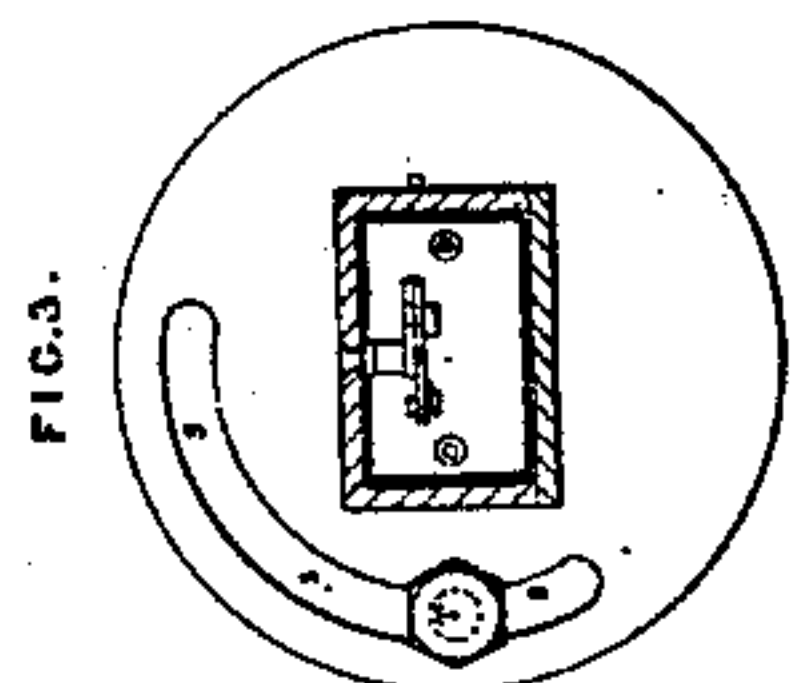
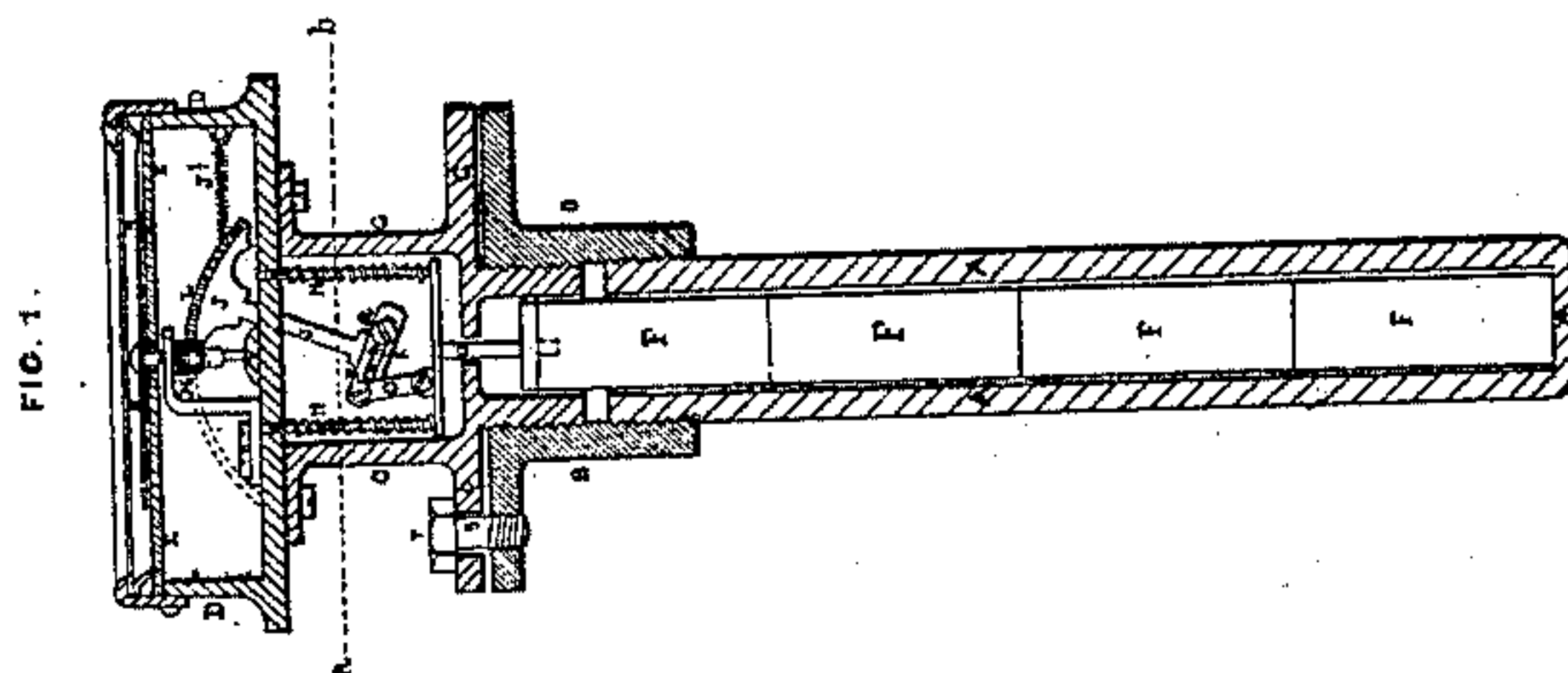
