(No Model.) 2 Sheets—Sheet 1.

E. BROWN.

RECORDING PYROMETER.

No. 556,841. Patented Mar. 24, 1896.

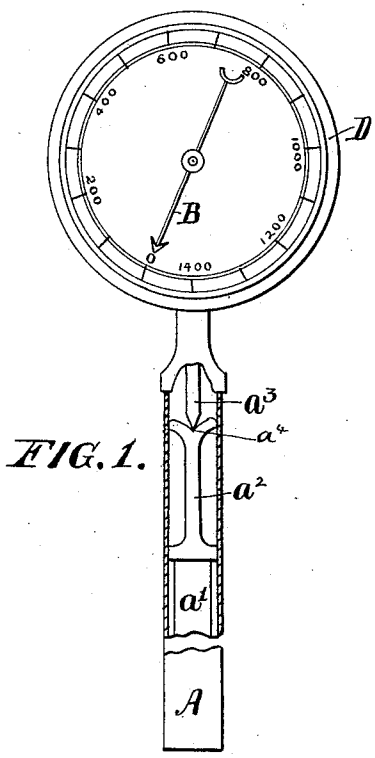


FIG. 1.

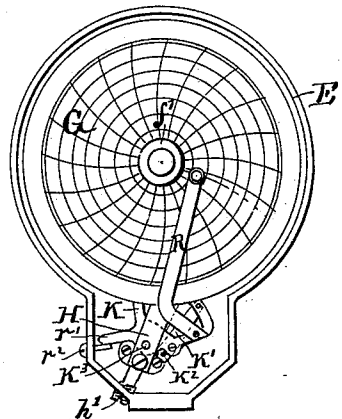


FIG. 2.

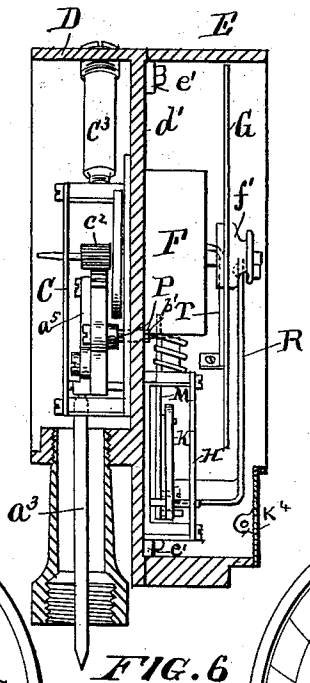


FIG. 6.

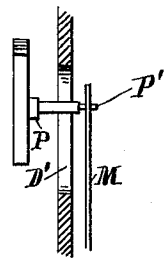


FIG. 4.

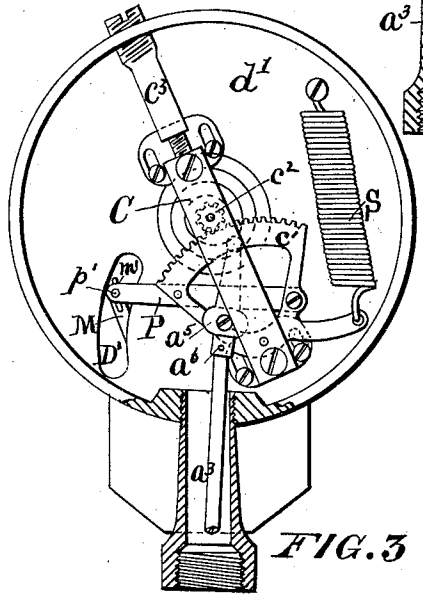


FIG. 3.

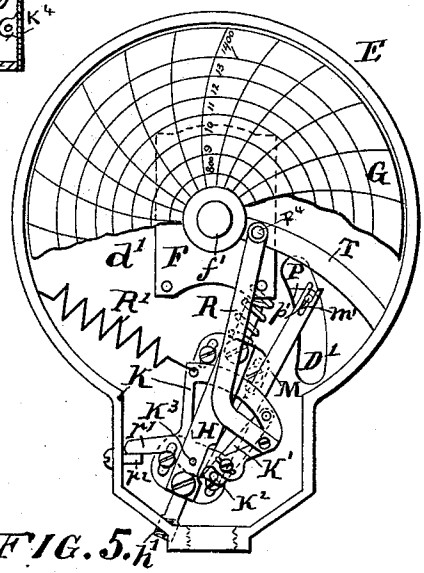


FIG. 5.

