

A. F. MITCHELL.
 PROTECTING HOOD FOR THERMO-COUPLES.
 APPLICATION FILED JUNE 23, 1914.

1,140,701.

Patented May 25, 1915.

FIG. 1

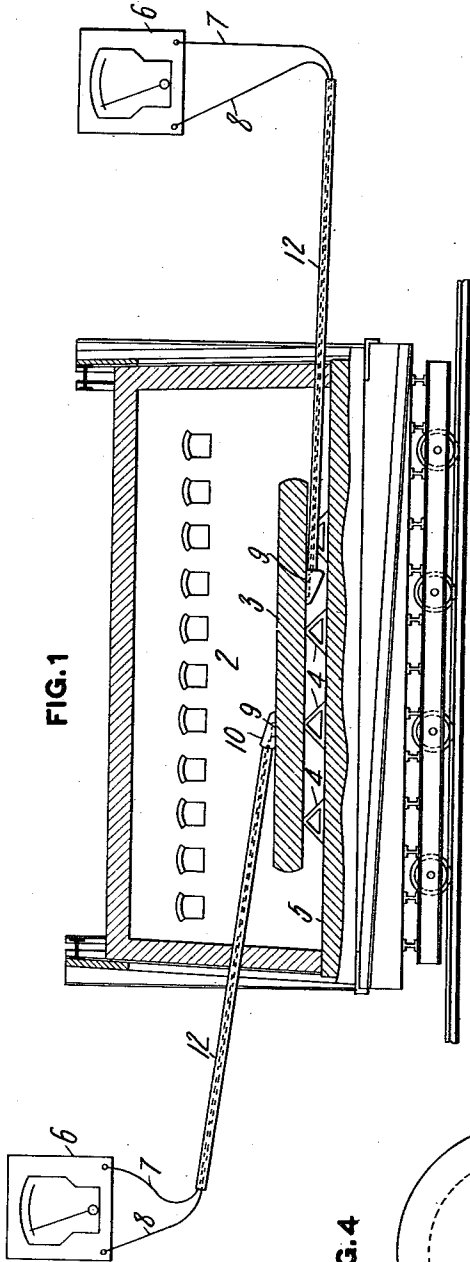


FIG. 2

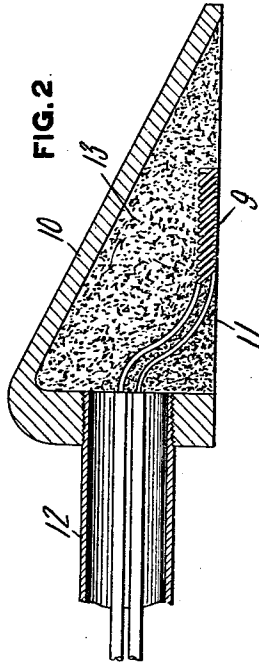


FIG. 3

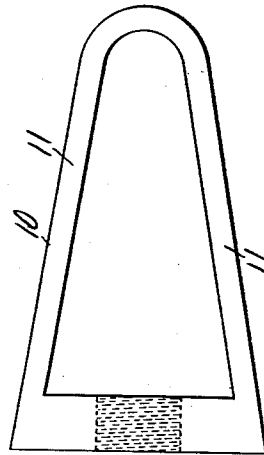
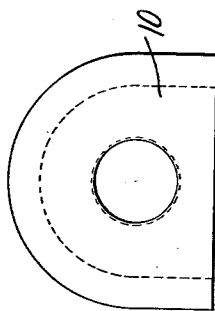


FIG. 4



WITNESSES

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PROTECTING-HOOD FOR THERMO-COUPLES.

1,140,701.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ANDREW F. MITCHELL, a citizen of the United States, residing at Homestead, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Protecting-Hood for Thermo-Couples, of which the following is a specification.

My invention relates to means employed in connection with electric pyrometers in determining the temperature of heated articles and while not restricted to such use more particularly relates to the construction of the hot end of thermo-couples forming part of electric pyrometers, used in determining the temperature of armor plates and similar metal bodies while such plates are being heated within a furnace.

Heretofore it has been the practice to incase the hot end of the thermo-couple within a cover made of iron, quartz, porcelain or similar heat resisting material, the covering being employed to prevent oxidation of the thermo-couple and the thermo-couple, of course, being connected by suitably insulated wires to the galvanometer forming part of the pyrometer. It has also been the practice heretofore to use the apparatus by placing the naked or uncovered hot end of the thermo-couple in contact with the plate or other article, of which the temperature is to be determined, the cold end of the thermo-couple *b* connected by suitably insulated wires to the galvanometer forming part of the pyrometer. When used in this manner, the hot end of the thermo-couple is subject to the heating influence of the gases or products of combustion passing through the furnace, while the reading is being taken and is also subjected to the cooling influence of the furnace bottom when applied to the under side of the plate or other metal body, both influences acting to make the readings inaccurate.

One object of my invention is to provide a thermo-couple having novel means whereby the hot end thereof is protected or insulated from the direct action of the highly heated gases of the furnace.

Another object of my invention is to provide a thermo-couple having novel means whereby the hot end of the thermo-couple is brought in contact with the article whose temperature is to be measured while excluding it from the highly heated atmosphere of

the interior of the furnace in which the plates or other articles are situated.

