

J. L. ZANDER.
MECHANICAL PYROMETER OR HEAT MEASURING DEVICE.
APPLICATION FILED MAY 21, 1909.

938,034.

Patented Oct. 26, 1909.
2 SHEETS—SHEET 1.

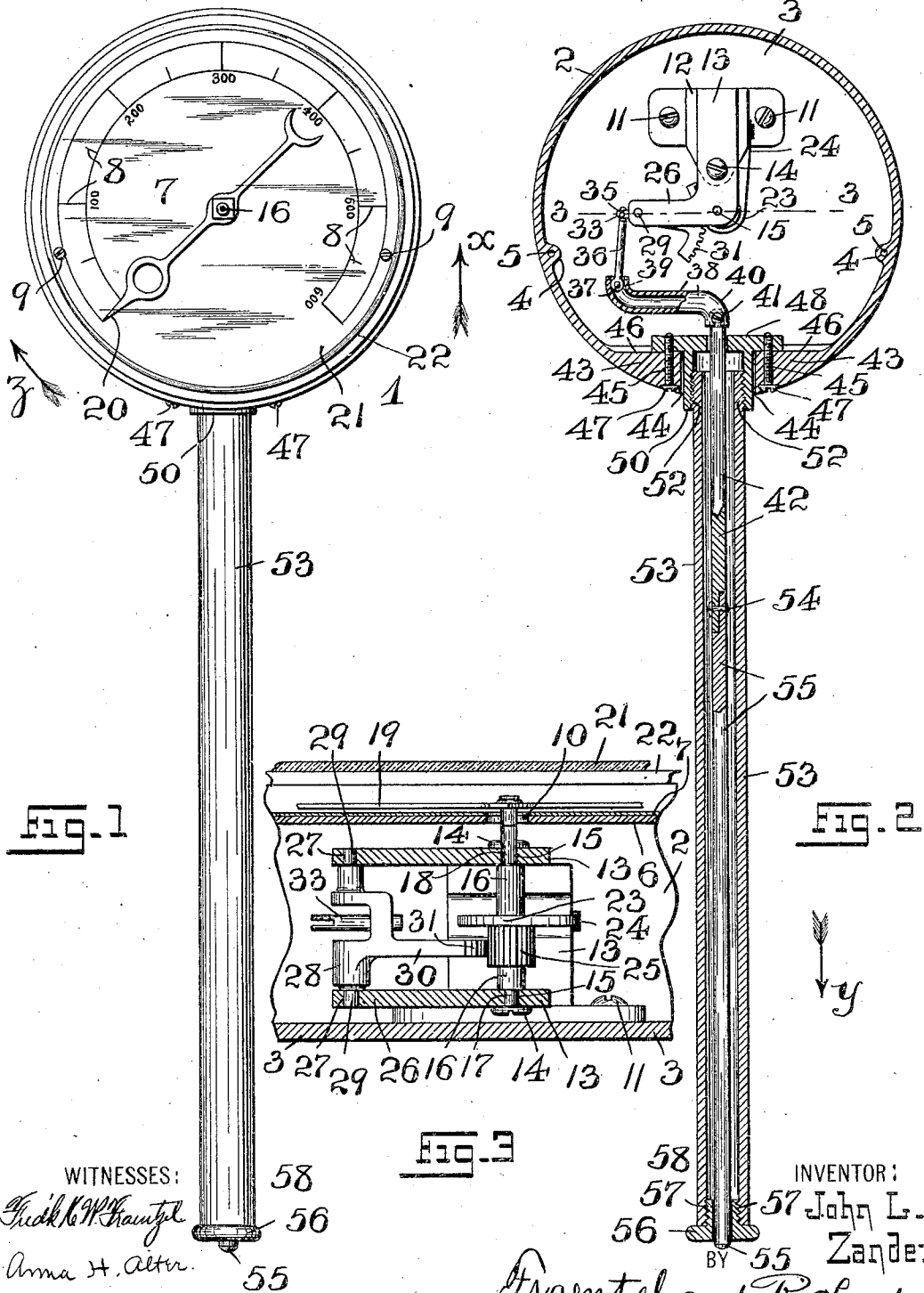


FIG. 1

FIG. 2

FIG. 3

WITNESSES:
Friedrich W. Fraentzel
Anna H. Alter.

