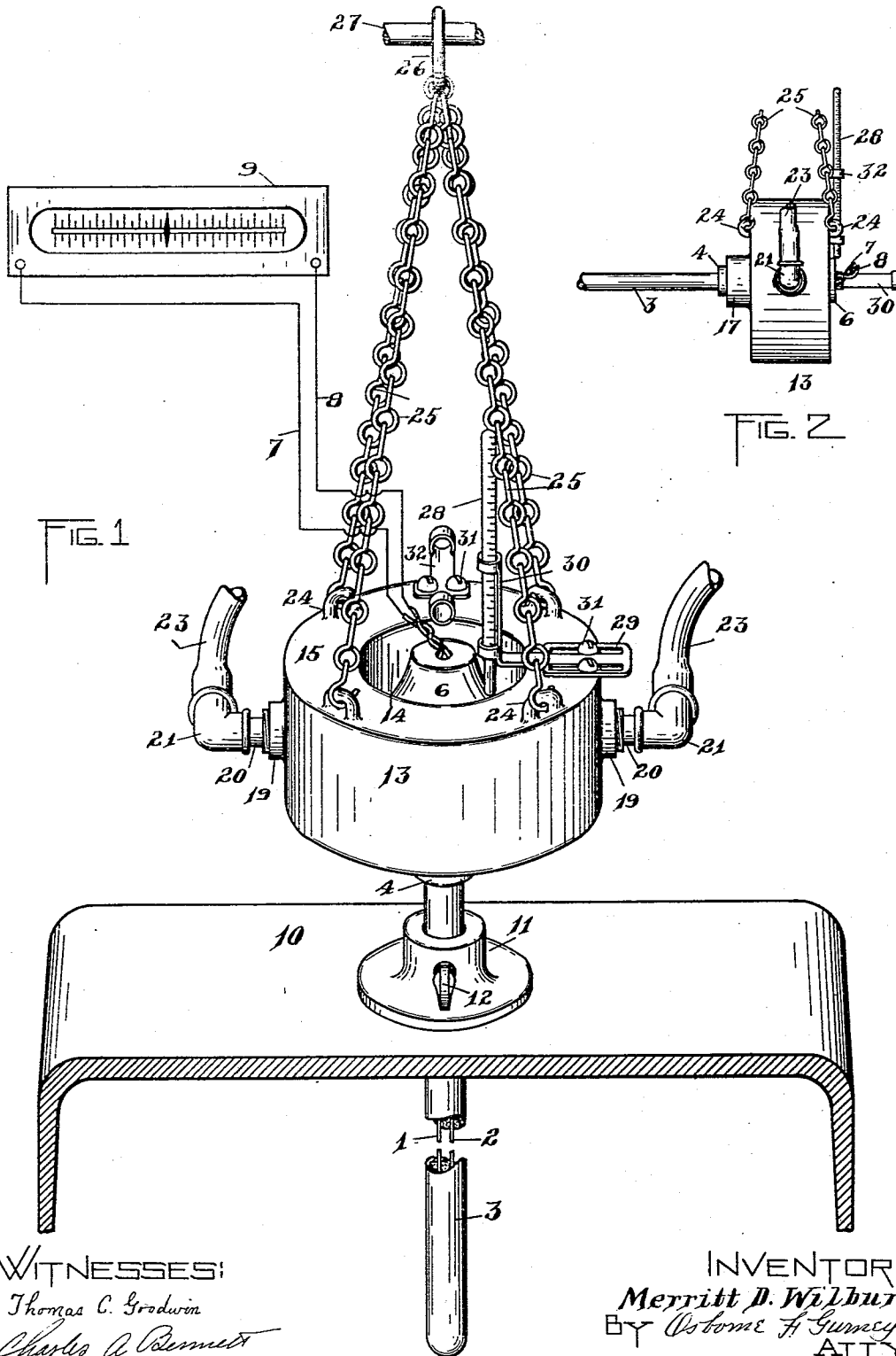


M. D. WILBUR.
COOLING JACKET FOR THERMO COUPLES.
APPLICATION FILED JULY 21, 1913.

1,122,345.

Patented Dec. 29, 1914.

