

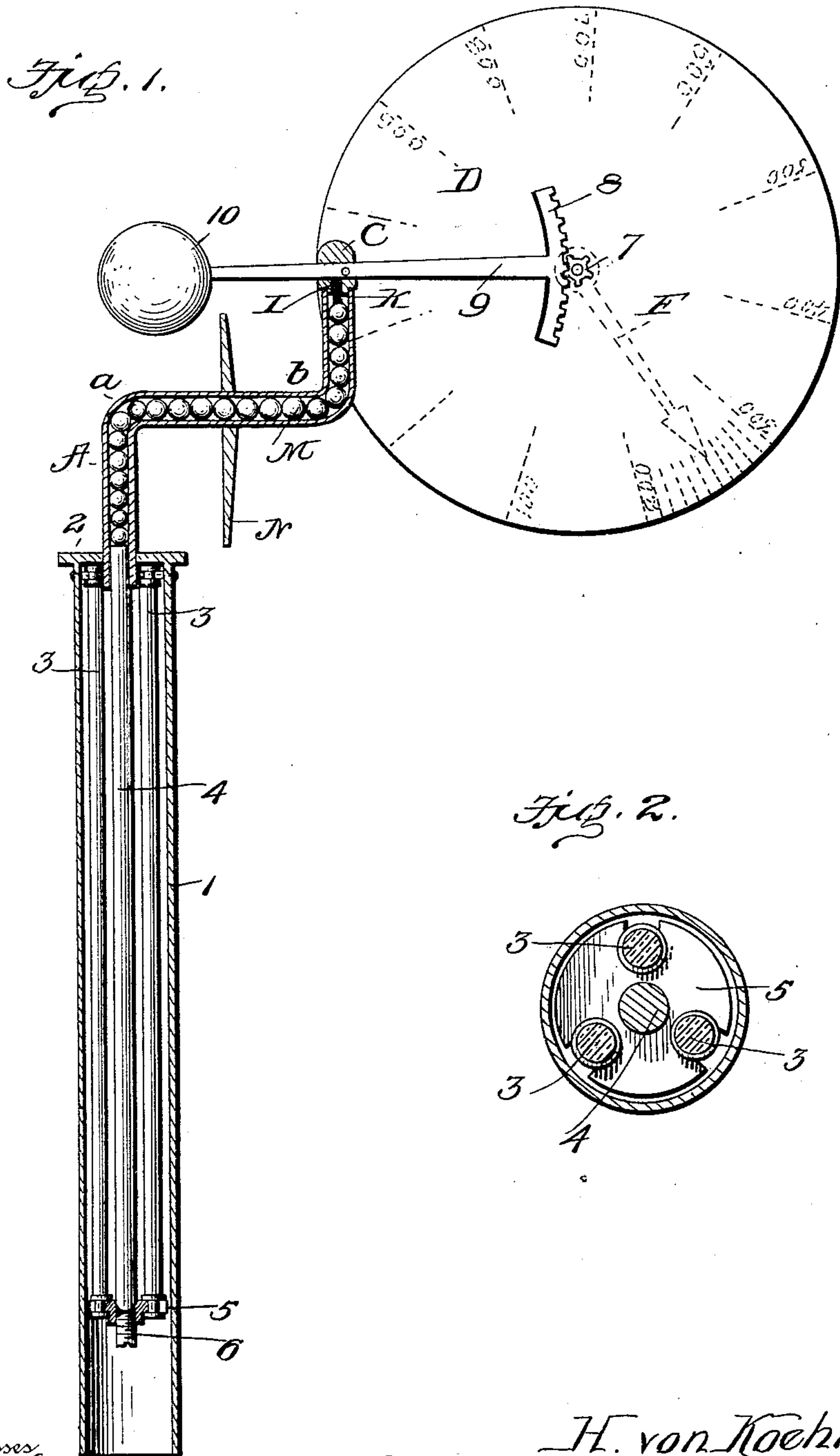
No. 664,764.

Patented Dec. 25, 1900.

H. VON KOEHRING.  
PYROMETER.

(Application filed July 5, 1900.)

(No Model.)



Witnesses  
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# UNITED STATES PATENT OFFICE.

HENRY VON KOEHRING, OF SEGUIN, TEXAS.

## PYROMETER.

SPECIFICATION forming part of Letters Patent No. 664,764, dated December 25, 1900.

Application filed July 5, 1900. Serial No. 22,544. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY VON KOEHRING, a citizen of the United States, residing at Seguin, in the county of Guadalupe and State of Texas, have invented certain new and useful Improvements in Pyrometers; 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.

My invention relates to pyrometers of that type in which a column or series of balls of high expansive power is employed in conjunction with a metallic tube of less expansive power; and the present invention is an improvement upon the pyrometer shown in my United States Letters Patent No. 637,343, dated November 21, 1899.

