

(No Model.)

A. MAILLÉ.
COMPENSATING PENDULUM.

No. 315,527.

Patented Apr. 14, 1885.

Fig. 1.

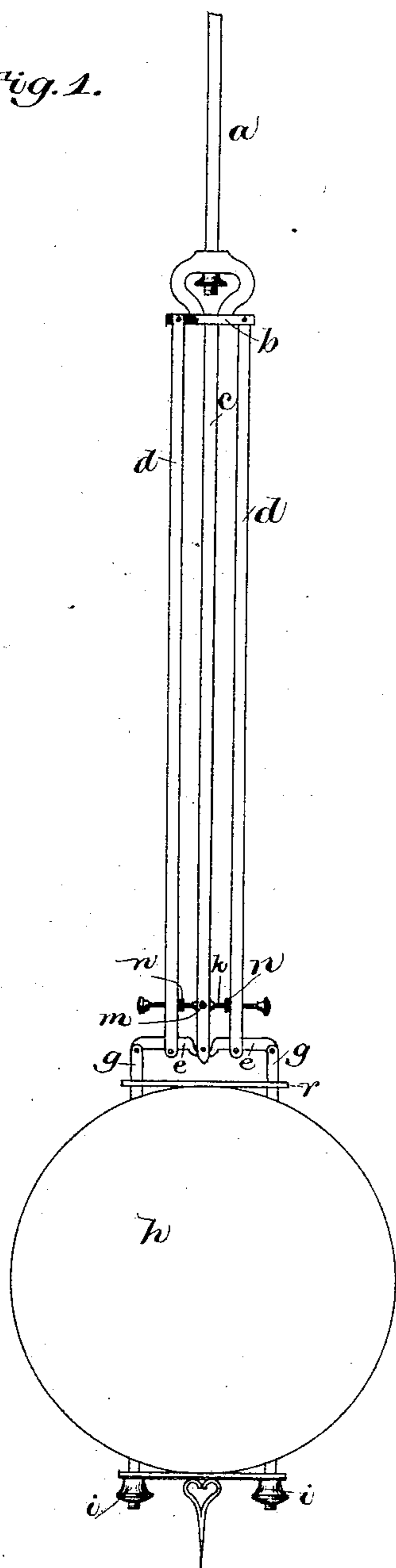


Fig. 2.

