A. MEUCCI.

HYGROMETERS.

No. 183,062. Patented Oct. 10, 1876.

Fig: 1.

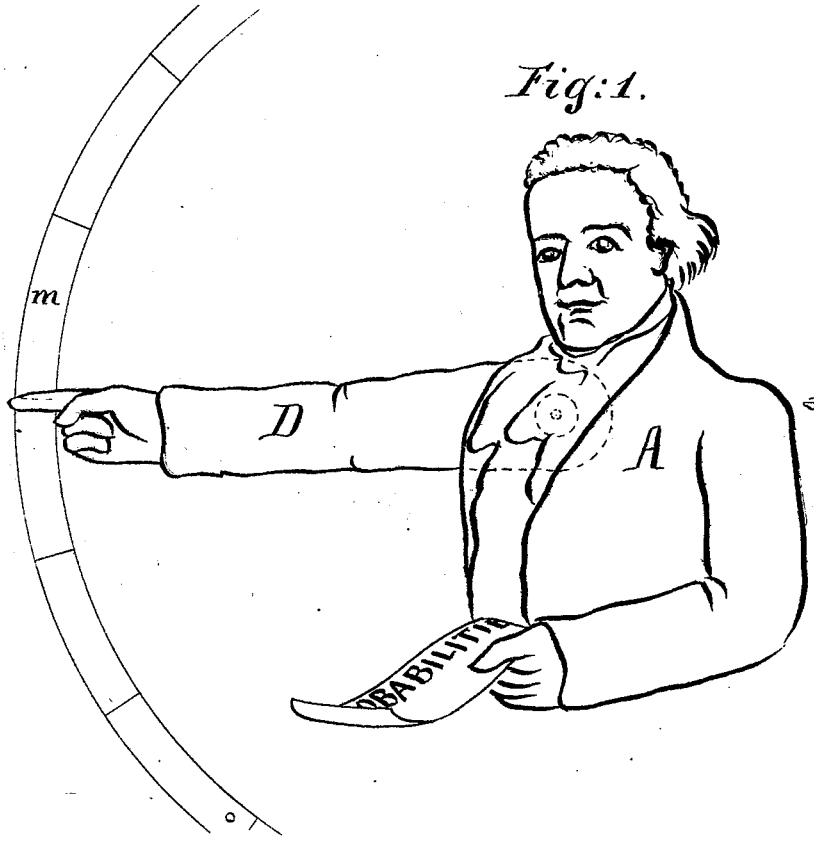


Fig: 3

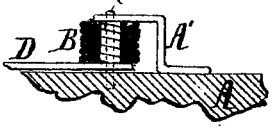
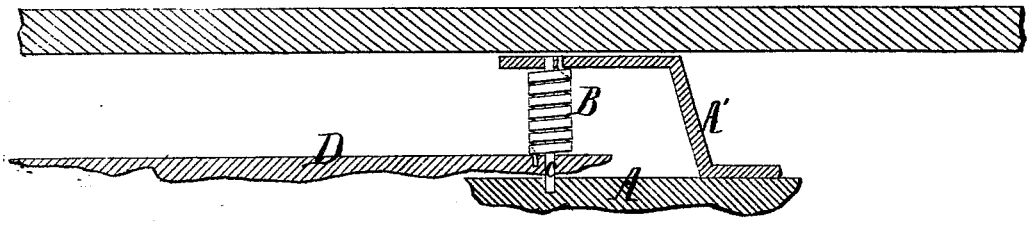


Fig: 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

ANTONIO MEUCCI, OF STAPLETON, NEW YORK, ASSIGNOR TO ESTERRE MEUCCI, OF SAME PLACE.

IMPROVEMENT IN HYGROMETERS.

Specification forming part of Letters Patent No. **183,062**, dated October 10, 1876; application filed December 1, 1875.

To all whom it may concern:

Be it known that I, ANTONIO MEUCCI, of Stapleton, Richmond county, New York, have invented certain new and useful Improvements relating to Hygrometers; and I do hereby declare that the following is a full and exact description thereof.

There are many substances, among which are whalebone in small strips, which, on being exposed to air having different quantities of moisture therein, will twist in one direction or the other as soon as they have time to assume a correspondingly moist or dry condition. This is the principle on which are based a large proportion of the hygrometers in use. But, as heretofore constructed, a very considerable length was required in the instrument in a direction at right angles to the plane of the traverse of the index. This was necessary, because a short piece of whalebone or other material will not give a sufficient amount of twisting.