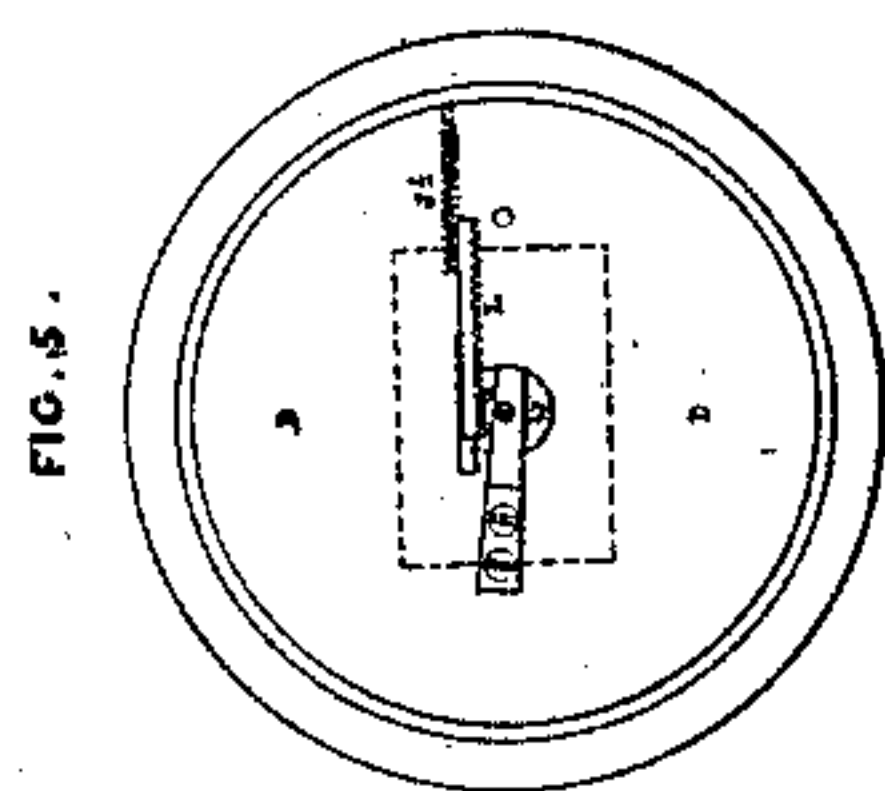
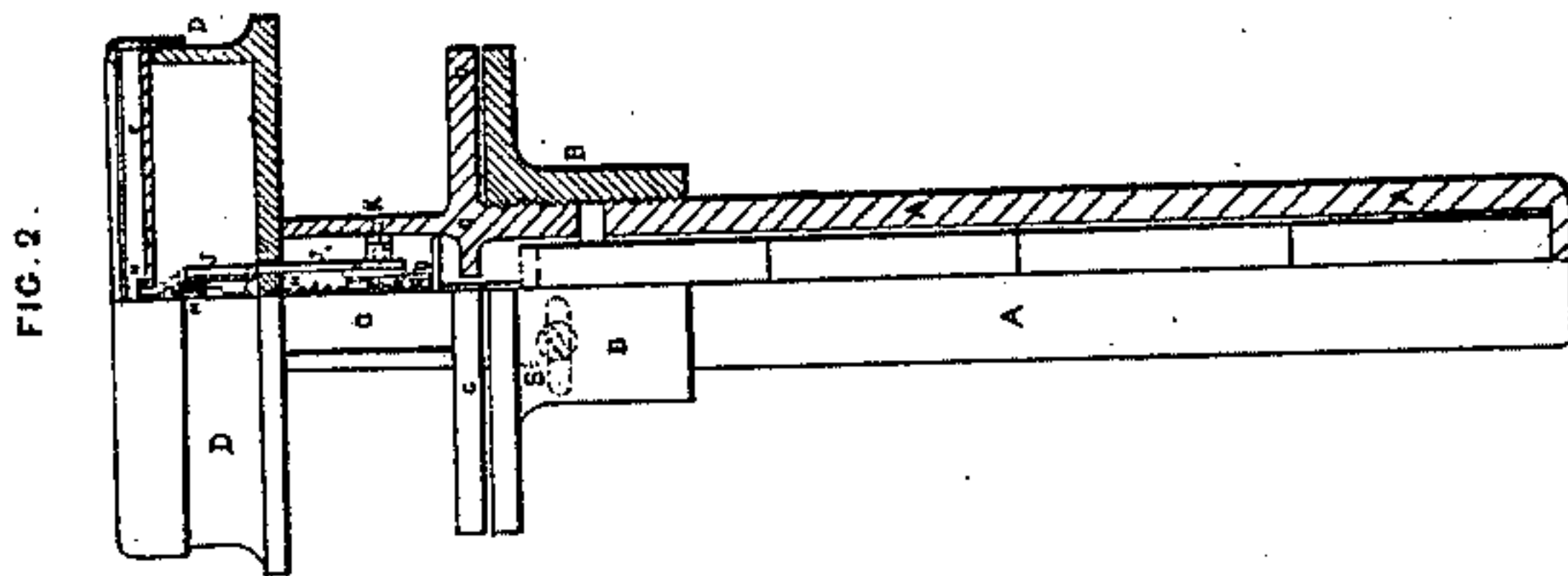