2 SHEETS-SHEET 1.

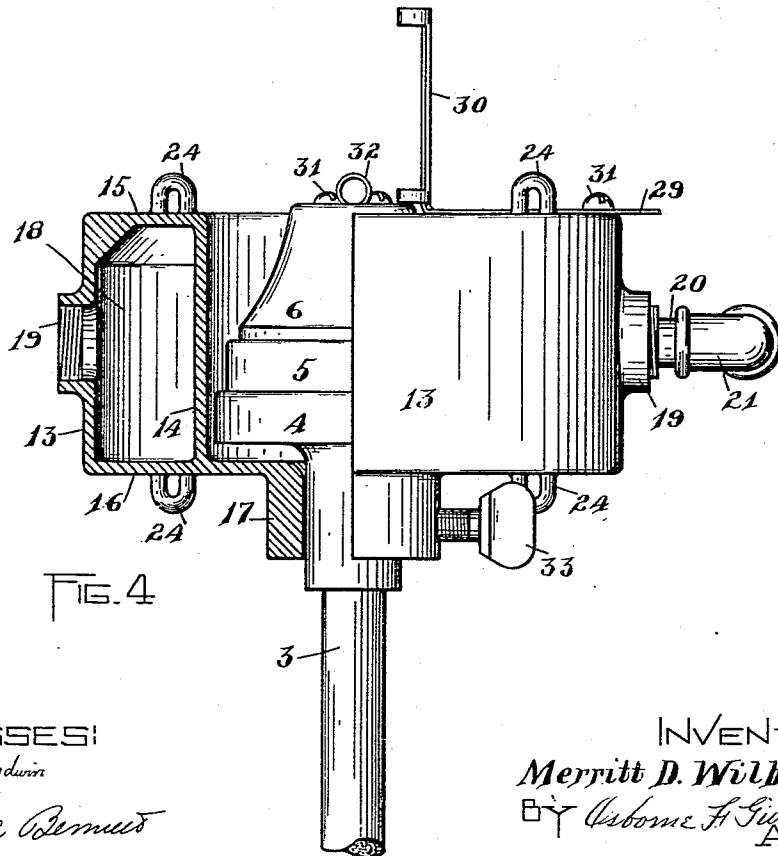
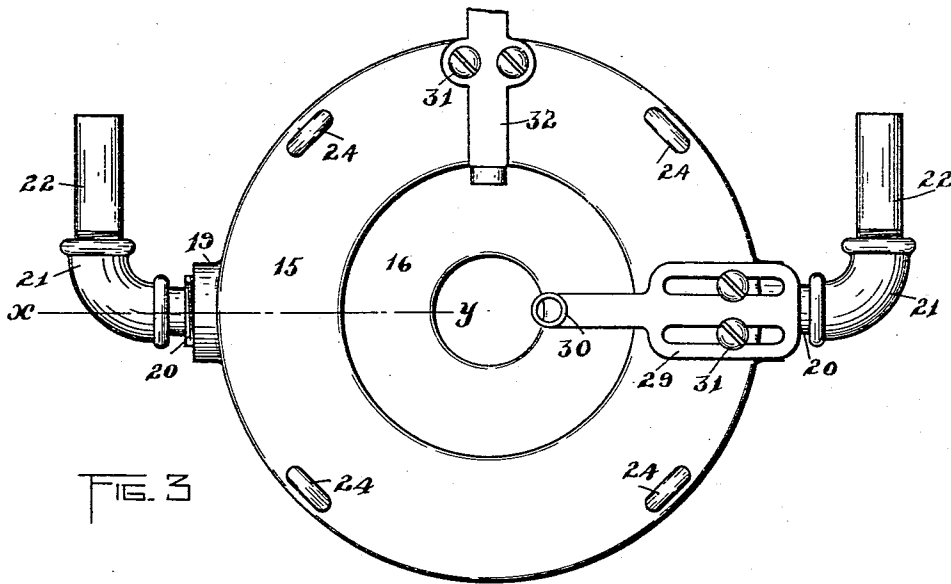


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2 SHEETS—SHEET 2.



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COOLING-JACKET FOR THERMO-COUPLES.

1,122,345.

Specification of Letters Patent.

Patented Dec. 29, 1914.

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To all whom it may concern:

Be it known that I, MERRITT D. WILBUR, a citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented a new and Improved Cooling-Jacket for Thermo-Couples, of which the following is a specification.

This invention relates to thermo-electric couple pyrometers and more especially to means for maintaining that end of the thermo couple at which the pyrometer wires are joined to the line wires, which is termed the cold-junction end, at a predetermined temperature. Pyrometers of this type are used in connection with annealing, hardening and tempering furnaces in which the range of temperature is from 1000 to 3000° F. and to ascertain the exact temperature it is very essential that the cold-junction end of the thermo couple be maintained at a constant and comparatively low temperature, say 80° F. The heat conducted along the metal tube surrounding the pyrometer wires, however, and that radiating from the furnace causes the cold-junction end of the thermo couple to become heated to about 180 or 200°, and this not only renders the pyrometer less sensitive but causes an error of 100° or more in the reading thereof. To overcome this trouble pyrometers have been made, I am aware, with water jackets forming an integral part thereof but these, as a rule, are both costly and impractical and are seldom made use of.

My object, then, in this invention is to provide a device independent of but adapted to be used with any thermo couple to maintain the cold-junction end thereof at a predetermined and comparatively low temperature. I attain this object by providing a cooling jacket such as shown in the accompanying drawings, in which,—

Figure 1 is a perspective view of the device with a thermo couple extending there-through and supported in its proper position relative thereto, and in this figure the furnace and the indicator are shown in diagram. Fig. 2 is a side view of the device, drawn to a smaller scale, and shows how it can be suspended when used in conjunction with a thermo couple extending in a direction at right angles to that shown in Fig. 1. Fig. 3 is a plan view of the cooling jacket, while Fig. 4 is, at the right, a side elevation thereof and, at the left, a sectional

view taken along the line $x-y$ of Fig. 3. The thermo couple is also shown in this figure.