WITNESSES:

Sydney P. Beaver.

John F. Grant

INVENTOR

Edward Brown

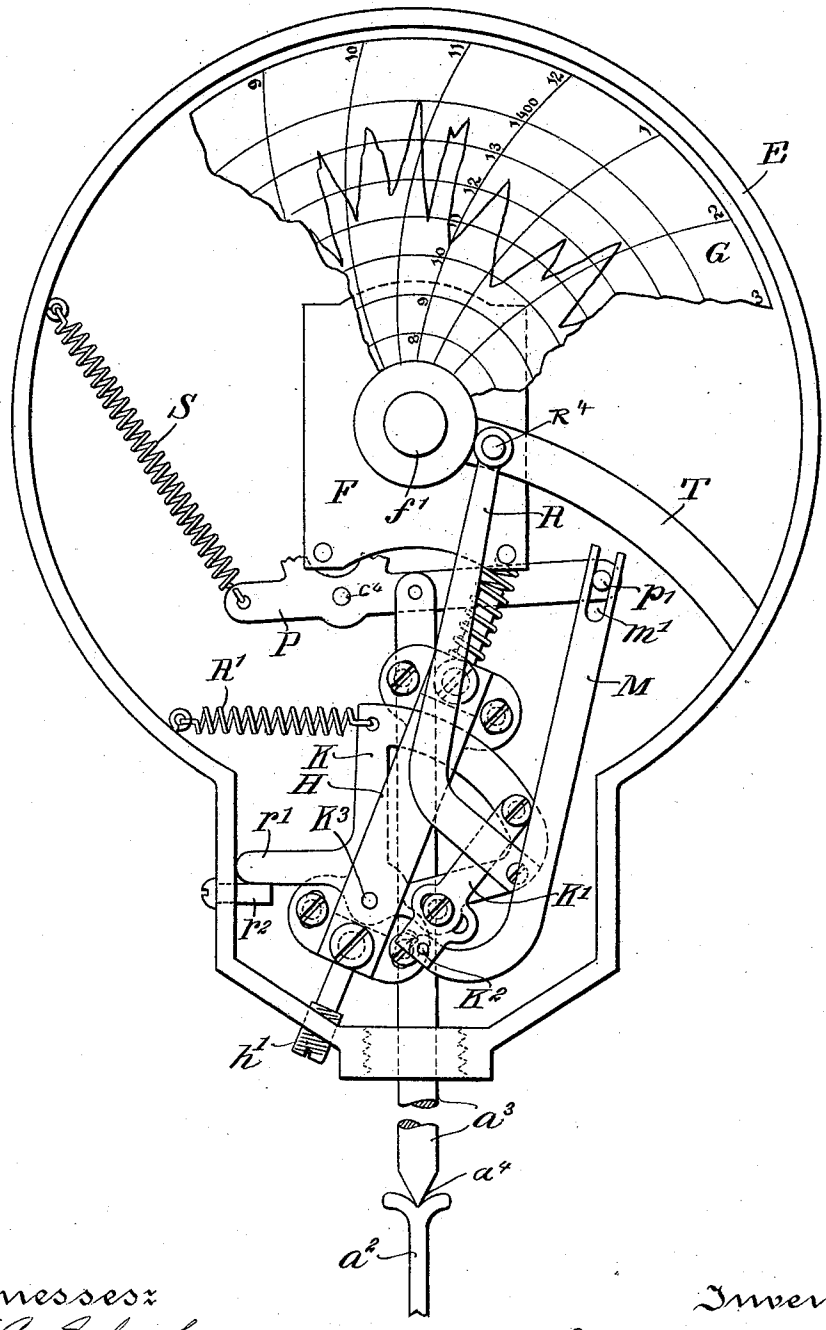
(No Model.) 2 Sheets—Sheet 2.

