

956,296.

Fig. 1

Fig. 2

Fig. 3

Witnesses  
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# UNITED STATES PATENT OFFICE.

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HYGROMETER FOR REGULATING HUMIDIFYING AND HEATING SYSTEMS.

956,296.

Specification of Letters Patent.

Patented Apr. 26, 1910.

Application filed December 21, 1907. Serial No. 407,521.

*To all whom it may concern:*

Be it known that we, STUART W. CRAMER and WILLIAM B. HODGE, citizens of the United States, residing at Charlotte, in the county of Mecklenburg and State of North Carolina, have invented certain new and useful Improvements in Hygrometers for Regulating Humidifying and Heating Systems; and we 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.

Our invention relates to instruments for indicating and regulating the degree of moisture in the atmosphere in a factory or other building, and in separate rooms thereof.

The invention consists in certain improvements in construction of the device shown in Patent 856,944, bearing date of June 11, 1907, which improvements will be fully disclosed in the following specification and claims.

In the accompanying drawings, which form part of this specification:—Figure 1 represents a front elevation of our improved instrument. Fig. 2 a like view of a modification of the same, and Fig. 3 a diagrammatic view of the electrical connections.

Reference being had to the drawings and the designating characters thereon, the numeral 1 indicates one bulb of a differential thermometer, and 2 the other bulb, the bulbs being connected by stem 3—4, bent in U form and in the bend 5 of which is a liquid conductor 6, consisting of mercury or other suitable material capable of moving up and down the inner legs 7, 8 of the stem, as differences in temperature occur in bulbs 1 and 2. Within each of said inner legs 7, 8 is a fine wire 9 emerging at points 10 and 11, a portion of this conductor always being short circuited by conductor 6. To points 10 and 11 are connected auxiliary resistances 12 and 13, in this particular case joined in the form of Wheatstone bridge. Also connected to the points 10 and 11 are the terminals 14, 15 of current supply wires connected to a battery 15' and to the junction of the two resistance coils 12 and 13 and to the liquid conductor 6 are connected the terminals 16, 17 of a suitable device 18 for indicating electric current. This current indicator is arranged to open and close an

auxiliary electrical circuit, thereby actuating a valve controlling the admission of moisture to the compartment. P and P' represent terminals for connection to this auxiliary circuit, shown diagrammatically in Fig. 3 where 15'' represents an auxiliary source of electrical energy and V the moisture controlling valve.

19 indicates wicking covering the bulb 2 and arranged to be kept moistened by water in a receptacle 20 or bulb 2 can be supplied with moisture by any other well known means.

In Fig. 2, the bend 5 is provided with an auxiliary stem 21 having a chamber 22 containing a liquid conductor 6 capable of changing volume under differences in temperature.

The lengths of free wire between 10 and 6, and 11 and 6, depend upon the difference in temperature between bulbs 1 and 2, and as this difference in temperature changes, the resistance in these two arms will vary. The Wheatstone bridge being balanced at any predetermined difference in temperature, an increase or decrease in this difference will disturb the balance and cause a current to flow through the current indicator 18.

It is obvious that there are other electrical connections which can be employed to accomplish this same result. We therefore do not limit ourselves to the exact details set forth, as this invention has reference to actuating a current indicating device by means of disturbed relation of balanced Wheatstone bridge arms in a differential thermometer.

Having thus fully described our invention, what we claim is—

1. A hygrometer comprising a differential thermometer having a plurality of legs, means for supplying moisture to one of the legs, and means for completing an electric circuit through each leg; in combination with a source of electrical energy, and means for balancing the resistances of said legs.

2. A hygrometer comprising a differential thermometer having a plurality of legs, means for supplying moisture to one of the legs, an electrical conductor in each leg, a fluid conductor connecting each leg, and means for indicating differences in resistances of the exposed portions of said conductors in said legs.

3. A hygrometer comprising a differential thermometer having a plurality of legs, means for supplying moisture to one of the legs, an electrical conductor in each leg, and  
5 a fluid conductor connecting each leg; in combination with a source of electrical energy, and means for indicating differences in resistances of the exposed portions of said conductors in said legs, said indicating

means consisting of an electro-magnetic 10 device.

In testimony whereof we affix our signatures, in presence of two witnesses.

STUART W. CRAMER.  
WILLIAM B. HODGE.

Witnesses:

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