

(No Model.)

E. BROWN.  
PYROMETER.

No. 538,149.

Patented Apr. 23, 1895.

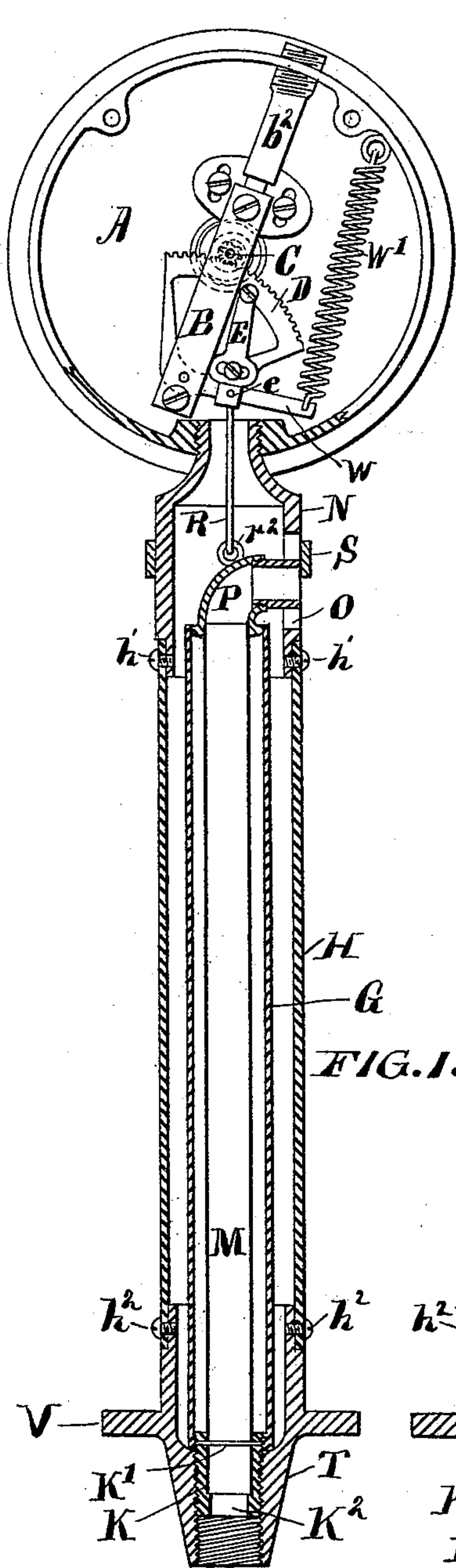


FIG. 1.

