G. B. WIGGIN.

THERMOMETERS.

No. 183,523. Patented Oct. 24, 1876.

Fig. 1.

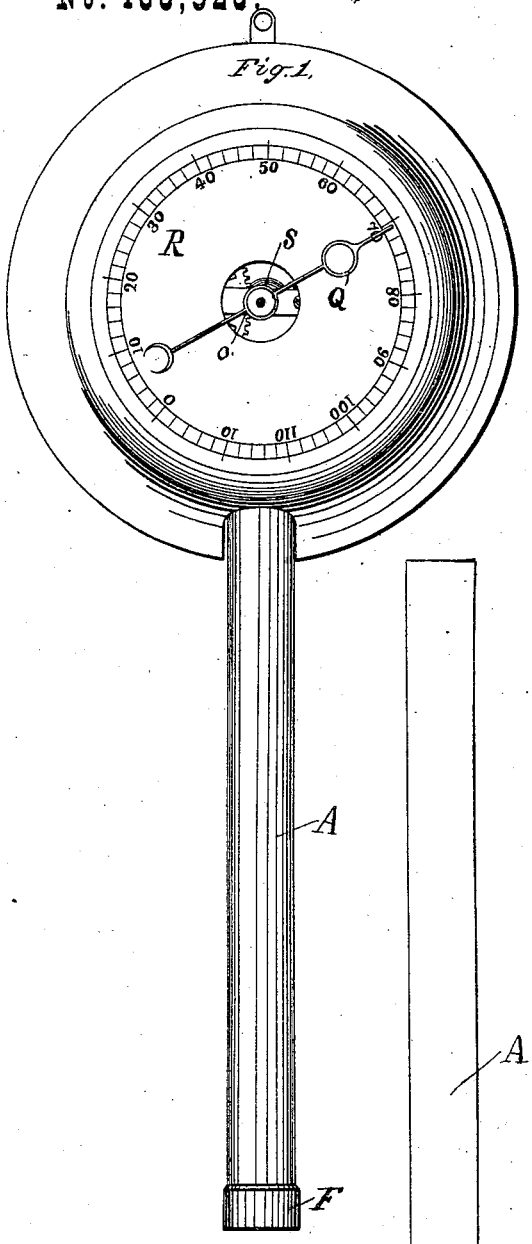

Fig. 2.

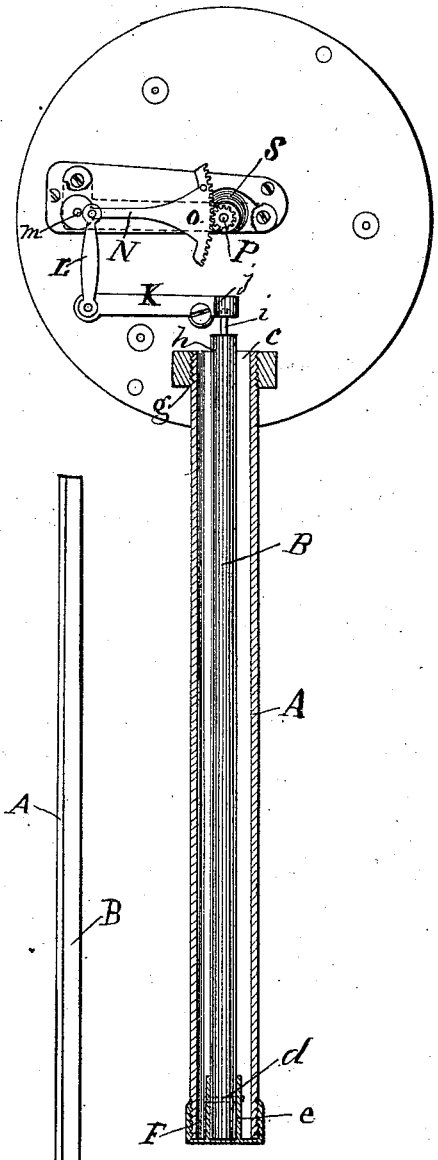

Fig. 3.

Fig. 4.

Witnesses.

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GEORGE B. WIGGIN, OF SOUTH NEW MARKET, NEW HAMPSHIRE.

IMPROVEMENT IN THERMOMETERS.

Specification forming part of Letters Patent No. **183,523**, dated October 24, 1876; application filed April 12, 1876.

To all whom it may concern:

Be it known that I, GEORGE B. WIGGIN, of South New Market, in the county of Rockingham and State of New Hampshire, have invented a new and useful Improvement in Thermo-Motors and Thermometers, and which is set forth in the following specification, reference being had to the accompanying drawings.

The object of my invention is to provide a combination and arrangement of materials, one highly sensitive to expansion by heat, and the other very little so, the combination, as hereinafter described, being applicable and available in many branches of the arts and sciences where the principle of expansion or of differential expansion may be used to impart motion to bodies, or to indicate varying conditions due to heat, and also applicable to actuate mechanism of such character that the apparatus shall serve as a thermometer, dispensing with mercury or other liquid in its construction.

