

M. S. CLAWSON.  
TEMPERATURE INDICATING DEVICE.  
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1,094,530.

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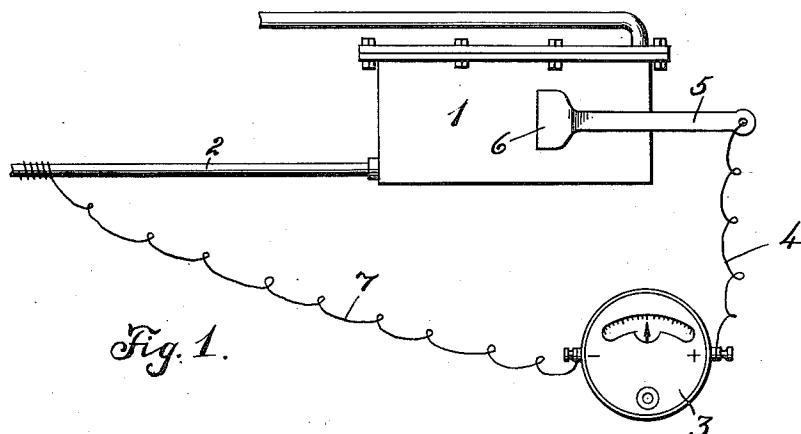


Fig. 1.

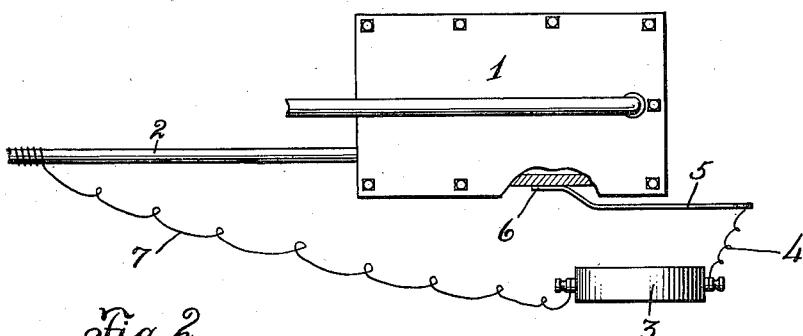


Fig. 2.

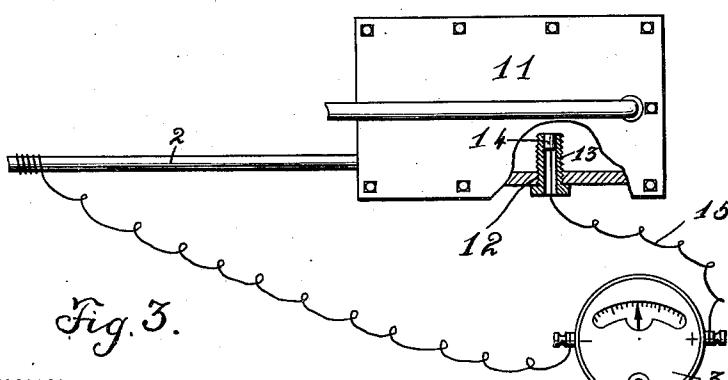


Fig. 3.

Witnesses.

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# UNITED STATES PATENT OFFICE.

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## TEMPERATURE-INDICATING DEVICE.

1,094,530.

Specification of Letters Patent. Patented Apr. 28, 1914.

Application filed May 31, 1910. Serial No. 564,298.

To all whom it may concern:

Be it known that I, MONROE S. CLAWSON, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Temperature-Indicating Devices, of which the following is a specification.

My invention relates to devices for indicating the temperature of furnaces, retorts and the like and refers particularly to an apparatus for detecting the changes of temperature in retorts used with my improvement in oxygen generators for which Letters Patent No. 964,492, were issued to me on July 19, 1910.

The object of my invention is the improvement of means for detecting changes of temperature in the retort consisting in securing a bar of metal thereto widely differing from the metal of the retort in the thermoelectric series, and connecting said bar to one pole of a galvanometer, while the other pole of the galvanometer is connected to a pipe or other metal structure secured to the retort and at a distance therefrom so as not to be influenced by the heat of the retort.