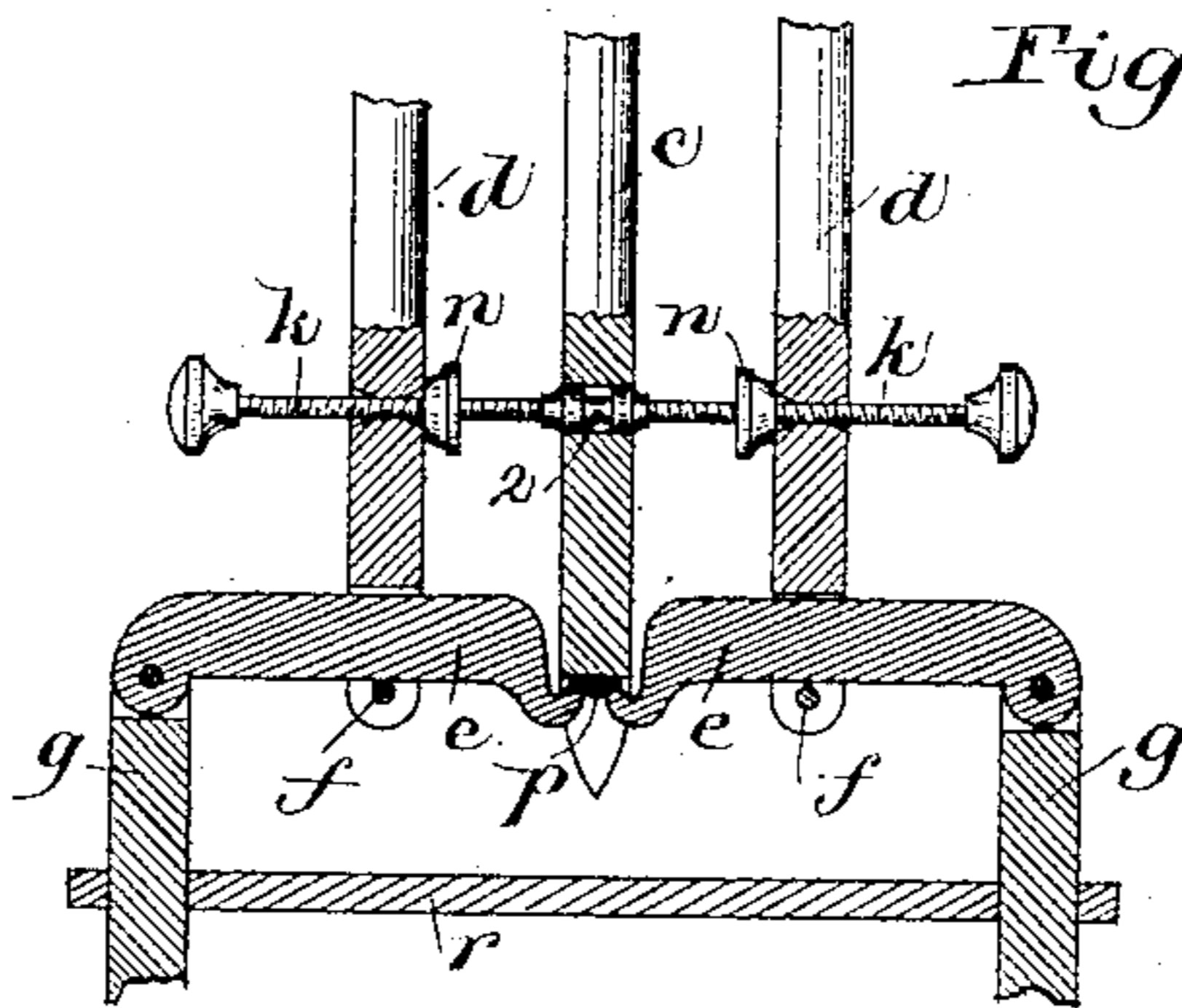
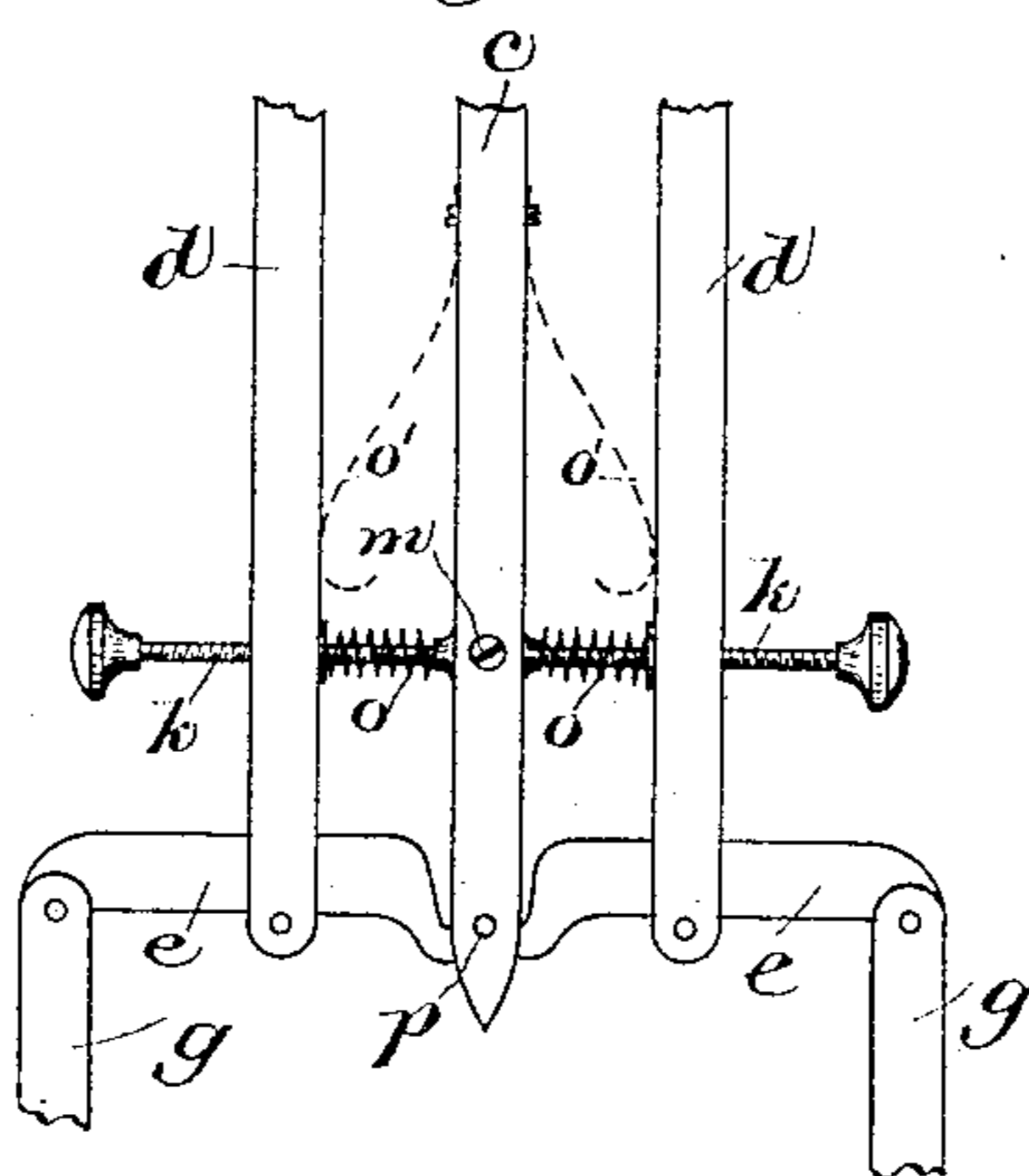


Fig. 3.



Fig. 4.



Witnesses
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UNITED STATES PATENT OFFICE.

