J. H. ROSS.

Steam Heater.

No. 12,071. Patented Dec. 12, 1854.

Fig. 2.

Fig. 3.

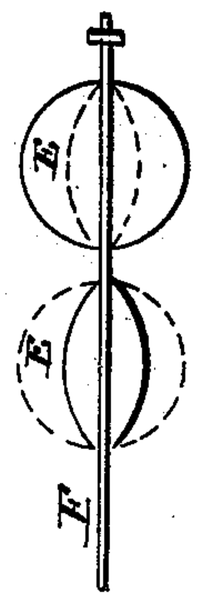

Fig. 1.

UNITED STATES PATENT OFFICE.

JOEL H. ROSS, OF NEW YORK, N. Y.

IMPROVED HYGROMETRIC REGULATOR FOR HOT-WATER APPARATUS.

Specification forming part of Letters Patent No. **12,071**, dated December 12, 1854.

To all whom it may concern:

Be it known that I, JOEL H. ROSS, of the city, county, and State of New York, have invented a new and useful machine for producing a healthful standard of humidity in the atmosphere of dwelling-houses during cold weather wherever artificial heat is required; and I do hereby declare that the following is a full and exact description.

The nature of my invention consists in providing a self-adjusting instrument or machine (to be connected with a boiler affording a sufficient quantity of vapor) with valves to be opened and shut by the hygrometric changes of the air itself, so as to provide a healthful and uniform humidity within, though there be little or no moisture without, and the quantity varying at every hour of the day.

To enable others to make and use my invention, I will proceed to describe its construction and operation.

I construct of any desired material a small chamber A, (see Figure 1 of drawings,) into which steam is conducted from any ordinary boiler through pipe B, and connected with the said chamber are two other pipes of any required size, one of which pipes C may supply the demand with vapor, while the other pipe D is for the escape of surplus moisture. In these pipes C and D are two valves E E, (see Figs. 1 and 3,) like an ordinary stove-pipe damper, (though the form is not material,) situated near the chamber A, and in relation to each other are placed at an angle of about forty-five degrees (more or less) upon a shaft F, which passes through pipes C and D, and so revolve that when either opens the other shuts, and should be of such size as to give the required amount of vapor with slight motion. To move these valves, I attach in any convenient way to the external end of the shaft F a horizontal lever or scale-beam G (see Fig. 2) within, say, six inches of one end, while tne remaining portion is three or four feet in length, so that a very slight change of weight at the extremity of the long portion of the beam will easily move it and with it the said valves. To the long end of this lever G, I attach some hygrometric substance, as linen canvas H, sponge, lint, flax, blotting-paper, or any other material that will readily absorb and give off moisture as the air becomes moist or dry. The cloth may be stretched upon any frame, as hoop I, fastened to the extremity of said lever in any convenient manner, and as the canvas becomes heavier by absorption and lighter by evaporation the lever descends and ascends, carrying with it the valves, as circumstances demand. The canvas or other material thus used is thought to remain more permanently qualified to perform the function above spoken of by being previously immersed in a weak solution of some salt, as chloride of sodium or chloride of calcium, &c. The piece of canvas may vary in size, while it is apparent that the larger its surface the more prompt its action. I have pretty readily, however, produced all the motions, as above described, with a naked pine lever three feet long and less than half an inch square. The short end of the lever it will be understood must be heavy enough to counterpoise the long arm and to aid in nicely balancing it at any time. I place in the short end of said lever (though either end will answer) a heavy-headed screw J, by turning which the object is easily gained, and by the screw the machine may be made to introduce more or less moisture, as may be required. To the said lever G or shaft F, I attach a hand K, and over it at the proper places the words "Dry," "Medium," "Moist" indicate the hygrometric state of the atmosphere to a sufficient extent. I would here remark, incidentally, that on this principle may be constructed a hygrometer to show the drying power of the atmosphere at a glance, and which may also be made to keep its own record for a day, week, or year, at least the maximum and minimum; but to return to the further description of my machine either end of the lever G may be substituted for the hand K, herein described. Now, if it be desirable to have the "dew-point" within 20° or 30° of the temperature (which would be the drying power of the air) the screw must be turned until the hand remains pointing at "Medium," after having been exposed to such an atmosphere for half an hour. Moreover, a scale of degrees with a sliding gage may be placed in connection with the said screw to obviate the necessity of resorting to a hygrometric test for any future modification. The

machine being thus adapted to a given drying power, if from any cause, either without or within, the air becomes deficient in moisture, the hygrometric extremity of the lever becomes so light that it rises and opens still wider the supply-valve in pipe C and equally closes the valve of pipe D, and vice versa. To prevent an unnecessary waste of steam, the supply-valve may be more nearly open and the escape-valve more nearly shut than is exhibited in the accompanying model, while the hand points at "Medium."

I now wish it to be understood that in constructing a self-adjusting hygrometric regulator I do not confine myself to the above mode of gaining the desideratum herein set forth, for the machine may be made to act under the influence of a change of volume as well as of weight of hygrometric substances, such as catgut, horse hair, whalebone, &c. Moreover, a threefold influence (should it ever become necessary) may be brought to bear upon the self-regulating principle—namely, change of weight, change of volume, and modification of length of lever—either by the contraction and expansion of itself, or of some substance attached to it, so as to move a sliding portion of said lever.

What I claim as my invention, and desire to secure by Letters Patent, is—

The regulating of the hygrometric condition of the air in apartments by opening and closing the valves E E in the pipes C D by the balance-lever G, its action being self-adjusting through the excess or diminution of vapor imparted to the equipoise H irrespective of the material of which said equipoise is constructed.

New York, November 25, 1854.

JOEL H. ROSS.

Witnesses:
D. T. STANIFORD,
JOS. REYNOLDS.