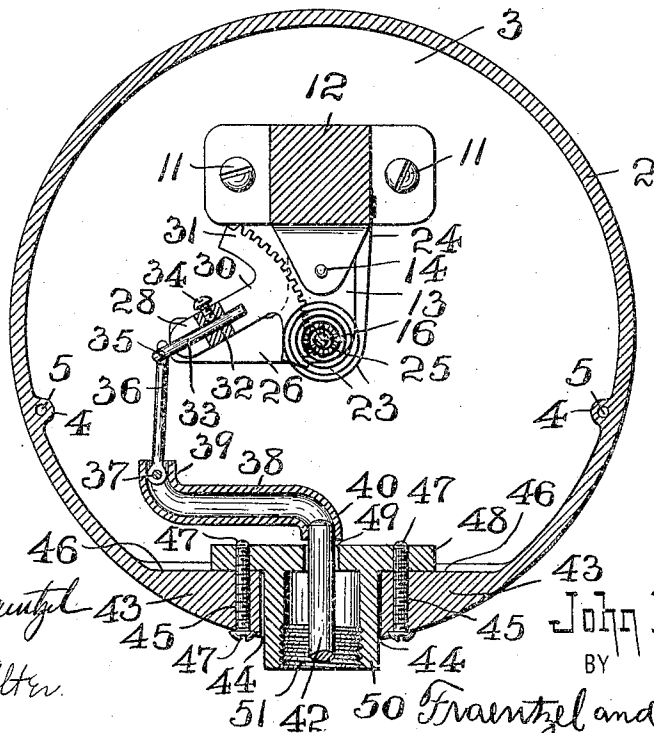
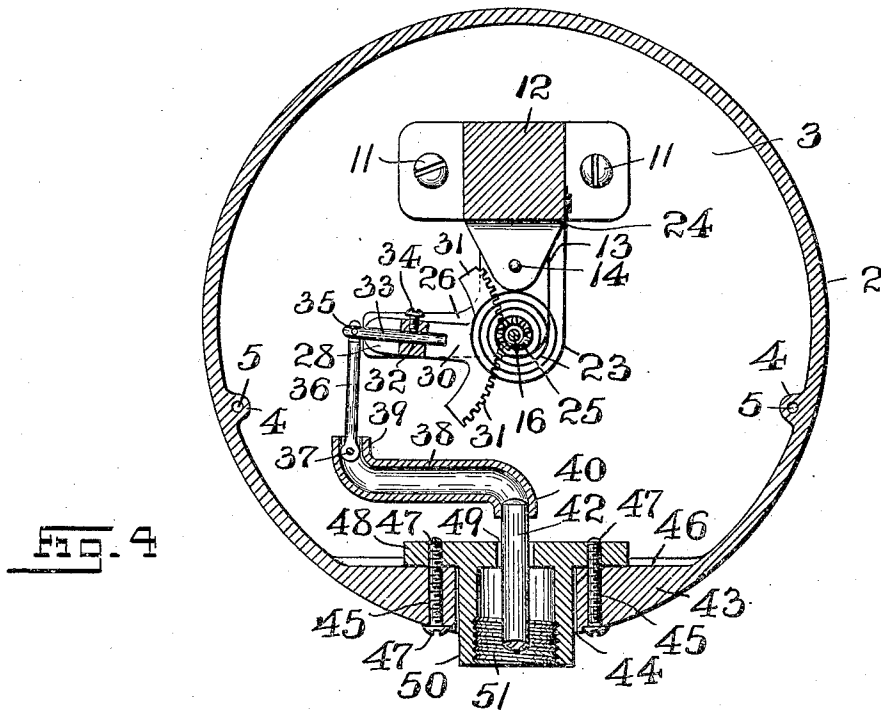
INVENTOR:
John L. Zander,
BY Fraentzel and Richards,
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INVENTOR:
John L. Zander,
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UNITED STATES PATENT OFFICE.