The object of this invention is to obviate certain defects incident to the construction shown in said patent and to provide a highly-sensitive pyrometer which is simple in construction, cheap to manufacture, adapted to be readily used for any ordinary cooking-stove, and not liable to irregularity, and one in which the sensitive indicator-operating devices are exposed to direct heat, and the pyrometer thereby rendered accurate and reliable.

With this and other minor objects in view the invention consists of certain novel features of construction, combination, and arrangement of parts, as will be hereinafter more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is an elevational view of a pyrometer embodying my invention, showing the outer inclosing tube and bent tube in vertical section. Fig. 2 is a cross-section through the outer tube.

Referring now more particularly to the drawings, in which like reference characters designate corresponding parts throughout both views, the numeral 1 represents an outer inclosing tube or shield of convenient size, of steel or other suitable material, of low expansive capacity, and open at its lower end and closed at its upper end by a head or top plate 2. To the under side of this cap or plate are secured the upper ends of two or more vertical columns 3, grouped about a central rod

4 and made of some poor conducting material of low expansive capacity, such as glass, china, earthenware, graphite, &c. These columns are protected by the tube 1, and arranged between the same is the rod 4, and they are united at their lower ends by a metallic head or plate 5, located above the lower open end of said tube 1. The rod 4 is made of zinc or other metal of high expansive capacity and is mounted between the non-conducting columns 3, its lower end being seated upon an adjusting-screw 6, mounted in the head or plate 5. The outer inclosing tube 1 thus serves the dual function of a shield to protect the fragile non-conducting columns 3 and conductor for bringing the heat in direct contact with the entire surface of the rod 4. The columns 3 act, in conjunction with the heads or plates 2 and 5, to provide an open or foraminous frame for the sensitive rod, the spaces between said columns serving as ports or passages to allow the heat to come in direct contact with the rod and also as non-conducting guards to prevent the rod from being unduly influenced by sudden changes of temperature affecting the tube 1, such as produced by the opening of the oven-door of the stove, &c., whereby accuracy is insured and irregular expansion and contraction of the rod obviated. In my aforesaid patented construction the lower balls of the column of balls are heated by radiation from the tube in which they are inclosed and being in direct contact with said tube are unduly influenced by drafts of air coming in contact therewith, whereby the pyrometer is rendered to a certain extent irregular and inaccurate. By, however, employing the construction above set forth this difficulty is entirely prevented.

A represents a tube of steel or other suitable material of low expansive capacity having its lower end straight and vertical and fitted in the plate or cap 2 and loosely receiving the upper end of the rod 4. This tube is provided with two rectangular bends *a* and *b* and is closed at top by a cap C, to which is connected a dial D. To the dial is pivoted a hand or pointer F, to the axis of which is connected a pinion 7. This pinion meshes with a rack or toothed segment 8, mounted upon the long arm of a lever 9, eccentrically piv-



oted to the cap C, and upon the short arm of this lever is mounted a ball 10 for balancing the lever.

The tube A is filled up to near its top with balls M of zinc or other material of high expansive capacity, and into the upper ball is screwed or otherwise secured one end of a pin or contact-piece K, the free end of which passes through the center hole I of the cap C and contacts with the short arm of the lever 9 at a point adjacent to its pivot. The tube A is adapted in use to pass through a hole in the door or side of the cooking-stove and is provided with a flange N to secure it to the stove, as in my aforesaid patent.

In operation the heat enters the lower end of the tube 1 and comes into direct contact with the tube 4, which latter expands and imparts motion to the balls M. The pin K thereupon lifts up the short arm of the lever 9, and the toothed segment of the latter operates the hand, according to the degree of expansion of the rod and movement of the balls, to indicate the temperature on the dial D.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a pyrometer, an indicator, means for operating the movable member thereof, an inclosing tube closed at top and open at bottom, an open framework supported from the up-

per portion of the tube and composed of columns of low expansive capacity, a tube entering the upper end of the inclosing tube and having a column of balls therein adapted to operate the movable member of the indicator, a cap or plate connecting the columns of the open framework at their lower ends, an expansive rod about which the columns are grouped, having its upper end projecting into the ball-tube, and an adjusting device on said cap or plate for supporting and adjusting said rod, substantially as set forth.

2. In a pyrometer, a dial having a hand on the axis of which is mounted a pinion, an inclosing tube, an open frame in said tube, an expansive rod in said frame, a tube connected to said inclosing tube and having a column of balls therein acted upon by said rod, and a lever upon the upper end of the ball-tube and provided upon its long arm with a toothed segment meshing with said pinion and upon its short arm with a counterbalancing-weight and means actuated by the balls for operating said lever, substantially as set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HENRY VON KOEHRING.

Witnesses:

F. SUCHART,  
WM. DUKE.