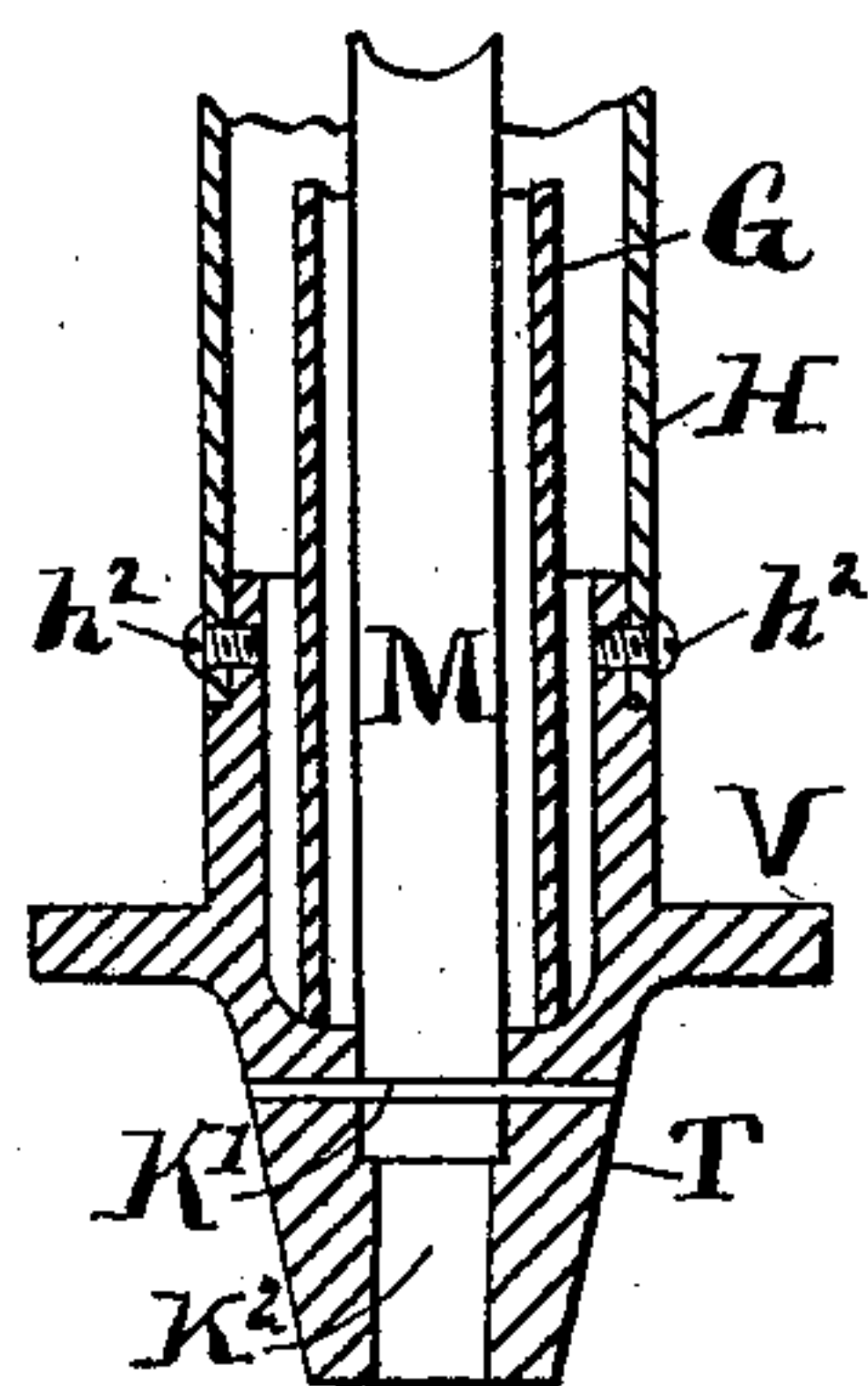


FIG. 3.

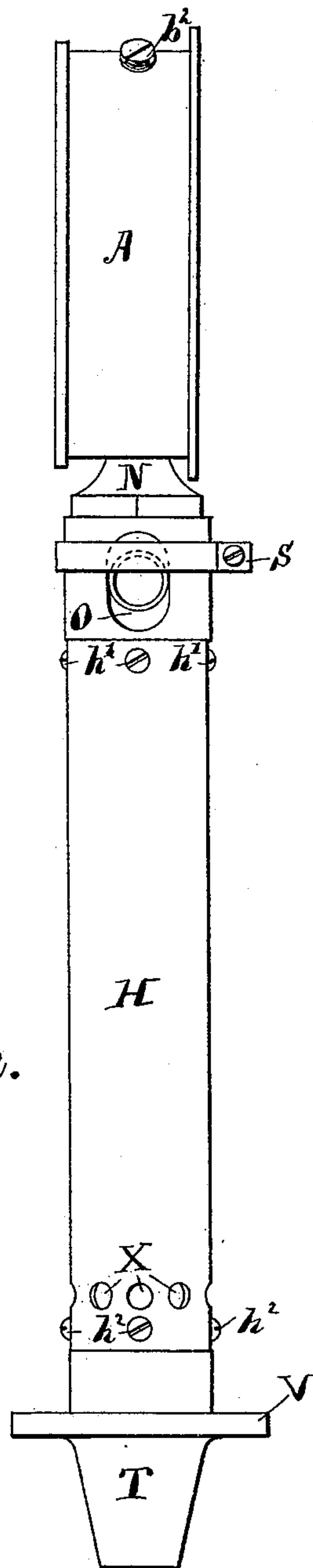


FIG. 2.

WITNESSES:

John F. Grant  
Norman Green

INVENTOR

Edward Brown

# UNITED STATES PATENT OFFICE.

EDWARD BROWN, OF PHILADELPHIA, PENNSYLVANIA.

## PYROMETER.

SPECIFICATION forming part of Letters Patent No. 538,149, dated April 23, 1895.

Application filed October 29, 1894. Serial No. 527,372. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD BROWN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Pyrometer, of which the following is a specification.

My invention relates to pyrometers in which a heated current of air under pressure is permitted to escape through the instrument. It is an improvement on my patent pyrometer of September 20, 1881, No. 247,157. In that patent, the blast, whether diluted with cold air or not, is carried through a conductor and impinges upon an expansion strip. This strip operates indicating mechanism, secured upon a mahogany bar which is removed from the influence of the heated blast.

The present invention consists in utilizing the conducting tube as an expansion bar, the advantage of this being, that by means of a tight cap or quarter bend upon the top of the tube, the destructive influence of the blast is diverted away from the connecting rod and lever, which operate the indicating mechanism. This plan also permits the head containing the indicating mechanism, to be placed directly upon the outside tube or case, which incloses the expansion tube.