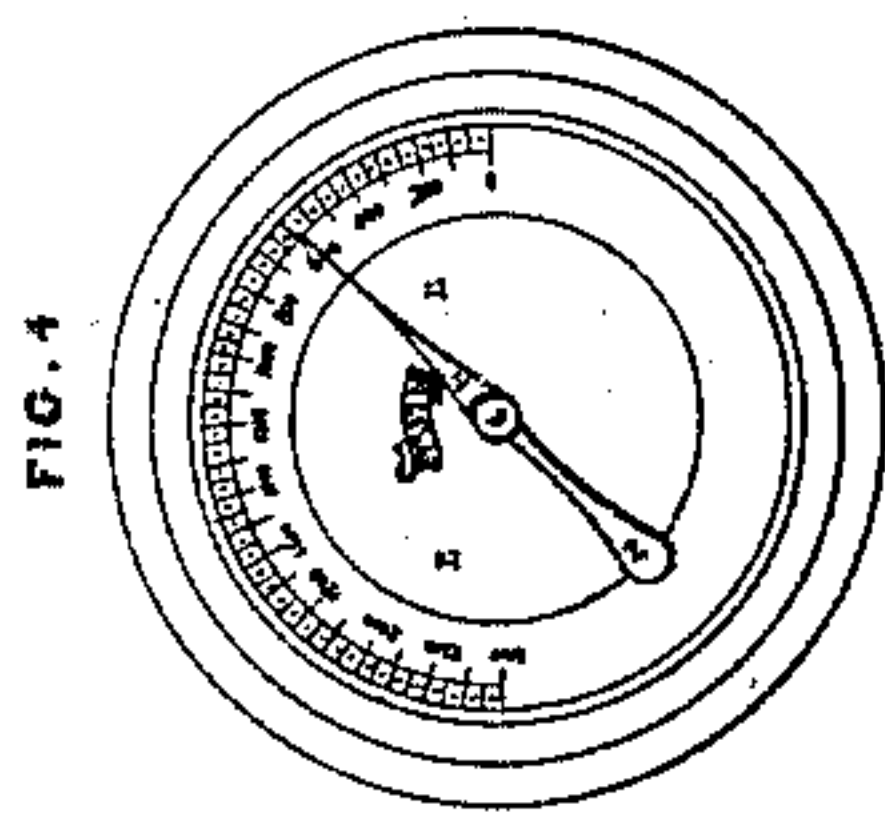
