

(No Model.)

D. G. COOPER.
OVEN THERMOMETER.

No. 360,950.

Patented Apr. 12, 1887.

Fig. 1.

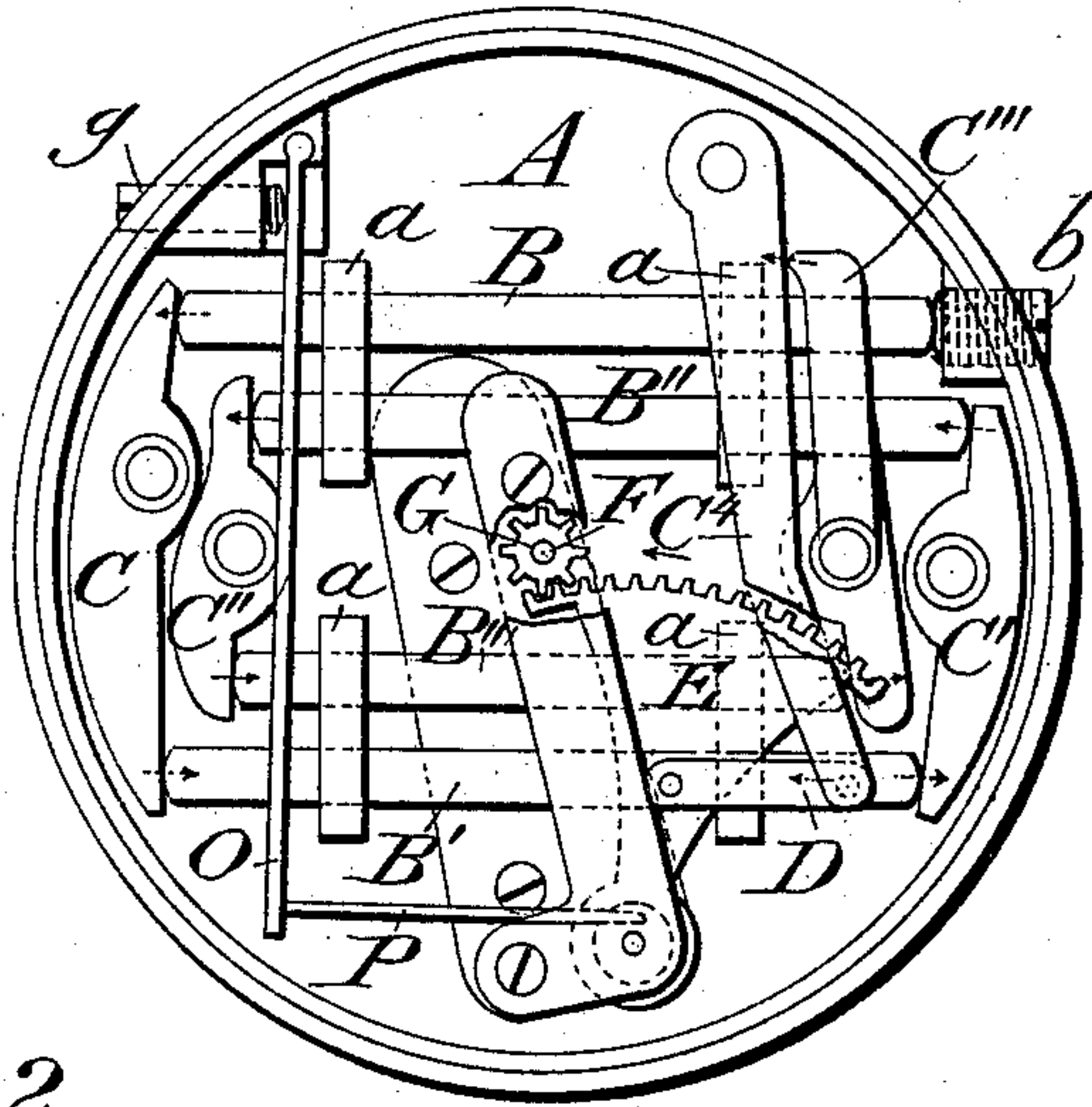


Fig. 2.