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COMPENSATING PENDULUM.

SPECIFICATION forming part of Letters Patent No. 315,527, dated April 14, 1885.

Application filed July 5, 1884. (No model.)

To all whom it may concern:

Be it known that I, AIMÉ MAILLÉ, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Compensating Pendulums, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention, relating to a compensating pendulum, has for its object to provide means for readily adjusting the relative effect of the expanding bars so as to produce exact compensation for changes in temperature. The pendulum-support is composed of bars having different rates of expansion operating in connection with levers to maintain the pendulum bob or weight at a uniform distance from its point of support during the various changes in length of said bars. The adjusting device operates to vary the relative lengths of the lever-arms until the bars, acting upon the said levers, produce the desired result of exact compensation for changes in temperature.

Figure 1 is a front elevation of a pendulum embodying this invention; Fig. 2, a vertical sectional detail of the weight-supporting levers, the portions of the expanding bars acting thereon, and the adjusting device for varying the lever-arms; Fig. 3, a horizontal sectional detail, and Fig. 4 a modification to be described.

The upper portion, *a*, of the pendulum-supporting rod may be sustained in any usual manner, and is provided at its lower end with a cross bar or yoke, *b*, to which the upper ends of the compensating bars *c d* are attached, the said bars being in this instance three in number, and the central one composed of material having a higher rate of expansion than the side bars, *d*, the central one being, for example, of brass, and the side bars steel. The lower end of the central bar, *c*, forms a support or abutment for one end of the weight-sustaining levers *e*, which rest at an intermediate point upon pins *f*, connected with the lower ends of the bars *d*. The outer ends of the levers *e* are connected with rods *g*, which support the weight or pendulum-bob *h*, (see Fig. 1,) the distance of which from the stationary point of support at the upper end of the rod *a* may be adjusted by nuts *i*, or in any other usual manner.

It will be understood that if the three bars *c d* expanded equally the weight *h* would be lowered, or its distance from the point of support increased; but since the central bar, *c*, expands more than the side bars, *d*, it will in expanding depress the inner ends of the levers *e* more than their intermediate support, *f*, thus raising their outer ends with relation to the said supporting-points *f*, and if the bar *c* acts with the proper leverage the amount that the outer ends of the levers are raised may be sufficient to compensate for the bodily depression of the said levers or the increased length of the pendulum-supporting bars.

As the rate of expansion will vary in different bars, it is necessary to provide means for varying the relative effect of the bars *c* and *d* upon the levers *e*, so as to insure exact compensation, and this is effected by the adjusting device *k*, consisting of a screw passing transversely through the three bars near their lower ends, the central portion of the said screw in the bar *c* being provided with collars, or having a groove, 2, engaged by a stud or projection, *m*, (see Fig. 3,) permitting it to rotate without longitudinal movement with relation to the said central bar.

The threads of the screw at either side of the central bar are of opposite inclination, but of equal pitch, and engage threaded openings in the side bars, *d*, so that by rotating the screw in one or the other direction the bars *d* will be caused to approach or to recede from the central bar, *c*, as may be desired, thus moving the pins *f* along the levers *e*, and varying the relative lengths of the lever-arms until the exact compensation is attained.

If, for instance, it were found that the compensation was not sufficient, or, in other words, that the weight *h* is lowered as the temperature is increased, the screw *k* should be rotated in the direction to cause the bars *d* to approach the bar *c*, so that the depression of the lower end of the latter will cause an increased upward movement at the outer end of the levers and of the weight *h* suspended therefrom.

In order to prevent lost motion at the screw-thread, nuts *n* may be employed, as shown in Figs. 1 and 2, the said nuts being tightened after the adjustment is effected; or springs, such as shown at *o*, or in dotted lines at *o'*,

Fig. 4, may be employed to take up or prevent looseness between the male and female threads.

A pin, *p*, at the lower end of the bar *c* serves to prevent lateral movement of the levers thereon, and a cross bar or yoke, *r*, engaging the suspending-bars *g*, prevents the said bars and levers from being separated when the parts *f* are moved outward on the latter.

I claim—

10 1. In a compensating pendulum, the combination, with the supporting-bars having different rates of expansion, of the weight-sustaining levers and adjusting device operating upon the said bars, whereby the lever-
15 arms are adjusted simultaneously, substantially as described.

2. The central and side bars having different rates of expansion, combined with the weight-sustaining levers, and the adjusting-
20 screw passing through the three bars, having oppositely-inclined threads engaging the side

bars, and having a rotary without longitudinal movement in the central bar, substantially as described.

3. The central and side bars having different rates of expansion, combined with the weight-sustaining levers, adjusting-screw passing transversely through the lower ends of the bars, as described, and device for taking up the lost motion at the screw-threads, substantially
25 as and for the purpose described. 30

4. In a compensating pendulum, the combination of the central and side bars with the levers *e*, pins *p* and *f*, rods *g*, yoke *r*, and weight or pendulum-bob, substantially as described. 35

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

AIMÉ MAILLÉ.

Witnesses:

JOS. P. LIVERMORE,
W. H. SIGSTON.