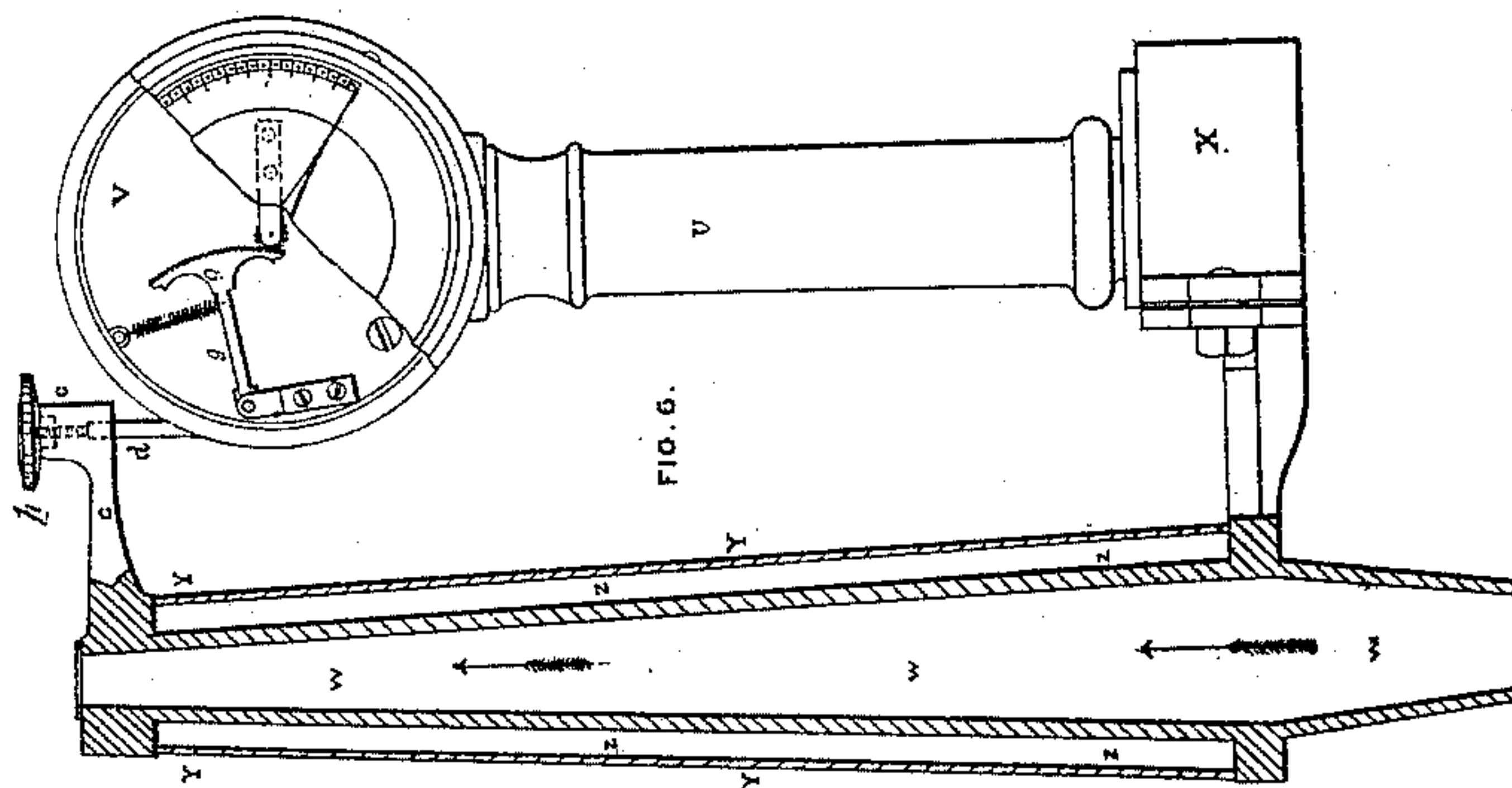
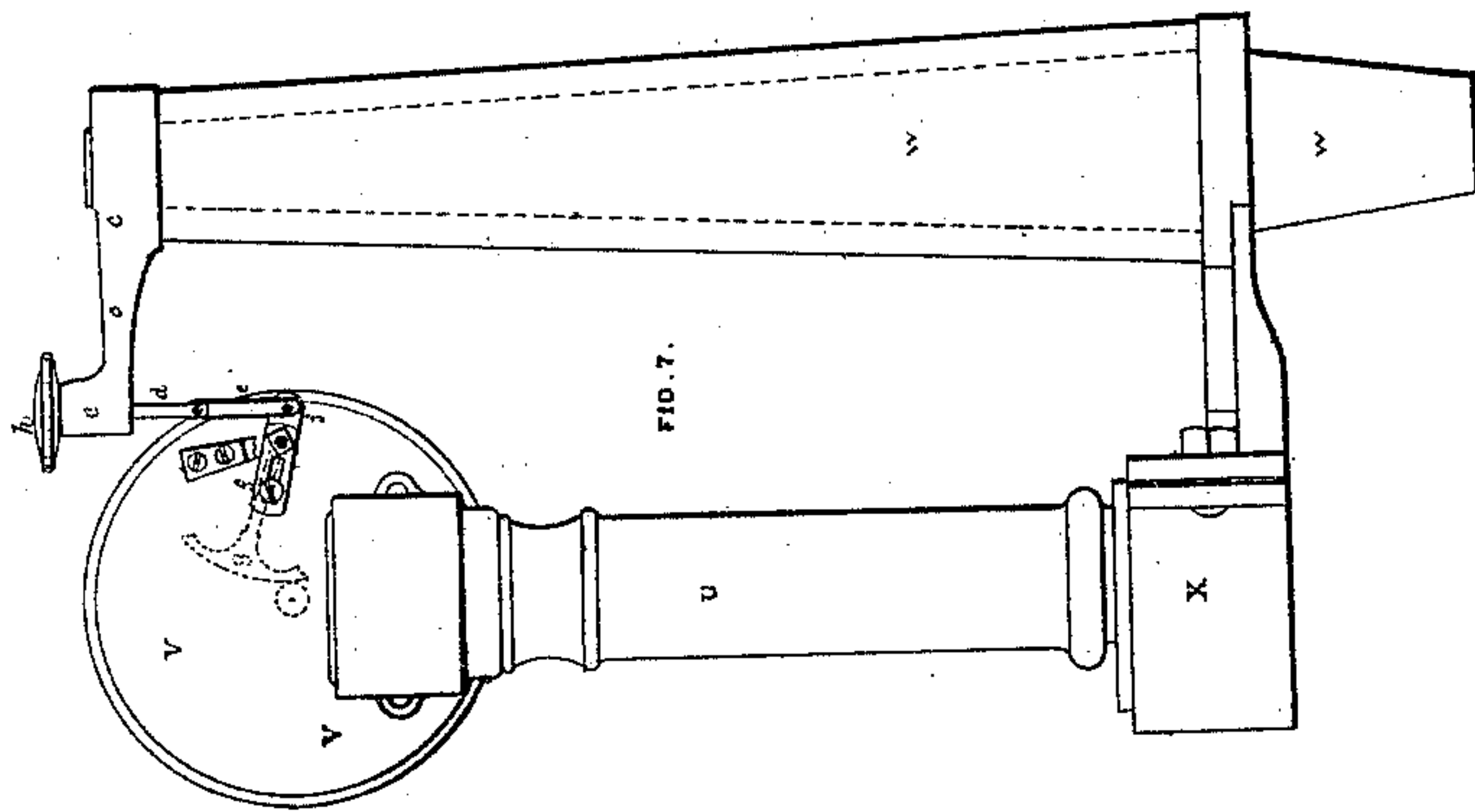