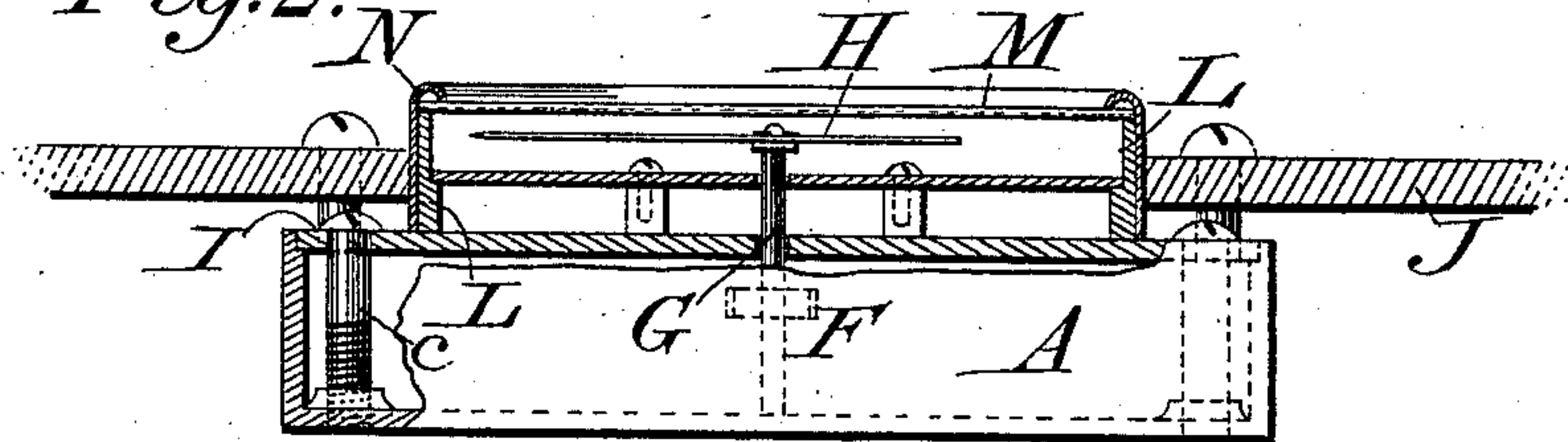


Fig. 3.