Similar reference characters refer to similar parts throughout the several figures of the drawings.

A thermo couple is shown in Figs. 1, 2 and 4 and comprises,—the usual pyrometer wires, as seen at 1 and 2 in Fig. 1, which are properly insulated; a metal tube 3 inclosing such wires and closed at one end; a head piece 4 having a downwardly extending projection into which the open end of the tube 3 is threaded and porcelain cap members 5 and 6 secured to the top of the head piece 4 and within which the pyrometer wires 1 and 2 are joined to the line wires 7 and 8. In Fig. 1 the line wires 7 and 8 are shown as twisted together and extending out of the cap member 6, then diagrammatically and leading to the indicator 9.

A portion of a furnace wall 10 is shown in Fig. 1 and has an opening therein through which the thermo couple extends. This opening is slightly greater in diameter than the tube 3 and to entirely cover such opening a flanged collar 11, slidable on the tube 3, is provided and rests upon or is secured to the wall of the furnace. This collar 11 is provided with a suitable thumb-screw for adjustably securing the thermo couple so that the hot-junction end thereof will extend a proper distance within the furnace.

The cooling jacket is, preferably, an integral casting having parallel outer and inner side walls 13 and 14, respectively, which are connected at their upper and lower edges, with reference to Figs. 1, 3 and 4, with parallel top and bottom walls 15 and 16, respectively. An annular chamber 18 is thus formed within the four walls mentioned. The bottom wall 16 extends from the inner side wall 14 and has a centrally disposed downwardly extending projection 17 on the under side thereof, and there is a hole extending vertically through this projection and also the bottom wall 16 adapted to receive the projection on the under side of the head piece 4 of the thermo couple. The thermo couple may be supported with the head piece 4 thereof resting upon the flange formed by the inwardly extending bottom wall or, as shown in Fig. 4, may be supported with the head piece slightly above such bottom wall and held by means of the

thumb-screw 33 threaded into the projection 17.

There are two bosses 19 formed on the outer wall 13, diametrically opposite each other, and they are each bored out and threaded to receive a short section of pipe 20 to each of which, in turn, is secured an elbow 21 having a pipe section 22 secured into its other end and over which a suitable tube 23 is secured. One of these tubes 23 leads to a source of fluid supply and the other is the outlet or discharge tube.

There are four lugs or eyes 24 formed on the top wall 15 of the jacket spaced equally apart and located near the outer edge thereof, and there are two of such lugs 24 on the bottom wall 16 located directly opposite two adjacent ones on the top wall. The jacket is suspended by means of chains 25 having hooks at their lower ends for releasably engaging the eye members 24 and these chains are connected at their upper ends to a common ring 26 supported by a member 27.

To be able to tell at all times the temperature of the cold-junction end of the thermo couple, a thermometer 28 is made use of and is supported in the rings formed on the upward extension 30 of the adjustable bracket 29 or by the rings formed on the fixed bracket 32, accordingly as the device is suspended as shown in Fig. 1 or as shown in Fig. 2. The brackets 29 and 32 are secured to the top wall 15 of the jacket by means of screws 31.

The thermo couple may be adjustably supported with the hot-junction end thereof the proper distance in the furnace and held by either the thumb-screw 12 in the flange member 11 or by a similar thumb-screw 33 in the projection 17 on the bottom of the jacket, or it may be supported with the head piece 4 thereof resting on the bottom wall 16 of the jacket. If the thermo couple extends vertically into the furnace, the cooling jacket is suspended as shown in Fig. 1, but if the thermo couple extends horizontally into the furnace the jacket is suspended

as shown in Fig. 2. Water is the cooling medium usually employed although other fluids may be used if desired.

It is believed that the above description of the construction and method of using my cooling jacket is sufficiently clear as to call for no further explanation.

What I claim is:

1. In a device for the purpose described, a jacket, comprising a chamber for receiving a cooling medium, having outer and inner side walls connected by top and bottom walls, suitable outlet and inlet connections to said chamber, means carried by one of said walls for removably supporting a thermo couple with the cold-junction thereof surrounded by said inner wall, a thermometer for registering the temperature of the cold-junction end of the thermo couple, means for supporting said thermometer, means for supporting said jacket, and members carried by said jacket for releasably engaging said last named supporting means.

2. In a device for the purpose described, a jacket, comprising a chamber for receiving a cooling medium, having outer and inner side walls connected by top and bottom walls, suitable outlet and inlet connections to said chamber, a flange having a downward extension with an opening there-through for receiving a thermo couple, means in said extension for adjustably supporting the thermo couple with the cold-junction end thereof surrounded by said inner wall, a thermometer for registering the temperature of the cold-junction end of the thermo couple, means for supporting said thermometer, and flexible means comprising chains adapted to releasably engage members formed on the walls of the jacket and to suspend the jacket at any desired angle.

MERRITT D. WILBUR.

Witnesses:

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