JOHN L. ZANDER, OF NEWARK, NEW JERSEY.

MECHANICAL PYROMETER OR HEAT-MEASURING DEVICE.

938,034.

Specification of Letters Patent.

Patented Oct. 26, 1909.

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To all whom it may concern:

Be it known that I, JOHN L. ZANDER, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Mechanical Pyrometers or Heat-Measuring Devices; and I do hereby 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 characters of reference marked thereon, which form a part of this specification.

My present invention relates, generally, to improvements in mechanical pyrometers or heat-measuring devices; and, the present invention has reference, more particularly, to a novel pyrometer for the purpose of indicating heat-measurements.

This invention has for its principal object to provide a novel and simply constructed and portable pyrometer, the parts of which are mechanically operated by the expansion and contraction of a rod-like element forming part of the instrument, which parts produce an oscillatory movement of an index-hand or pointer so as to designate upon a suitable scale the degrees of heat.

Other objects of this invention not at this time more particularly mentioned will be clearly understood from the following detailed description of my present invention.

The invention consists, primarily, in the novel mechanical pyrometer hereinafter set forth; and, the invention consists, furthermore, in the novel arrangements and combinations of the various devices and parts, as well as in the details of the construction of the same, all of which will be more fully described in the following specification, and then finally embodied in the clauses of the claim which are appended to and which form an essential part of this specification.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a front face view of a pyrometer embodying the principles of my present invention; and Fig. 2 is a transverse sectional representation of the same. Fig. 3 is a detail horizontal section, taken on line 3—3 in said Fig. 2, looking in the direction of the arrow *a*, said view being made on an enlarged scale. Fig. 4 is an enlarged transverse section of the dial-case of the device

and the mechanism therein, the various parts being shown in their normal initial positions; and Fig. 5 is a similar sectional representation of the several devices represented in said Fig. 4, but showing the parts of the mechanism within the dial-case in one of their actuated positions.

Similar characters of reference are employed in all of the above described views, to indicate corresponding parts.

Referring now to the several figures of the drawings, the reference-character 1 indicates the complete mechanical pyrometer showing one embodiment of the principles of my present invention, and 2 indicates a suitably formed cylindrical dial-casing or body which has a back 3 and is formed with a number of lugs 4, substantially as shown. The said lugs are provided with screw-threaded receiving portions 5, and resting upon the said lugs 4 is a plate 6 provided with a suitable dial 7 upon which are suitable graduations, as 8. The said plate 6 and dial 7 is suitably fitted within the said casing 2, being secured in place by means of screws, as 9, which are screwed into the screw-threaded receiving portions 5, and said plate and its dial being formed with a centrally disposed opening 10. Suitably secured upon the back 3 of the said casing or body 2, by means of screws 11, or by means of any other suitable fastening devices, is a block or member 12 which is provided with a pair of bearing-members or arms 13. If desired, these arms may be made separate from the said block 12, as herein shown, in which case they are secured upon the opposite faces of the said block by means of suitable screws 14. The said bearing-members or arms 13 are also provided with journal-receiving holes, as 15, in which are rotatably arranged the reduced portions or journals 17 and 18 of an arbor or vertical spindle 16. The upper reduced portion 18 of said arbor or spindle extends through the centrally disposed hole or opening 10 in said plate 6 and dial 7, and suitably secured upon that portion of the journal 18 which projects above the face of the dial 7 is an index-hand 19 having a pointer 20 movably disposed above the scale or graduations of the dial, as clearly indicated in Fig. 1 of the drawings. The open front of said casing or body 2 is closed by means of a suitable glass 21 which is secured in the usual manner to said casing or body by means of a bezel or ring