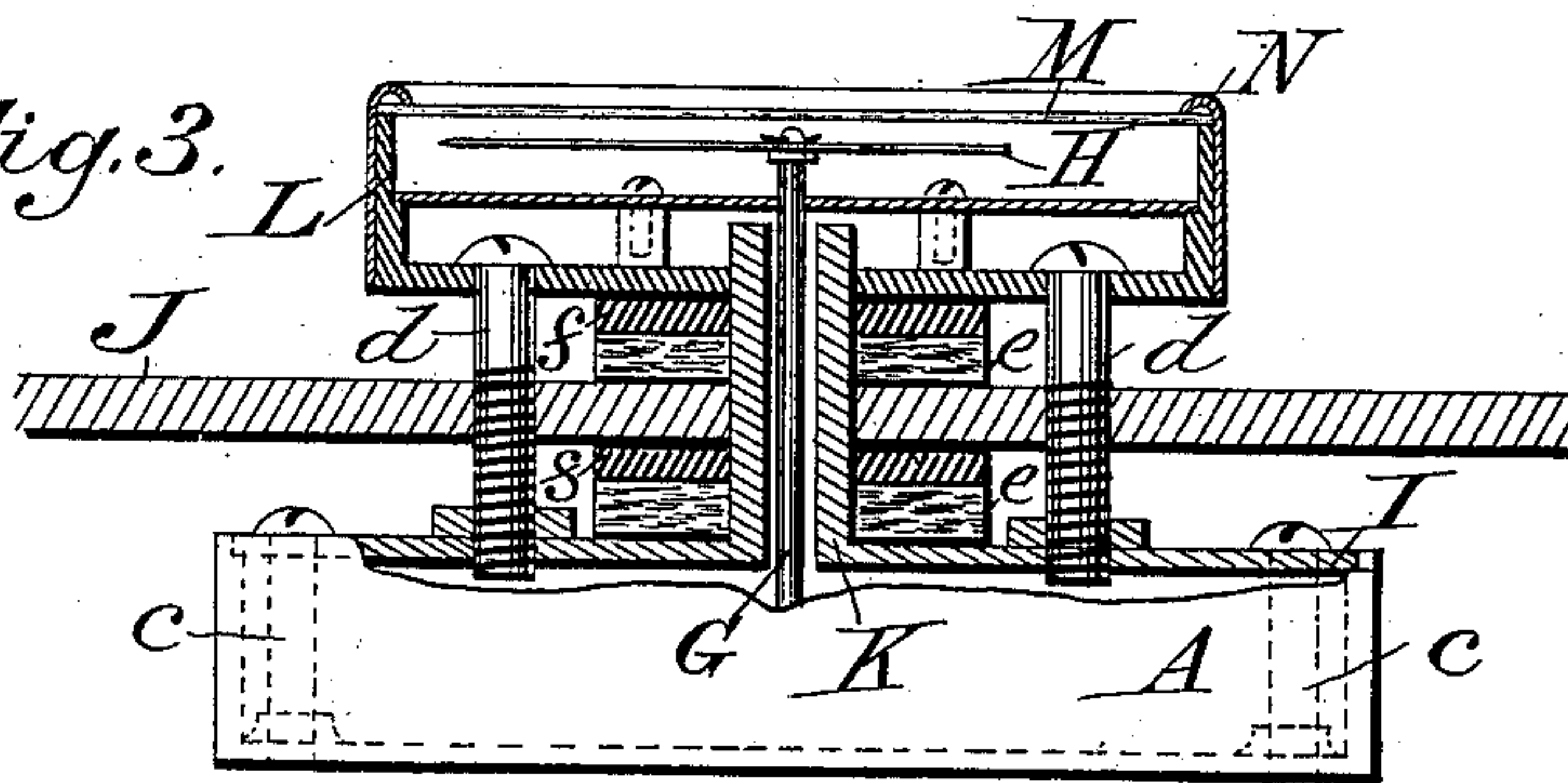
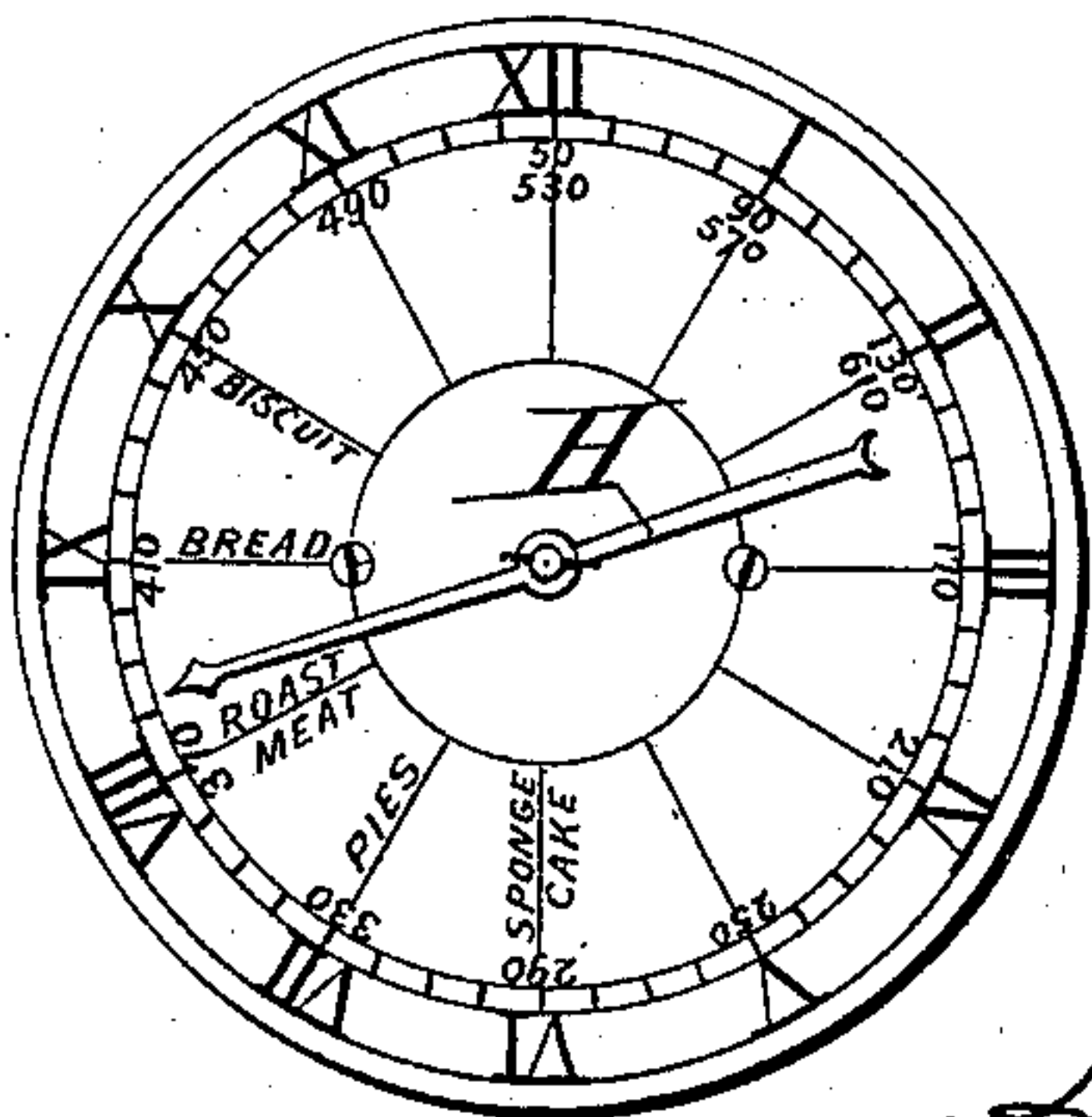


