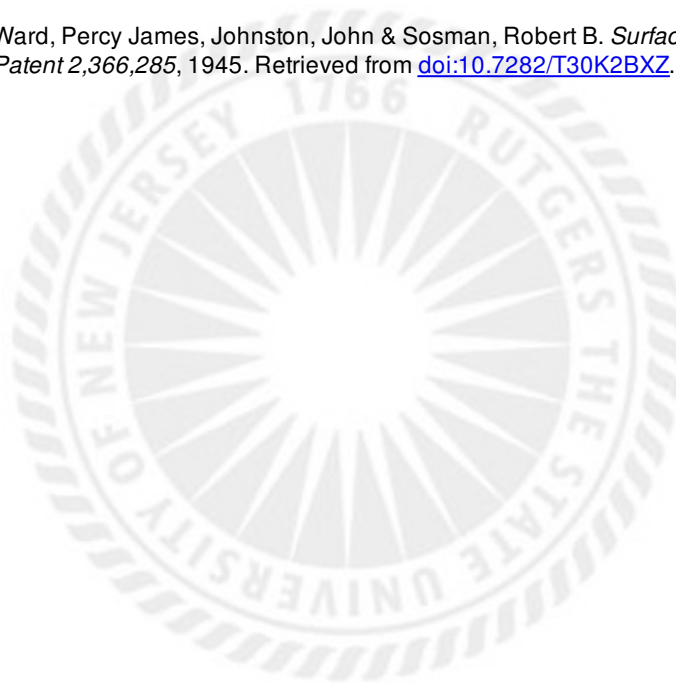


Surface temperature pyrometer, U.S. Patent 2,366,285

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Citation to *this* Version: Ward, Percy James, Johnston, John & Sosman, Robert B. *Surface temperature pyrometer, U.S. Patent 2,366,285*, 1945. Retrieved from [doi:10.7282/T30K2BXZ](https://doi.org/10.7282/T30K2BXZ).



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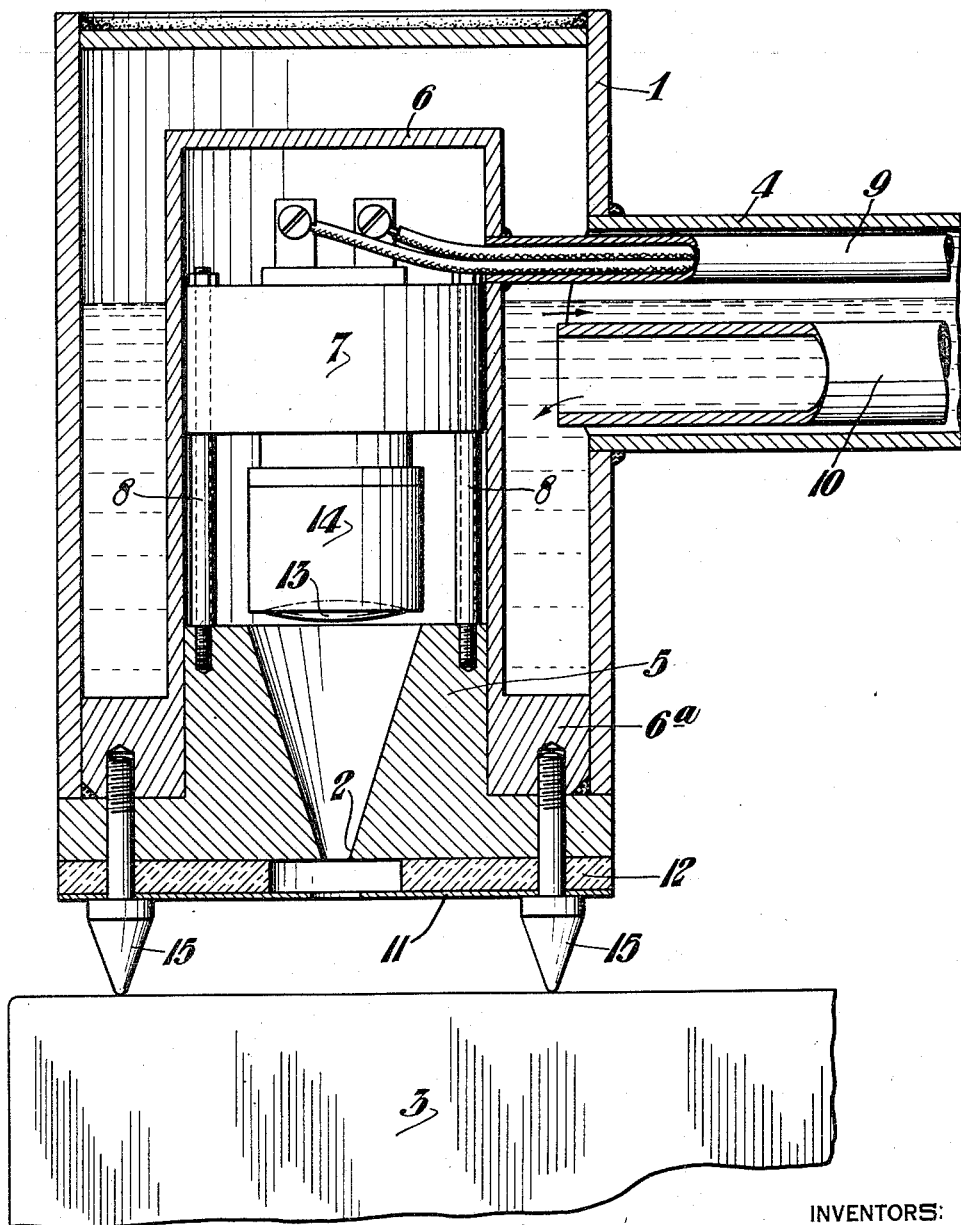
Jan. 2, 1945.