22. Suitably secured to said arbor or spindle 16 is the inner end-portion of a spiral spring 23, said spring having its outer end-portion 24 suitably fastened to the side of the block 12. A pinion 25 is also suitably secured upon said arbor or spindle 16 for the purpose of revolving the same, as will presently more fully appear. Each bearing-member or arm 13 is also provided with a supporting element or finger 26 extending from one side of each bearing-member or arm, substantially as shown in the several figures of the drawings, and each element or finger 26 being made with a journal-receiving hole or perforation 27. Arranged so as to oscillate within said holes or perforations 27 are the journals 29 of a crank 28, said crank being formed with a rearwardly extending arm 30 carrying a toothed sector 31 which is in operative mesh or engagement with the pinion 25 upon the arbor or spindle 16, as clearly shown. The said crank, as will be seen from Figs. 4 and 5 of the drawings, is provided with a perforation 32 in which is adjustably secured a suitable pin or stem 33, the same being fixed in its adjusted position by means of a set screw 34. Pivotally secured to the bifurcated end-portion of the said pin or stem 33, by means of a pivot 35, is a suitable link 36, said link having its lower end-portion pivotally secured by means of a pivot-pin 37 within the one end-portion 39 of a tubular member 38. This tubular member is preferably of the configuration shown in the several figures of the drawings, and is also provided with another end-portion, as 40, in which is arranged and suitably secured therein, preferably by means of a set screw 41, the upper end-portion of a rod 42.

The previously mentioned casing or body 2 is formed with a thickened portion, as 43, which is provided with an opening 44 and suitable screw holes 45. Suitably secured over the said opening 44 and against the inner face 46 of the said thickened portion 43 by means of screws 47 is a plate 48, said plate being provided with a hole or opening 49 in which a portion of the previously mentioned rod 42 is movably arranged. The said plate 48 is also provided with a tubular hub or socket-like member 50 which is arranged in the opening 44, the said member 50 being internally screw-threaded, as at 51. Suitably secured to the said tubular hub or socket-like element 50 by means of an externally screw-threaded portion 52, which is screwed into the screw-threaded portion 51, as shown in Fig. 2 of the drawings, is an expansion member or element 53. As shown in said Fig. 2 of the drawings, the previously mentioned rod 42 extends part way down into the said tube 53, and suitably secured to the lower end-portion of the said rod 42 which is preferably made of copper by

means of a pin 54 or other suitable fastening means, is an expansion rod 55, which is preferably made of nickel. This rod 55 extends down through the remaining portion of the tube 53 and has its lower end suitably and immovably fixed to a cap or element 58 which is fastened in the lower end of the said tube 53, preferably by means of a screw-threaded portion 57.

Having thus in a general way described the construction and arrangement of the several devices and parts of my novel form of mechanical pyrometer, I will now briefly set forth the manner of employing the same for recording temperatures or degrees of heat.

The end-portion 58 of the device is applied to the source or medium of which the temperature is to be taken, either by inserting the said end into said medium, or by otherwise applying it thereto. The generated heat will cause an expansion of the tubular member 53, in the direction of the arrow y in Fig. 2 of the drawings, on account of the opposite end-portion of the expansion tube being fast to the casing or body 2. At the same time, the lower end-portion of the expansion rod 55 being fast in the element 56, and the latter in turn being fast to the lower end-portion of the expansion rod 53, the two connected rods 55 and 42 will also move in the direction of the arrow y in said Fig. 2, and by means of the connecting member 38, the link 36 and the stem 33, will actuate the crank and the toothed sector connected therewith. The result will be that the parts will move into the positions indicated in Fig. 5 of the drawings, the rotary movement of the pinion 25 and the arbor or spindle 16 causing the spiral spring to be wound up, and the index hand to move from its normal initial position indicated in Fig. 1 of the drawings in the direction of the arrow z in said figure, so as to indicate the degrees of heat upon the scale of the dial 7, as will be clearly evident. When the end-portion 58 is removed from the heat-supplying source, and during the contraction of the parts due to cooling off, the previously wound spiral spring, as well as the contraction of the tube 53 and the rod 55, again cause the said parts to assume their normal initial positions, as will be clearly evident.

