section of my new pyrometer or thermostat as applied to a steam-boiler, the line *x x*, Fig. 2, indicating the plane of section. Fig. 2 is a similar section in the plane *y y*, Fig. 1. Fig. 3 is a face view on a smaller scale than the previous figures.

Similar letters indicate corresponding parts.

The apparatus which I have described in my Patent No. 217,822 consists of a manometer, a hollow leg which is open at the bottom, a curved tube or siphon, which connects at one end with the hollow leg and at its opposite end with the manometer, an opening through which the hollow leg and also the siphon can be charged with liquid, and a scale on the manometer, which is divided off to indicate the temperature corresponding to the tension of the saturated vapors emanating from the mercury or other liquid in the hollow leg at such temperature. In order to make this instrument available for various purposes—such, for instance, as for low-water indicators in steam-boilers or for a fire-alarm—I have connected to the hollow leg B of the instrument a hollow foot-piece, A, which is made of copper or other good conductor of heat, and the shape of which depends upon the purpose for which it is to be used.

In Fig. 1 of the drawings I have represented my instrument as applied to a steam-boiler, and the hollow foot-piece A is made in such a shape that it will fit the convex surface of the smoke-flue R, which is inclosed within the boiler, and serves to heat the water therein to generate steam. S represents the shell of the steam-boiler, and the hollow foot-piece A is placed upon the highest portion of the smoke-flue, which, when the water in the boiler sinks down below the low-water mark, will become highly heated. The liquid in the hollow foot-piece, being thus exposed to a high heat, evolves vapors, the tension of which corresponds to the temperature of the highest portion of the smoke-flue. The hollow leg B and the hollow foot-piece communicate with the tubular spring L of the manometer M, and the index-hand L′ is moved on the manometer-scale L*, Fig. 3, to a point corresponding to said temperature. Behind the tubular spring L is situated a second tubular spring, I, which connects through the nipple H and pipe H′ with the steam-space of the boiler, and which actuates the index-hand I′, which points to the scale I*, Fig. 3, so as to indicate the pressure of the steam in the steam-boiler. If the temperature indicated by the index-hand L′ is greater than that corresponding to the pressure indicated by the index-hand I′, the water in the boiler is low or the temperature of the smoke-flue R is higher than it ought to be, and the danger of an explosion is imminent. In order to produce an alarm when the above state is reached, I have combined with the index-hand L′ a contact-hand, D, which is insulated from the metallic case of the manometer, but which is in metallic connection with a clamping-screw, E. On the case of the manometer is secured another clamping-screw, F, and these clamping-screws are connected by wires 10 and

11 with the opposite poles of an electric battery, one of said wires being made to pass through a suitable electric alarm. The contact-hand is set to a point on the scale L* from five to ten degrees higher than the maximum temperature, corresponding to the maximum pressure of the boiler, and whenever the temperature to which the foot-piece A of the apparatus is exposed becomes greater than the above-named maximum temperature the index-hand L′ is brought in contact with the contact-hand D and the alarm is sounded.

From this description it will be readily understood that the shape of the hollow foot-piece A must be changed according to the shape of that part of the smoke-flue on which the same is to be placed; but in all cases the foot-piece ought to be placed on that portion of the smoke-flue which is exposed to the strongest heat when the water gets low. My instrument can, however, also be used as a fire-alarm—for instance, in a vessel, by placing the foot-piece A down into the hold of the vessel, or in a building, by placing the foot-piece A into a room, so that whenever the temperature in the hold of the vessel or in the room rises beyond a fixed limit the alarm is sounded.

What I claim as new, and desire to secure by Letters Patent, is—

1. A pyrometer and pressure-gage combined, consisting of the tubular springs I and L, the index-hands I′ and L′, a pipe for connecting the spring I with the steam-space of a boiler, and the hollow leg B, having the attached foot-piece A, communicating with the spring L, all substantially as described.

2. The combination of the tubular spring L of the manometer, the hollow leg, open at its lower end, and the hollow foot-piece in communication with the tubular spring through the leg, with the contact-hand D, insulated from the manometer-case, and electrical conductors 10 and 11, one in metallic connection with the contact-hand, and the other with the manometer-case, for connecting with the opposite poles of a battery, substantially as described.

3. A pyrometer and pressure-gage consisting of the tubular springs I and L of the manometer, the index-hands I′ and L′, a pipe for connecting the spring I with the steam-space of a boiler, the hollow leg B, having the attached foot-piece communicating with the spring L, the contact-hand D, insulated from the manometer-case, and electrical conductors 10 and 11, for connecting with a battery, one of the conductors being in metallic connection with the contact-hand, and the other with the manometer-case, substantially as described.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

AUGUSTUS SEYFERTH. [L. S.]

Witnesses:

F. VOGELER,

A. S. HOGUE.