E. BROWN.

RECORDING PYROMETER.

No. 556,841. Patented Mar. 24, 1896.

Fig. 7



Witnesses:
W. A. Schaefer
John F. Grant

Inventor:
Edward Brown

UNITED STATES PATENT OFFICE.

EDWARD BROWN, OF PHILADELPHIA, PENNSYLVANIA.

RECORDING-PYROMETER.

SPECIFICATION forming part of Letters Patent No. 556,841, dated March 24, 1896.

Application filed July 17, 1895. Serial No. 556,268. (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 Recording-Pyrometer, of which the following is a specification.

My invention relates to the construction of a recording device for preserving a record of the fluctuations of the pointer of a pyrometer, which invention is applicable to other indicators.

In my pyrometer where the head containing the indicating mechanism is attached direct upon a stem which projects into the heated gas or other medium to be indicated, whether the instrument be a fixture or carried about by hand from one furnace to another, it is important that the head be reduced to a small and portable size. The circular paper dial turns upon its central pivot, as is customary in recording steam-gages; but instead of the pencil-arm recording all the fluctuations within the limit of the pyrometer it is made to record only that portion most desirable—as, for instance, the degrees from the center to circumference run from 800° to 1,400° out of a limit of 0° to 1,400°—by which improvement I obtain a large and distinct scale of movements with a small head and dial.

Another feature of my invention is in utilizing the mechanism of my ordinary pyrometer to actuate recording mechanism on the reverse side of the head or case.

Another improvement is in dispensing with the usual metallic-disk backing for the paper dial and using only a stiff piece of paper or cardboard driven by the central shaft of the clock. The cardboard has a fixed curved support at its back immediately beneath the pencil. The novel mechanism to carry this out I will now describe.

Figure 1 is a view of my ordinary pyrometer, the stem partly in section. Fig. 2 shows the reverse side, the cap K^4 removed. Fig. 3 shows the interior mechanism of my ordinary pyrometer having an additional slot cut in the case through which a new lever P conveys its motion to the recording mechanism at the rear. Fig. 4 is a cross-section showing the connection through the back of the case. Fig. 5 shows the recording mechanism. Fig. 6 is a cross-section through the pyrometer and its recording mechanism. Fig. 7 is an enlarged view of the recording mechanism partly in section.

Looking at Fig. 1 we see the metal stem A closed at the bottom, having an inside graphite rod a', a metal rod a^2, and upon that a connecting link or pin a^3, by which the expansion of the stem is communicated through multiplying mechanism in the head D to the pointer B. This mechanism has been described by me in other patents, especially in No. 393,962, dated December 4, 1888. It consists of a frame C carrying a pivoted rack c' and pinion c^2, upon which is the pointer B. The frame is capable of a sliding motion, and by means of the screw C^3 the pointer can be adjusted. The link a^3 actuates the rack through the pin a^6 upon the arm a^5. To the rear of the rack I secure an arm P, upon which a pin p' projects through the opening D′, and communicates its motion to the recording mechanism at the rear. A strong spring S takes up the lost motion in the joints and causes the recording-arm to follow the expanding motion of the stem, except when the arm is stopped in its course, as afterward explained.

To the rear of the case or head D, I bolt the case E by lugs e'. A clock F bolted to the back d' actuates the paper dial G, which is clamped firmly over a central pivot by the nut f'. In place of the dial-rings being marked from 0° to 1,400°, as is the front dial, they run from 800° to 1,400° in this case, as the usual temperature to be recorded averages about 1,200°. Other radial lines divide the dial up into twenty-four parts for the twenty-four hours of the day. A very similar frame and mechanism to that actuating the pointer B are screwed partly to the case E and partly to the back d'. Therein the sliding frame H is adjustable by the screw h'. A quadrant K is pivoted within the frame. Upon the under side of the quadrant is an adjustable arm K′, like the arm a^5 previously mentioned, by which the movement of the pencil-arm may be increased or diminished. To the pin K^2 is attached the link M, the other end being slotted at m'. The link is moved by the pin p', which projects from the arm P.