W. H. BAILEY.

Pyrometer.

No. 112,106.

Patented Feb. 28, 1871.



WITNESSES { John G. Wilton -
James Ashman

William Henry Bailey

United States Patent Office.

WILLIAM HENRY BAILEY, OF ALBION WORKS, SALFORD, GREAT BRITAIN.

Letters Patent No. 112,106, dated February 28, 1871.

IMPROVEMENT IN PYROMETERS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern

Be it known that I, WILLIAM HENRY BAILEY, of the Albion Works, Salford, in the county of Lancaster, Kingdom of Great Britain and Ireland, have invented certain new and useful Improvements in Pyrometers; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing and to the letters of reference marked thereon.

My invention refers to that class of pyrometers in which rods or tubes of different substances, which expand unequally, are used to indicate high temperatures; and

The improvements relate to obviating the breakage which often occurs by using rods of earthenware or other brittle material which does not readily expand, and consists in substituting short lengths of such material, protected by an outer tube of metal.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawing which forms a part of this specification—

Figure 1 is a side sectional view of a pyrometer which is suitable for indicating the temperature of furnaces, ovens, flues, molten metal, or any high temperature, such pyrometer having my improvements applied to it.

Figure 2 is an end view of fig. 1, shown half in section.

Figure 3 is a sectional plan of fig. 1 through the line *a b*.