From the foregoing description of my present invention, it will be seen that I have devised a simply constructed mechanical pyrometer which can be readily carried about and which is effective for heat measurements of low temperatures.

I am aware that some changes may be made in the arrangements and combinations of the various devices and parts, without departing from the scope of my present invention as described in the foregoing specification, and as defined in the claims which

are appended thereto. Hence I do not limit my invention to the exact arrangements and combinations of the devices and parts as set forth in the specification, nor do I confine myself to the exact details of the construction of the said parts as illustrated in the accompanying drawings.

I claim:—

1. A mechanical pyrometer comprising a casing provided with a dial and an index, a tubular expansion element extending therefrom, an expansion rod within said tubular element, said rod having one end fixed to the free end-portion of said tubular element, a second rod of a different metal from said first-mentioned rod, said second rod being arranged in said tubular element, said second rod having one end connected with said first-mentioned rod and having its other end extending into said casing, and mechanism within said casing and connected with said second mentioned rod for actuating said index-hand.

2. A mechanical pyrometer comprising a casing provided with a dial and an index, a tubular expansion element extending therefrom, an expansion rod within said tubular element, said rod having one end fixed to the free end-portion of said tubular element, a second rod of a different metal from that of said first-mentioned rod, said second rod being arranged in said tubular expansion element, said second rod having one end connected with said first-mentioned rod and having its other end extending into said casing, a spring-controlled arbor within said casing, a pinion upon said arbor, a crank, an arm extending from said crank, a toothed sector upon said arm in mesh with said pinion, a stem connected with said crank, a link connected with said stem, and a tubular connecting element with one end-portion of which said link is pivotally connected, said connecting element being attached at its other end portion to said second-mentioned rod for actuating said index.

3. A mechanical pyrometer comprising a casing, provided with a dial and an index, said casing having an opening in its side, a perforated plate secured over said opening, a screw-threaded socket upon said plate

extending into said opening, a tubular expansion element having an end-portion screwed into said socket, an expansion rod within said tubular element, said rod having one end fixed to the free end-portion of said tubular element, a second rod of a different metal from said first-mentioned rod, said second rod being arranged in said tubular element, said second rod having one end connected with said first-mentioned rod and having its other end extending into said casing, and mechanism within said casing and connected with said second-mentioned rod for actuating said index-hand.

4. A mechanical pyrometer comprising a casing provided with a dial and an index, said casing having an opening in its side, a perforated plate secured over said opening, a screw-threaded socket upon said plate extending into said opening, a tubular expansion element having an end-portion screwed into said socket, a spring-controlled arbor within said casing, a pinion upon said arbor, a crank, an arm extending from said crank, a toothed sector upon said arm in mesh with said pinion, a stem connected with said crank, a link connected with said stem, a second tubular element within said casing and a connecting means between said link and said second-mentioned tubular element for actuating said index, an expansion rod within said first-mentioned tubular element, said rod having one end fixed to the free end-portion of said tubular element, a second rod of a different metal from that of said first-mentioned rod, said second rod being arranged in said first-mentioned tubular expansion element, said second rod having one end connected with said first-mentioned rod and having its other end extending into said casing, and secured to said second-mentioned tubular element within said casing.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 18th day of May 1909.

JOHN L. ZANDER.

Witnesses:

FREDK. H. W. FRAENTZEL,
FREDK. C. FRAENTZEL.