I am aware that an expansion tube is not new, and that the head containing the indicating mechanism has been placed upon an outer tube or case, but only when the outer tube has been of metal, having a different ratio of expansion; the indication depending upon the difference of expansion between the inside and outside tube when both are completely heated by the blast. In my invention the blast is kept from contact with the outer tube; which receives only a very small amount of heat by conduction or radiation.

Another essential feature of this pyrometer is, that the expansion tube must be made very thin, so that it will acquire in a few seconds the full temperature of the blast, and give an accurate indication before heat is communicated to the outside tube, sufficient to materially alter its accuracy.

Figure 1 is a vertical section through my pyrometer. Fig. 2 is an outside view of it

sidewise. Fig. 3 is another mode of connecting the expansion tube to the nozzle.

Similar letters in each figure refer to similar parts.

The expansion tube M is fitted closely at its lower end into a conical nozzle T, which is made suitable to fit into various openings in the furnace blast pipe.

V is a flange to prevent the escaping blast from burning the hand of the operator. The tube M is fitted into a recess in the thimble K and secured there by a pin K'. The projecting part K<sup>2</sup> protects the tube from the cutting action of the blast. The thimble may be dispensed with and the tube secured directly to the nozzle T as in Fig. 3, or when cold air is admitted it may be attached as shown in my aforesaid patent, No. 247,157. To the nozzle T is secured the outside case or tube H by screws h<sup>2</sup>. The other end of the tube H is fitted to the socket N, and secured by screws h'. The upper end of the expansion tube M is fitted into a cap or bend P so that the blast issues at a right angle direct to the atmosphere through an opening O in the socket N. A movable band or ring S encircles the casting N, so as to cover partially the outlet o; whereby the issuing blast is regulated and the indication of the instrument is made capable of adjustment. A tube G surrounds the expansion tube M to prevent any radiation of heat to the outside tube H.

The gage head A containing the indicating mechanism is screwed directly upon the end of the socket N, or the socket N may be cast as part of the head. The mechanism within consists of a movable frame B; adjustable by the screw b<sup>2</sup>. The indicating pointer is secured upon the pinion C, which is actuated by the toothed quadrant D. The quadrant carries an adjusting arm E, upon which is a pin e—and the movement of the pointer is controlled by the distance of the pin e from the center pivot of the quadrant. An eye r<sup>2</sup> is secured to the bend P, and a link R conveys the expansion of the tube M to the pin e, and thus the motion is conveyed to the pointer.

By means of an arm W upon the rack D and the spring W', the link R and the tube M are kept under tension and lost motion is



taken up. Holes X are made in the case H, to prevent heat being carried by conduction to the outside case H.

Upon applying the nozzle T to an opening  
5 in a furnace blast pipe, the blast heated to a temperature of about 1,200° will rush through the thin expansion tube M and out at O, giving an indication in a few seconds, before the heat can be radiated or conducted to the out-  
10 side tube H to materially affect the indication, further than to bring the pointer to a stand at its maximum position more decidedly.

The radius of the arm E is so adjusted as to give the correct indication so soon as the  
15 pointer arrives at its maximum, and before it returns, which it will soon do in consequence of the nozzle T and tube H becoming warmed up.

What I claim is—

20 1. In a portable pyrometer, operated by the passage through it of a heated current, the combination of the nozzle T, an expansion, and conducting tube M, a cap P with an outlet direct into the atmosphere, an outside case  
25 H removed from contact with the heated current, and secured rigidly to the nozzle T, and indicating mechanism operated by the expansion tube.

2. In a portable pyrometer operated by the

passage through it of a heated current, a con- 30 ducting and expansion tube M secured to the nozzle T by the removable thimble K.

3. In a portable pyrometer, operated by a heated current passing through it; the combination of a conductor M for the passage of 35 the hot blast, with an adjustable valve over the blast outlet.

4. In a portable pyrometer operated by the passage through it of a heated current; the combination of a nozzle T, an expansion and 40 conducting tube M, an outlet cap P, an outside case H removed from contact with the current, and secured rigidly to the nozzle T, a link R, the head A secured upon the case H; and mechanism adjusted to indicate cor- 45 rectly upon the first maximum rise of the pointer.

5. In a portable pyrometer stem operated by the passage through it of a heated current; the conducting tube M utilized as an expansion 50 bar, a cap P by which the blast is deflected laterally to the atmosphere, and multiplying mechanism to indicate the temperature according to the expansion of the tube M.

EDWARD BROWN.

Witnesses:

JOHN F. GRANT,  
NORMAN GREEN.