I have devised means whereby the hand or index may traverse in a vertical plane, easy to be observed by the eye, with or without a dial, and whereby very little depth is required in the instrument to serve efficiently and successfully.

I have discovered that if a whalebone is coiled in a helical coil, that fact does not seriously interfere with its twisting action with the changes of moisture. I have practically applied this discovery in my instrument by employing the sensitive material in the form of a closely-wound coil, steadying the position of the index by a central shaft of small diameter, offering but little resistance by friction. I have discovered that the sensitiveness of this coil may be greatly increased by my improved process or treatment, and in this process very largely consists my invention. At any time, either before, during, or after the process of coiling, I varnish, with any suitable material, that side of the whalebone which forms the outer surface after the coil is completed, leaving the inner surface free. The result is that the outer surface is rendered impervious, and, the atmosphere acting only upon the inside surface, the desirable capacity of the sensitive material is increased, and greater traverse is given to the index in consequence.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a front elevation, and Fig. 2 is a section, of a hygrometer with my improvements. Fig. 3 shows a modification.

Similar letters of reference indicate like parts in all the figures.

A is a fixed support, preferably made in an ornamental form, and decorated with colors to give a pleasing effect. A′ is a rigid arm or brace extending backward therefrom, and forming a firm support both for a piece of coiled whalebone, or analogous material sensitive to hygrometric changes, (indicated by B,) and for a slender shaft, *c*. The spiral piece B is rigidly attached to the arm A′ at one end, and to a lever, D, at the other end, so that, as the material B coils and uncoils with the hygrometric changes, it turns the lever D. The outer surface of this coil B is varnished, or otherwise rendered impervious, and the atmosphere acts only upon the inner surface.

The coil B may be formed by steaming a strip of whalebone, rawhide, or other strong material having the required hygrometric properties, and bending it around something of a little smaller size than the intended coil. After holding it thus coiled until cold and dry it will uncoil but little on being liberated.

It may be preferable to apply the varnish after the coil becomes dry; but the same may be applied at any time during the process without departing from the principle of my invention.

The form in which I place my sensitive material B is very convenient for artificially increasing the sensitiveness by oiling or varnishing the exterior of the helix, and leaving the interior undefended. Such treatment may add to the sensitiveness of a given length of whalebone, or other material employed; but I believe that a sufficient length to produce all the effect desired can usually be obtained by means of the helical form without such additional treatment. I propose in some cases, where a

great length is required, where still less depth is afforded, to coil the material in the form of a volute instead of a helix. When either form of the coil is used I consider that the effect is greatly improved by the employment of the slender axis *c*.

Many modifications and variations may be made in the details without sacrificing the benefits of the invention. Thus, the simplicity and economy of construction will not be entirely sacrificed if, instead of holding the fixed end of the coil B directly to the fixed parts, I connect it by an adjustable turning piece, and thus obtain the means of adjusting the device if it shall ever be found to indicate habitually a more dry or more damp condition than actually obtains. Another mode of attaining that end is to provide an adjustable scale in lieu of the fixed scale *m* on the background M, along which the end of the lever D traverses.

I prefer for general use to give all the parts an ornamental appearance, imitating the person of a weather-prophet, or some other significant device.

I am experimenting on the selection and combination of materials to form what I have called the "coiled rod B." I do not wish to confine myself to any particular material. I propose in practice to not only use different materials, and sometimes with the outer surface varnished, oiled, or otherwise differently prepared from the inner surface, but to combine two different pieces of material, one inside the other, like brass inside of iron, so that any difference in their shrinkage and expansion shall be made effective.

I am aware that coils of different materials have before been used in hygrometers for a similar purpose. I am also aware that one surface of a semicircular piece of wood has been rendered impervious to increase the sensitiveness of the same, and such, therefore, I do not claim; but

What I do claim is—

The hygrometer herein described, composed of the coil B, having one of its surfaces varnished along its entire length, the index D, shaft *c*, and frame A′, as and for the purposes specified.

In testimony whereof I have hereunto set my hand this 27th day of November, 1875, in the presence of two subscribing witnesses.

ANTONIO MEUCCI.

Witnesses:

WM. M. WERMERSKIRCH,

LEONARD D. CUNNINGHAM.