Figure 4 is a front view of the dial-case appertaining to fig. 1, and

Figure 5 is a view of the same having the dial-plate and index-finger removed.

Figure 6 is a front view, partly in section, and

Figure 7, a rear or back view of another arrangement of pyrometer for indicating the temperature of hot blasts.

Similar letters refer to similar parts throughout the several views.

In figs. 1, 2, 3, 4, and 5—

A represents a metallic tube closed at one end, and provided at its other extremity with a flanged socket, B, in which is screwed the tail end of the flanged box C, which is affixed to the case D, containing the dial-plate E and indicating mechanism.

By preference, short lengths of porcelain or earthenware F are inserted in the tube A, and the uppermost piece of such porcelain or earthenware is in contact with the lower end of the spindle G, which is kept up to its position by the pressure of the spiral springs H placed upon the guide-rods I.

J is a quadrant-lever, working upon the fixed stud K, and provided with teeth L upon its side or edge, gearing into the toothed pinion M upon the axis or spindle of which the hand or index-finger N is affixed, for indicating upon the dial-plate E. This quadrant-lever is kept in position by the spiral hair-spring J', and is connected by the link O to the spindle G by means of the adjustable plate P, which actually forms the short arm of such quadrant-lever, being screwed upon it, but made adjustable by means of the set-screw Q passing through the slot R, so as to regulate the length of such short arm to the greatest nicety, and thereby also regulate the distance through which the teeth of the quadrant pass.

The flange of the box C has a slot, S, formed through it, through which slot a stud or set-screw, T, is screwed into the flange of the socket B, so that if the tube A permanently expands, the case D, containing the dial-plate, may be turned bodily around, or screwed further into the socket B, the index-finger, meanwhile, retaining its exact original position with regard to the tube A, and thus the dial-plate is moved round until the index-finger N points to the zero or first figure of the graduations, when the dial-case may be fixed in that position by means of tightening the set-screw T, without taking the instrument in pieces to make such adjustment.

It is not really necessary that flanges need be used for making the requisite adjustments in consequence of permanent expansion in the materials employed in the construction of pyrometers, as a slot might be formed through the socket side and a screw passed through it into the tail-end of the box C, as seen dotted in fig. 2, and marked S'.

The method or manner of using, and the action of this instrument, may be thus described.

The tube A is placed in the oven or other vessel of which it is desired to ascertain the temperature, when the action of the heat causes such tube to expand, whilst the earthenware rod F remains about the same length, the pressure of the springs H, meanwhile, causing the spindle G to still keep up the contact with the earthenware rod F, and consequently drawing down the link O, which in its turn moves the quadrant lever J in the direction of the dotted lines, thus turning the pinion and index-finger N, and thereby indicating on the graduated dial-plate E the degree of expansion of the tube A, or the temperature to which it has been subjected.

It is preferred to have the porcelain or earthenware in short lengths, as if used in a single rod it is liable to crack and fall to pieces, especially when high temperatures have to be gauged, or when carried about from place to place.

The tube A is formed of brass, to indicate up to 1,000° Fahrenheit, and of iron when used to indicate above that temperature; and when used to indicate the temperature of acids, such tube should either be coated with some enamel which will resist the action of the acids, or the outer tube may be formed of porcelain or earthenware, or other suitable acid-resisting substance, having a metallic rod inserted within such outer tube to indicate the expansion.

A modification of my invention, shown in figs. 6 and 7, is not here claimed, as it may form the subject-matter of a separate application for Letters Patent.

In some cases it is not desirable that the temperatures at which the various processes are carried on should be known by any one except those whose business it is to attend to them, and yet it is necessary that the dial of the pyrometer should be in a conspicuous position. In order to meet this difficulty I apply to the pyrometer what I call a "blind dial," that is to say, a dial which is not graduated and marked in the ordinary manner, but has signs or characters instead, such as A B C D E, which form a scale of tem-

peratures understood by the persons interested, but not to an onlooker.

I do not desire to claim the use of any materials or metals which expand unequally in the construction of pyrometers; but

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

1. The combination of the tube containing the porcelain sections F, and the case containing the registering mechanism, when the said case is adjustable on the tube, as and for the purpose described.

2. Using short lengths of porcelain, earthenware, or other suitable material, in the construction of pyrometers, which are not liable to break in pieces when subjected to a high temperature, or broken in carriage.

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

WILLIAM HENRY BAILEY.

Witnesses:

JOHN GUY WILSON,
JAMES ASHMAN.