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

DAVID G. COOPER, OF DOVER, NEW HAMPSHIRE.

OVEN-THERMOMETER.

SPECIFICATION forming part of Letters Patent No. 360,950, dated April 12, 1887.

Application filed August 12, 1886. Serial No. 210,731. (No model.)

To all whom it may concern:

Be it known that I, DAVID G. COOPER, a citizen of the United States, residing at Dover, in the county of Strafford and State of New Hampshire, have invented certain new and useful Improvements in Oven-Thermometers; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to devices for indicating and measuring the heat of an oven, kiln, or similar heating surface or chamber, the object being to provide a compact and convenient device that may be readily applied to the door or other part of a stove, a range, oven, &c., and to those heaters that are already in use as well as those to be hereinafter manufactured.

In the annexed drawings, illustrating my invention, Figure 1 is a plan view of my improved pyrometer mechanism. Fig. 2 is a side view of the pyrometer-casing in position, with the dial-case and a portion of the stove and oven in section. Fig. 3 is a similar view of the same parts differently arranged. Fig. 4 is a face view of the dial and index-finger.

Like letters of reference designate like parts in all the figures.

A represents the thermometer-casing, made, preferably, in the circular form shown; but it may, obviously, if so desired, be constructed in any other convenient shape and size. Within the casing A, which is preferably made of cast-iron, are lugs *a a*, secured to or cast integral with the case, which serve as guides for the expansible metallic bars *B B' B'' B'''*, that are generally made of brass or some metal that readily expands with any increase in temperature, but in a different ratio from the expansion of the casing. Arranged at right angles with the expansible bars *B B' B'' B'''* are pivoted the multiplying-levers *C, C', C'', and C'*. The lever *C'* is pivoted to the end of a connecting link or rod, *D*, the opposite end of which is attached to the segment-gear *E*, that meshes with a pinion, *F*, on the shaft *G*, which carries the index finger or pointer *H*.

It will thus be seen how efficient will be the operation of this compact series of bars and levers in actuating the dial-finger when heat causes an expansion or lengthening of the bars, for the said bars and levers are combined and arranged within the casing *A* in a manner designed to accomplish the most successful results. The bar *B* bears endwise against one end of the lever *C*, which is at right angles thereto, and the opposite end of the lever *C* abuts against the bar *B'*. The other end of bar *B'* touches and acts upon the pivoted lever *C'*, whose other extremity is in contact with the expansion-bar *B''*, located parallel to and between bars *B* and *B'*. The lever *C''* is pivoted alongside of the lever *C*, and its ends are respectively in contact with the bars *B''* and *B'''*. The bar *B'''* presses against the end of the lever *C'''*, the opposite end of which lever is formed with a lug or equivalent projecting knob, so that it may readily bear against the long lever *C'*, pivoted at one end to the casing, as shown, and at the other to the connecting-link *D*, which is attached to the pivoted segment *E*, and will move the latter and thus rotate the pinion *F*, and thereby change the position of the index-finger. The expansion of the bars by this train of devices therefore accomplishes the result of moving the index-finger and of indicating upon the dial the degree of heat attained by the oven with which the pyrometer is used. Through the casing *A* is inserted an adjusting-screw, *b*, the inner end of which bears against the end of the expansible bar *B*. By turning this screw the series of bars and multiplying-levers, &c., are moved sufficiently to adjust the index-finger *H* as may be required.

I represents the cover of the thermometer-casing *A*. This cover is secured to the casing by the screws *c*, or other equivalent means. The oven-door to which the pyrometer is attached is designated *J*. The mode of attachment to said door will differ with different heating devices. One plan is shown in Fig. 2 and another in Fig. 3. The shaft *G*, that carries the pinion *F* and index-finger *H*, may be of any required length, and is preferably inclosed in a tube, *K*, which is cast as a part of or is secured to the cover *I*, and passed through an opening in the door *J*, or else said shaft may be passed directly through an opening in cover *I*,

as shown in Fig. 2, the one plan or the other being used, according as the one or the other mode of attachment of the pyrometer is adopted. The tube or projection K, and also the shaft G, may be cut off at or extended to any desirable length, which will thus adapt the device for use with old heating arrangements.