The flexible pencil-arm R is secured to the

quadrant and describes its curve from the pivot K^3.

A curved arm T projects from the side of the case immediately beneath the dial and pencil to support the dial at that point. This arm may have rollers upon it to reduce the friction of the paper. By this device I can dispense with the heavy metal disk in common use.

The operation is in this way: The expansion of the pyrometer-stem causes the connecting-link a^3 to fall and the pointer B to rise to 800°, at which point the pin p' engages with the end of the slot m' and starts the pencil-arm upon its forward motion until it arrives at its terminus, (1,400°,) where it remains in contact with the side of the case, which acts as a stop, though the temperature be raised higher, in which event the rod a^2 breaks contact with the link a^3. Upon the fall of the temperature the pencil recedes by the pull of a light spring R′ until it arrives at 800°, where it is stopped by the contact of the arm r' with the pin r^2. By means of the adjusting-arms a^5 K′ and the adjusting-screws C^3 h' the movement of the pointer B and pencil-arm M may be made to coincide upon the degrees on each dial.

By this device the recording-pen may be moved from any position to the circumference of the dial and a new dial easily inserted.

I claim—

1. In a recording-pyrometer the combination of an expansion-stem, the motion of which is communicated through multiplying mechanism to a pointer B over a dial on one side of the case D, a division-plate d' upon which is secured a clock F, a recording-dial G upon the clock and facing outwardly on the opposite side of the case, the arm P, connecting-link M which operates the multiplying mechanism within the frame H, and the recording-arm R vibrating upon the pivot K^3 to indicate in unison with the pointer B on the opposite side of the case.

2. In a recording-pyrometer, an expansion-stem A, a spring S to hold the joints of the lever P and pin a^3 in contact with the stem, a link M connecting the lever P with the multiplying mechanism which operates the recording-arm R, a recording-dial upon the arbor of the clock F, a stop to limit the rise of the recording-arm beyond the periphery of the recording-dial by which a separation of continuity of the parts (as at a^4) occurs upon a further rise of temperature beyond the recording limit.

3. In a recording-pyrometer, the combination of an expansion-stem, multiplying mechanism connecting the movement of the said stem with a recording arm and pen, spring S to hold all the joints in contact, a recording-arm pivoted at K^3 a spring R′ which presses the recording-arm in the reverse direction to spring S, and a slip-joint as at m', whereby the recording-arm is free to be moved by hand toward the circumference of the case on the changing of the recording-dial.

4. In a recording-pyrometer an expansion-stem to operate the recording mechanism, a spring S to force the movement of the lever P in unison with the expansion of the stem, a link M to operate the multiplying mechanism which carries the recording-arm R, a recording-dial driven by a clock F stops to limit the rise and fall of the recording-arm beyond the limits prescribed on the recording-dial, spring R′ which operates the recording-arm in a contrary direction to spring S, and slip-joints as at m', and a^4 whereby a separation of the continuity of movement between the recording-arm and stem occurs, when the pen has reached its limit on the upward and downward stroke.

5. In a recording-pyrometer, the combination of an expansion-stem, a connecting-pin a^3, pivoted lever P, operating multiplying mechanism within the frame H, adjusting-screw h', recording-arm R, and dial G driven by the clock F.

6. In a recording-pyrometer, the combination of an expansion-stem, a connecting link or pin a^3, a spring to force the motion of the recording-arm in unison with the motion of the inside rod a^2, an adjusting-arm to regulate the size of the degrees recorded, which in conjunction with intermediate multiplying mechanism operates the recording-arm upon a pivot K^3, and a recording-dial upon the arbor of the clock F.

7. In a recording-pyrometer the combination of an expansion-stem the motion of which is communicated by intermediate multiplying mechanism to a pivoted recording-arm R, a spring to force the recording-arm by its intermediate mechanism to follow the movement of the inside rod a^2 of the stem, an adjusting-arm by which the size of the degrees recorded by the pen is made to correspond with those engraved on the dial G, and a recording-dial G upon the arbor of the clock F.

EDWARD BROWN.

Witnesses:
SYDNEY P. BEAVER,
JOHN F. GRANT.