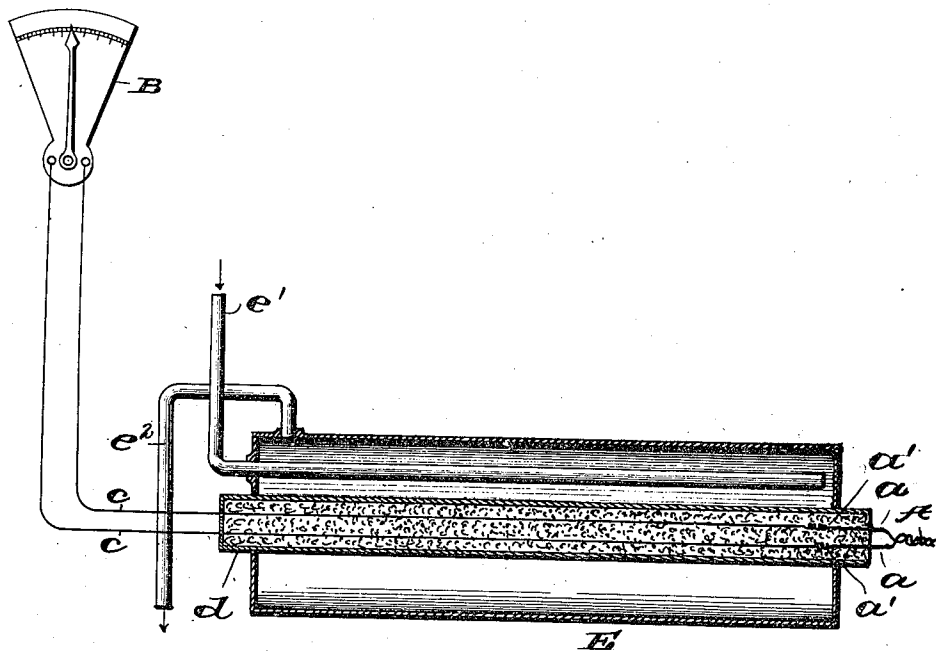


(No Model.)

A. A. SIMONDS.
PYROMETER.

No. 537,242.

Patented Apr. 9, 1895.



Witnesses
G. A. Taubenschmitt.
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UNITED STATES PATENT OFFICE.

ALVAN A. SIMONDS, OF DAYTON, OHIO.

PYROMETER.

SPECIFICATION forming part of Letters Patent No. 537,242, dated April 9, 1895.

Application filed December 13, 1894. Serial No. 631,635. (No model.)

To all whom it may concern:

Be it known that I, ALVAN A. SIMONDS, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Pyrometers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to pyrometers and more particularly to those pyrometers in which a thermo-electrical current is employed and it consists in certain new constructions and combinations of parts.

The best form in which I have contemplated embodying my invention is illustrated in the accompanying drawing, and the same is fully disclosed in the following description and claims.

The drawing is a view partly in elevation, partly in section of my improved pyrometer.

In the drawing A indicates the thermo-electrical elements, and B the indicator which indicates the degree of activity of the thermo-electrical elements and consequently the degree of heat applied thereto.

c c are the conductors connecting the thermo-electrical elements with the indicator. These conductors on leaving the elements pass into a tube *d* filled with plaster of paris or like material in which they are embedded and surrounded and by which they are insulated from each other and from the tube *d*.

The thermo-electrical elements which I prefer to use are platinum and an alloy of platinum and rhodium. The short conductors *a* leading from these elements into the tube *d* are of platinum or of the same material as the elements themselves. In most cases where such pyrometers have heretofore been employed, platinum conductors have to be used for a considerable distance from the elements as the heat is so great as to melt or rapidly destroy them if formed of other materials. This has rendered such pyrometers less efficient than desirable inasmuch as platinum possesses but a small conducting capacity, and as the heat to which such conductors are subjected increases their resistance, the electric action of the thermo-electrical elements is able to exert but little influence upon the indica-

tor. To avoid the effect of the heat upon the conductors, I employ the plaster of paris as before stated which prevents the conduction of the heat along the wires through the insulating material and further maintain these conductors at a low temperature by a water jacket E which surrounds the tube *d*. This water jacket is shown as extending to within a short distance of the tube *d* adjacent to the thermo-electrical elements, but it may be made to extend toward the elements as far as the tube *d*, or to the end of that tube if so desired. I prefer to make the inlet pipe *e'* extend to near the end of the jacket nearest the thermo-electrical elements and to have the same discharge near the top of the jacket. The outlet pipe *e''* leads from the upper side of the jacket at its opposite end. By this means the coldest water is conducted to the end of the jacket nearest the heat or source of heat and as its gravity is greater than the water within the jacket passes downward at that point around the tube *d*, thereby maintaining that part of the tube *d* at the lowest possible temperature. While this construction greatly improves the action of the pyrometer in cases where the platinum conductors are employed for a considerable distance from the elements by reason of maintaining the conductors at a low temperature or at approximately their greatest conductivity, I am by this construction enabled to use the best possible conductors for nearly the entire distance between the thermo-electrical elements and the indicator. This is also illustrated in the drawing in which the conductors *a a* extend but a short distance into the pipe *d*, and at the point *a' a'* are joined to copper conductors *c c* which extend from this point to the indicator.

A pyrometer constructed in this manner possesses a far greater sensitiveness, and range of movement and has been found to give the most satisfactory results where the prior forms of this device have been found impracticable.

I do not desire to limit myself to any particular form of indicator but prefer to employ one formed on the well known principles of the voltameter. The length of the tube *d* and of the water jacket E should be such as to carry the conductors without the injurious

action of the source of heat which it is desired to measure.

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

1. In an electrical pyrometer, the combination with thermo-electrical elements and an indicator, of electrical connections between said elements and the indicator and means for maintaining the said connections at a low temperature from a point near the said elements to a point substantially without the influence of the source of heat which it is desired to measure whereby the connections are maintained at their normal conductive efficiency, substantially as described.

2. In an electrical pyrometer the combination with the thermo-electrical elements, and an indicator, of electrical conductors connecting the said elements and indicator, a heat and electrical insulating material surrounding said conductors from a point near the said elements to a point without the influence of the source of heat and a water jacket for said insulation whereby a rise in the temperature of the conductors to effect their conductive capacity is avoided, substantially as described.

3. In an electrical pyrometer the combination with thermo-electrical elements and an indicator, of electric connections between them, a casing filled with plaster of paris, said connections being embedded in said plaster paris, and insulated thereby, and a water

jacket surrounding said casing whereby the injurious heating of the conductors is prevented, substantially as described. 35

4. In an electrical pyrometer the combination with the thermo-electrical elements, and an indicator, of electric conductors extending from said elements to said indicator, each conductor being composed of a main portion consisting of copper or other good conductor, extending to within a short distance of the elements and a short portion of platinum or like conductor connecting the main portion and the elements, and means for maintaining a comparatively low temperature at the point of junction and outward from the said elements, substantially as described. 45

5. In an electrical pyrometer, the combination with the thermo-electrical elements, and an indicator, of electric conductors extending from said elements to the indicator each consisting of a short portion of platinum or like material adjacent to said elements and the balance of copper, a heat and electric non-conducting insulating material surrounding said conductors at the point of junction of their parts and a water jacket for said material, substantially as described. 50

In testimony whereof I affix my signature in presence of two witnesses. 60

ALVAN A. SIMONDS.

Witnesses:

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J. D. KINGSBERRY.