In Fig. 2 the cover I forms the bottom of the dial-case, the sides thereof being lettered L, which sides are rabbeted, as shown, for the purpose of upholding the dial-face, which may be graduated similar to a clock-dial, and be provided with marks indicating degrees of heat and the temperature at which various articles of food should be cooked. A transparent cover, M, is attached over the dial-face and index-finger by means of a metallic rim or band, N, as shown in Figs. 2 and 3.

In Fig. 2 the casing A is properly secured to the door by means of screws or other means, and enough of the door is cut away to receive the dial-case in the opening thus afforded.

In Fig. 3 the door is only pierced for the reception of the spindle-tube K and the long attaching-screws *d*, that pass between the dial-case and pyrometer-mechanism casing, the door remaining otherwise intact. In the interspaces between the door and the two casings are located layers of asbestos *e e*, which serve the double purpose of preventing heat from passing to the dial-case and also of preventing the securing-screws *d d* from being loosened, the elasticity of the asbestos being a safeguard in this respect. In addition to the asbestos layers, metallic layers or washers *f f* are inserted between the layers of asbestos, to strengthen the device when the distances between the door and the casings is considerable.

When the expansion-bars are cooled by the reduction in the temperature of the oven, the segment-gear, pinion, and index are returned to their normal location by means of a spring-arm, O, acting on a toggle or arm, P, which connects with the segment-gear.

In the present compact and improved construction of my thermometer the arm P serves to make an easy and effective connection between the spring O and the segment, some such arm being necessary on account of the arrangement of the numerous parts. A screw, *g*, passes through the casing and bears against the spring O, thus regulating the degree of its tension. This spring is made of cast-iron. By continuous experimenting I have found that cast-iron is the only metal suitable for the purpose, and I therefore contend, and do here explicitly state, that I consider the cast-iron spring for use in this connection to be, broadly, my invention and discovery.

Having thus described my invention, what I

claim as new, and desire to secure by Letters Patent, is—

1. In a thermometer, the combination, with the expansible bars B B' B'' B''' and levers C C' C'' C''' C⁴, of the link D, segment-gear E, pinion F, shaft G, index-finger H, and dial-plate, substantially as described.

2. The combination, with the expansible mechanism of a pyrometer, of the cast-iron spring O, the arm P, segment-gear E, pinion F, shaft G, index-finger H, and dial-plate, as specified.

3. In a thermometer mechanism, the combination of the cast-iron spring O, having an adjusting-screw, *g*, the arm P, and the segment-gear E, substantially as and for the purposes herein set forth.

4. The combination, with the expansible bars B B' B'' B''' levers C C' C'' C''' C⁴, link D, segment-gear E, and pinion F, of the cast-iron spring O and the arm P, substantially as described.

5. The combination of the casing A, provided internally with guides *a a*, the expansible bars B B' B'' B''' supported in said guides, the pivoted levers C C' C'' C''' C⁴, the screw *b*, for adjusting said bars and levers, the pivoted segment-gear E, link D, adjustable cast-iron spring O, arm P, shaft L, the pinion K, and index-finger M, mounted on said shaft, and a dial, R, all arranged to operate substantially as described.

6. In a thermometer, the combination of the expansible bars B B' B'' B''' levers C C' C'' C''' C⁴, screw *b*, for adjusting said bars and levers, the link D, segment-gear E, pinion F, shaft G, index-finger H, and dial-plate, substantially as described.

7. In an oven-thermometer, the combination of the dial-case, the pyrometer-mechanism case connected with the dial-case by suitable means, and intervening layers of asbestos, substantially as and for the purposes shown and described.

8. The combination, of the dial-case, the door J, the pyrometer-mechanism case, connected with the dial-case by screws and having a cover, I, provided with tubular projection K, and the layers of asbestos intervening between the two casings, as specified and shown.

9. The combination of the dial-case, the pyrometer-mechanism case connected with the dial-case by suitable means, and the intervening alternating layers of asbestos and metal, arranged substantially as and for the purposes described.

In testimony whereof I affix my signature in presence of two witnesses.

DAVID G. COOPER.

Witnesses:

WM. VON TOBEL,
T. F. HIGGINS.