Still further objects of my invention will become apparent hereinafter as the invention is more fully described and specifically pointed out in the appended claims.

My invention consists in a protecting hood, which surrounds the thermo-couple and has an open side which enables the thermo-couple being brought and held in direct contact with the heated article, while its temperature is being determined and thereby excluding the thermo-couple from the action of the highly heated gases passing through the furnace.

Referring now to the drawings forming part of this specification, Figure 1 is a longitudinal sectional side elevation of a heating furnace for heating armor plates and similar large metal bodies. Fig. 2 is a longitudinal section showing on a larger scale, the construction of the protecting hood and the manner of applying the hood for use on the hot end of the thermo-couple in accordance with my invention. Fig. 3 is an inverted plan of the hood shown in Fig. 2. Fig. 4 is an end elevation of the hood shown in Figs. 2 and 3.

In the accompanying drawings, the numeral 2 indicates a heating furnace having an armor plate 3 mounted upon the supports 4 which are carried upon the movable bottom 5 of the furnace, the plate being supported in this manner to enable both sides to be simultaneously heated and obtain a more uniform heating of the plates within the furnace.

The galvanometer 6 forming part of the electric pyrometer, is connected by lead wires 7 and 8 to the hot end 9 of the thermo-couple and the hot end of the thermo-couple is positioned within the enveloping protector or hood 10, forming a novel feature of this invention. The hot end 9 of the thermo-couple is conveniently bent to bring it into substantially the plane of the side edges 11 of the open side of the protecting hood 10.

The rear end of the protecting hood is provided with a screw threaded opening and secured in this opening is one end of a hollow handle 12 of considerable length which may be formed conveniently of a piece of wrought pipe.

The lead wires 7 and 8 connect the cold end of the thermo-couple with the galva-

nometer, the wires forming the thermo-couple being of sufficient length to extend to the outside of the furnace and the wires conveniently extending through the hollow handle 12. The wires within the pipe may be covered with a suitable insulation as is shown.

The interior of the hood 10 which is inclosed upon all but one of its sides is preferably filled with a suitable insulating material 13 forming a lining for the hood and assisting in maintaining the hot end of the thermo-couple in position within the protecting hood. Asbestos preferably is used as the insulating material. Asbestos cement and mineral wool are other insulating materials which may be used for insulating the hood. When desired however the insulating material 13 in the hood may be omitted.

In using pyrometers equipped with my improved apparatus, the handle 12 through which the wires extend, forms a convenient means for positioning the hot end of the thermo-couple in the desired location on the heated article within the furnace, it being inserted within the furnace through suitable openings provided for that purpose in the side walls and in the doors or end walls of the furnace.

In placing the hot end of the thermo-couple in position the side edges 11 of the hood 10 come in contact with the surface of the plate, the temperature of which is being measured, and in this way prevent the highly heated gases in the furnace from coming into contact with the thermo-couple, so that the heating action of the surface of the plate on the hot end of the thermo-couple alone determines the registered temperature and inaccuracies heretofore present, due to the action of the gases, which are at a higher temperature than the heated metal, are prevented and avoided. The hot end 9 and its surrounding hood 10 are held in direct contact with the surface of the plate 3 for the necessary time interval and the temperature of the hot end of the thermo-couple, which will be the same as that of the temperature of the plate in contact therewith, is transmitted through the lead wires 7 and 8 to the galvanometer and the temperature indicated on the dial of the galvanometer.

The advantages of my invention will be apparent to those skilled in the art. The use of my protecting hood prevents the temperatures taken being influenced by the highly heated atmosphere of the furnace,

by excluding such atmosphere from contact with the hot end of the thermo-couple, and in this way the temperature readings are rendered much more accurate than has heretofore been possible with apparatus in which the naked hot end is introduced into the furnace.

The apparatus is extremely simple and is easily and cheaply manufactured, is strong and durable and does not require frequent and expensive repairs.

Modifications in the construction and arrangement of the parts may be made without departing from my invention as defined in the appended claims.

I claim:—

1. In an electric pyrometer a thermo-couple having lead wires and a hood encircling the hot end of the thermo-couple, said hood having an open side enabling the thermo-couple to contact directly with the surfaces of heated articles.

2. In an electric pyrometer a thermo-couple having lead wires and a hood encircling the hot end of the thermo-couple, said hood having an open side enabling the thermo-couple to contact directly with the surfaces of the heated articles and an insulating medium within the hollow protecting hood arranged to engage with and hold the hot end of the thermo-couple in position within the protecting hood.

3. In an electric pyrometer a thermo-couple having lead wires and a hood encircling the hot end of the thermo-couple, said hood having an open side enabling the thermo-couple to contact directly with the surfaces of heated articles and a handle secured to the protecting hood by which the hot end of the thermo-couple is manipulated.

4. In an electric pyrometer a thermo-couple having lead wires and a hood encircling the hot end of the thermo-couple, said hood having an open side enabling the thermo-couple to contact directly with the surfaces of heated articles and a hollow handle secured to the protecting hood by which the hot end of the thermo-couple is manipulated, the lead wires from the hot end of the couple extending through said hollow handle.

In testimony whereof, I have hereunto set my hand.

ANDREW F. MITCHELL.

Witnesses:

MICHAEL QUINN,
JULIUS C. HAMROCK.