My invention will be described in detail hereinafter and illustrated in the accompanying drawings in which—

Figure 1 is a side view showing a retort such as used in my oxygen generator apparatus and showing my temperature indicating device applied thereto, Fig. 2, a top plan view, and Fig. 3, a sectional view of a retort showing a modified form of thermopile.

In the drawing similar reference characters indicate corresponding parts in all of the views.

The retort 1 is constructed of any desired metal such for instance as iron and has a pipe 2 tapped into it which as stated in the U. S. Patent #964,492, above referred to, is provided to convey ozone from a suitable generator, not shown, to the retort.

As in oxygen generation it is important to know the exact temperature of the retort at all times I provide a temperature indicating device employing the principles of thermoelectricity in which 3 indicates a galvanometer of standard type having its positive side connected by means of a wire 4 with a thermopile of which one electrode consists of a retort 1 and the other electrode of a bar

5 of any metal having a thermoelectrical difference with the retort, as, for example, the retort being of iron the bar 5 could be made of German silver. The end of the bar 5 where secured to retort 1 is preferably made wider as shown at 6, and welded or otherwise secured to the retort opposite its middle so that the galvanometer will at all times register the mean temperature of the retort. The negative side of the galvanometer 3 is connected by wire 7 with pipe or tube 2 at a point remote from retort 1 so that the heat thereof will not reach it and set up a counter electro-motive force action.

In Fig. 3 is illustrated a modified form of thermopile in which the retort 11 is formed with an opening 12 in its side to receive a tube 13 of iron or other metal, having a plug 14, in its inner end, of German silver or other metal differing from the metal of the tube in the thermoelectric series, and securing thereto the wire 15 connected to the positive side of the galvanometer.

I have shown and described a retort such as used in generating oxygen but it will be apparent that it is adapted to other forms of retorts and furnaces so that I do not limit myself to the structure shown and described nor to the metals stated in the thermopile as other metals may be employed without altering the spirit of my invention. It will also be apparent that in retorts not employing a pipe 2 as well as in retorts employing the pipe I may make the negative side of the galvanometer in contact with some other metallic appendage of the retort, such a structure being readily apparent to any person either skilled or unskilled and considered to be not necessary to be illustrated.

Having thus described my invention what I claim is—

1. In combination with a metal retort, and a pipe tapped into the retort, a temperature indicating device comprising a galvanometer, a bar of metal having one end formed wider than the remainder of the bar, said wider portion of the bar being secured to the retort and forming an electrode, which with the metal of the retort as the other electrode, constitutes a thermopile, said bar being connected with the positive side of the galvanometer, and the negative side of the galvanometer being connected with the pipe aforesaid at a point remote from the retort.

2. A temperature indicating device, comprising in combination a metal retort, a

pipe tapped into the retort, a galvanometer, a bar of metal having a different thermo-electric potential from the metal of the retort, and secured thereto, thus forming an electrode, which with the retort as the other electrode constitutes a thermopile, there being means whereby said bar of metal is connected with one terminal of the galvanometer and the other terminal of the galvanometer is connected with the aforesaid pipe at a point remote from the retort.

3. A temperature indicating device comprising a thermopile one element of which is a retort, and the other element of which is a metal bar secured to the retort and having a different thermo-electric potential therefrom, said metal bar being provided with an enlarged body portion for attachment with

the retort; a galvanometer; and connecting means for connecting the galvanometer with the thermopile.

4. A temperature indicating device comprising a thermopile one element of which is a closed retort, and the other element of which is a metallic member secured on the outside of the retort; and having a thermo-electric potential differing from that of the material of the retort; a galvanometer; and connecting means whereby the thermopile is electrically connected with the galvanometer.

In testimony wherof I hereto affix my signature in the presence of two witnesses.

MONROE S. CLAWSON.

Witnesses:

H. D. ABBOTT,

C. LOPEZ DE VICTORIA.