In the drawings, I have illustrated my invention in Figures 1 and 2 as applied to mechanism, whereby it operates devices to indicate the thermal condition or character of the atmosphere. Figs. 3 and 4 are plan and edge views of the thermo-motor made flat instead of tubular. Fig. 1 is a front view of such a thermometer, and Fig. 2 a similar view with the tube in section, and the casing and dial removed to show the manner of operating mechanism through the instrumentality of an expanding body or medium acting as a thermo-motor.

A is a tube or piece of hard rubber, which is peculiarly sensitive to heat, readily responding even to the warmth of the hand when grasping it. This expansion, or its correspondent contraction, however, would be imperceptible to the touch or vision in a short tube, and therefore to bring it palpably to the senses I make use of suitable mechanical appliances whereby the slight increase or decrease in the length of the tube shall be represented to a multiplied extent, and to any degree desired. B is a wooden strip or rod, wood being selected because of its very slight capacity for longitudinal expansion or contraction. This rod extends through said tube at its open end, *c*, as shown, and at its other end it is secured by a pin, *d*, or otherwise, in a socket, *e*, of a cap, F, which is screwed or removably attached to the outer end of the hard-rubber tube. The wooden piece should be of lesser size and diameter than the bore of the hard-rubber tube, so that it shall preferably be out of contact with such tube, and offer no obstruction to its free longitudinal expansion.

The tube A is screwed or rigidly secured into the dial frame or box, as shown at *g*, and the end *h* of the rod has a terminal tip or pin, *i*, which may be of metal or other substance, entering a cavity in the short arm *j* of lever K, the long arm of which connects with a link, L. The other end of this link L is pivoted near the fulcrum *m* of the lever N, whose long arm is provided with a segmental rack, *o*, which engages with the teeth of a pinion, P, upon whose shaft is affixed the hand or pointer Q, which indicates upon the dial-plate R the degree of heat or the relative extent of the expansion. A coiled or other spring, S, serves to keep the lever K in contact with pin *i* of the rod B, especially during the contraction of the tube A. The scale on the dial, when used for a thermometer, is, of course, graduated to correspond with that of a Fahrenheit, centigrade, or other known scale, but arranged in a circular form.

The operation will now be apparent. As the heat expands the tube, its length relatively to the rod is increased, but as the tube and rod are connected at one end this difference becomes available and operative at the other end, the spring turning the pinion-shaft and pointer just to an extent proportionate to the expansion. Upon a reduction of temperature the wooden rod pushes the lever K, actuates the pointer in the reverse direction, and rewinds the spring to the extent proportionate to the reduction of temperature.

In my motor I purposely avoid the use of two different metals for expansion purposes, as they are not reliable or accurate; nor will metal of any kind, not even steel, answer well with the rubber, because all metal will contract and expand long after the rubber, because less sensitive, and slower to respond to the action of heat and cold, and therefore the

instrument would not indicate correctly, and would keep the gage wrong; but with the wood or glass, metal may be used.

It will be evident that the rod may be connected with other devices than an index or pointer, and may serve to actuate mechanism as well as to give the measure of heat—as, for instance, to open or close the ventilators of a car or dwelling when the heat of the same exceeds a proper or predetermined degree, to give the gage of heated liquids to any degree which would not be high enough to damage or soften the rubber, &c. The rubber and wooden rod may also be employed as a deep-sea thermometer, the metallic parts of the mechanism being gold-coated or otherwise, to prevent corrosion, and a stop-hand being provided on the dial.

My invention is also applicable for opening and closing hot-air registers for operating the valves in steam or hot-water radiators, for any cut-off or graduating purpose in buildings, cars, or rooms heated by steam; for graduating the air-slide in coal or wood stoves, and in general, wherever prompt positive action is demanded at any predetermined degree of temperature less than that which would damage the hard rubber or impair its efficiency.

The rod B may be made of glass instead of wood, and produce equally good results in conjunction with the hard-rubber tube; but I prefer wood, as glass is liable to get broken in transportation. The hard rubber, however, I use in either case, not only because of its extreme sensitiveness, but also because of its peculiar uniformity of action under heat and cold.

The hard rubber, as above intimated, need not necesssarily be tubular, as practically the same results are attainable by uniting at one end flat pieces of such rubber and wood, of which an illustration is given in Figs. 3 and 4.

I am aware that in thermostats bars of rubber have been used, and that rubber has been used with metal, and that strips of metal have been riveted or fastened together at both ends or throughout their lengths. These, therefore, I do not claim; but

I claim—

1. The described combination, with a hard-rubber strip or tube, of a wooden rod, the two being firmly connected at one end only, and the rod being elsewhere free of the rubber, and serving to communicate motion, derived from the expansion or contraction of the rubber, directly to the mechanism to be operated.

2. In combination with the hard rubber and the wooden rod, the described system of levers, the rack, pinion-shaft, and pinion, spring indicating hand or pointer, and dial, substantially as and for the purpose set forth.

GEORGE B. WIGGIN.

Witnesses:
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