J. W. PERCY ET AL

2,366,285

SURFACE TEMPERATURE PYROMETER

Filed Aug. 14, 1943



INVENTORS:
JAMES WARD PERCY, JOHN
JOHNSTON and ROBERT B. GOSMAN,
BY: *John E. Jackson*
THEIR ATTORNEY.

UNITED STATES PATENT OFFICE

2,366,285

SURFACE TEMPERATURE PYROMETER

James Ward Percy, Jersey City, John Johnston, Short Hills, and Robert B. Sosman, Westfield, N. J., assignors to United States Steel Corporation of Delaware, a corporation of Delaware

Application August 14, 1943, Serial No. 498,722

1 Claim. (Cl. 136-4)

This invention is concerned with the problem of measuring the temperature of the surface of a hot object and, particularly, of steel work in a furnace, the object being to obtain a more accurate determination of the temperature than is afforded by prior art devices.

A specific example of the invention is illustrated by the accompanying drawing.

More specifically, this drawing shows an enclosure 1 having a passage 2 for passing radiation from an adjacent hot object 3, which may be a steel slab in a heating furnace. The enclosure 1 is provided with a handle 4, in the form of a pipe opening into the enclosure, which is of sufficient length to permit the enclosure to be positioned entirely inside the furnace and adjacent the hot object 3, as contrasted to a remote position at a door or a sighting port in the roof of the furnace. The passage 2 flares inwardly and is formed in a relatively massive metal block 5 forming an end of the enclosure 1, this block mounting a second enclosure 6, spaced inside the enclosure 1, in which a radiation responsive unit 7 is positioned by struts 8 mounting it on the block 5. This radiation unit is positioned to receive radiation passed through the passage 2.

The pipe 4 internally carries a pipe 9 through which the lead wires may be passed from the radiation responsive unit 7, it being understood that this is of the type which is electrically responsive, the pipe 9 extending into communication with the inner enclosure 6. The pipe 4 also internally carries a second pipe 10 which opens into the space between the outer enclosure 1 and the inner enclosure 6, and through which water is introduced to cool the enclosure 6, the water exhausting by way of the space between the outside of the pipe 10 and the inside of the pipe 4.

In using a device of this character, it has been found that when it is placed close to the hot object 3 it unduly abstracts heat therefrom, so as to result in inaccurate measurements being obtained by means of the device 7. In the case of the present invention, this difficulty is avoided by providing a radiation reflector 11 on the outside of the enclosure 1 surrounding the passage 2, this reflector 11 being preferably made from a sheet of polished stainless steel and extending throughout the entire area of the enclosure 1 opposite the hot object. This reflector functions to return radiation from the hot object 3, excepting for the small amount that passes through the passage 2. A further feature is the provision of a layer of asbestos 12 between the reflector 11 and the outside of the enclosure 1, this preventing the conduction of heat from the mirror to the enclosure and tending to reduce the temperature of the enclosure and, particularly, of the radiation responsive unit 7 positioned inside the enclosure 6. In addition to these features, a

lens 13 is positioned in a tube 14 surrounding the radiation responsive area of the unit 7, for focusing all the radiation passed by the passage 2 onto this area, this further preventing overheating of the unit 7 by preventing its receiving radiation at locations other than its sensitive area. Conical legs 15 extend from the reflector 11 for supporting the instrument on the hot object 3 at a distance, preferably about three-quarters of an inch, in order that no appreciable heat may be abstracted from the surface by conduction, and at the same time that hot furnace gases may have access to the surface and so at least partly maintain the supplying of heat thereto that is temporarily interrupted by the insertion of the pyrometer.

It is to be understood that the device is entirely made of metal with all joints welded, wherever possible, to assure positive water tightness and gas tightness where these features are important. The struts 8 take the form of tubes with bolts passing through them and through the holes provided in the radiation responsive unit 7 for mounting it. There are various units of this type on the market, and it may be necessary to mount other types of units, than that shown, in a somewhat different fashion. The legs 15 are screwed into a thick flange 6^a on the bottom end of the enclosure 6, the block 5 forming the end of the enclosure 6, and the latter having the described flanges for forming the end of the enclosure 1. These are considered details of construction which may be varied as desired.

In addition to the pipe 9 carrying the electric leads for the unit 7, it may also carry compressed air for excluding the furnace gases from entering the passage 2. This passage 2 is formed in the massive block 5 so that there is adequate mass to rapidly conduct away unwanted heat, the block being, in part quite close to the water circulating between the enclosures 1 and 6.

We claim:

The combination of an enclosure having a passage for radiation from an adjacent hot object, a reflector surrounding the passage on the outside of the enclosure for returning radiation to said object, thermal insulation between the reflector and the enclosure to retard heat conduction therebetween, and a unit inside the enclosure receiving the radiation passed by the passage and which is responsive thereto, this unit being provided with a lens for focusing all the radiation passed by the passage onto its radiation responsive area, and legs extending from the reflector for contacting said object to provide a space between the reflector and object in which the atmosphere surrounding the object may have access to its surface opposite the reflector.

JAMES WARD PERCY.
JOHN JOHNSTON.
ROBERT B. SOSMAN.