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TEMPERATURE INDICATING APPARATUS.

APPLICATION FILED OCT. 14, 1919.

1,382,116. Patented June 21, 1921.

Fig. 1.

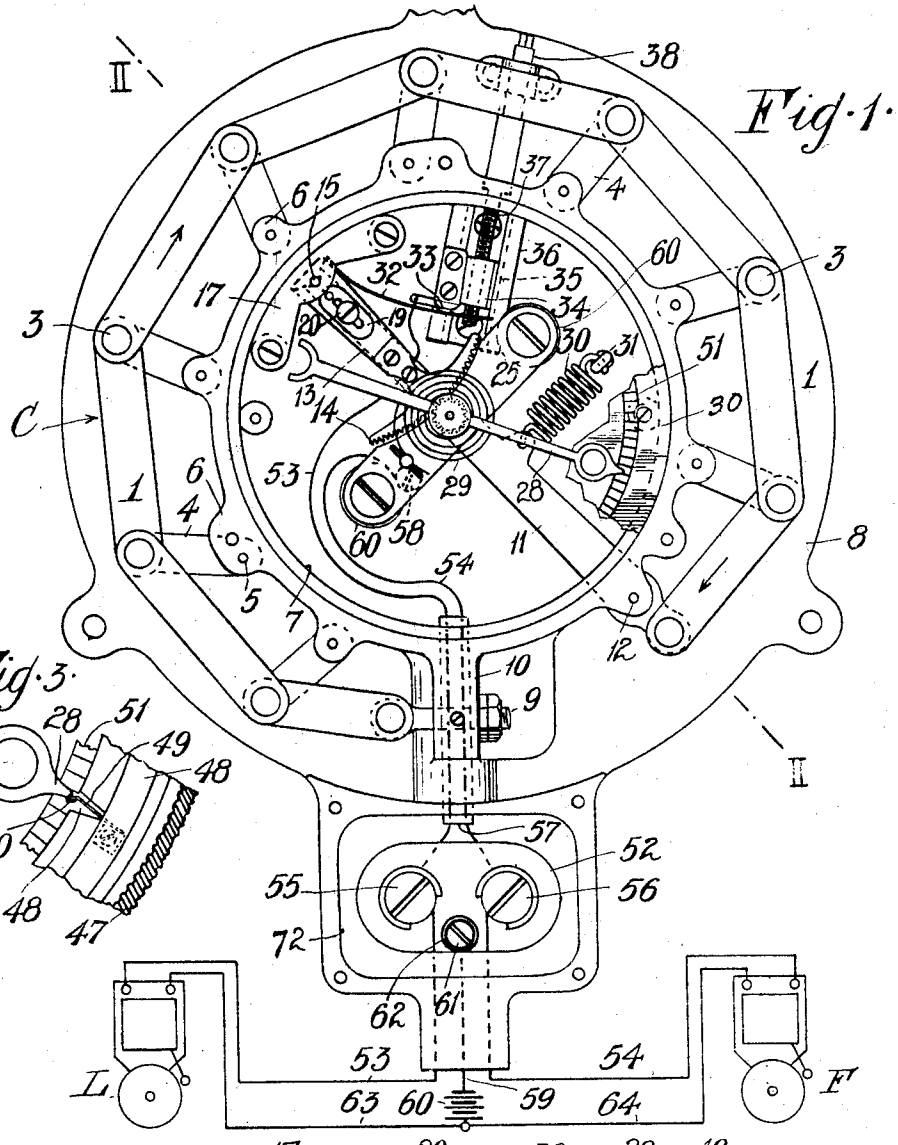
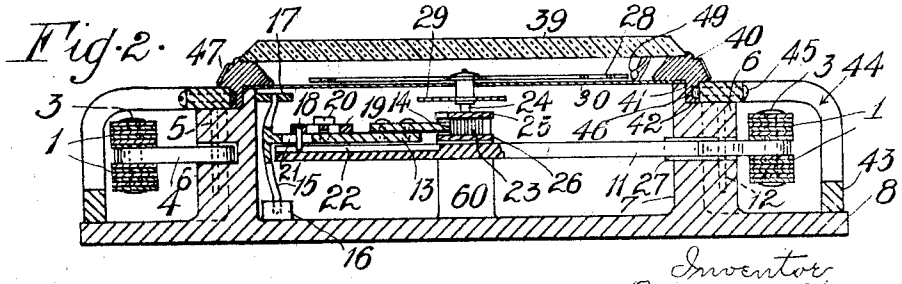


Fig. 3.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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TEMPERATURE-INDICATING APPARATUS.

1,382,116. Specification of Letters Patent. Patented June 21, 1921.

Application filed October 14, 1919. Serial No. 330,678.

To all whom it may concern:

Be it known that I, OLOF HENRY OLSON, a subject of the King of Great Britain, and resident of Kensington, in the State of New South Wales, Commonwealth of Australia, have invented certain new and useful Improvements in Temperature-Indicating Apparatus, of which the following is a specification.

The present invention refers to temperature indicating means of the type in which metal possessing a sensitive degree of expansion is employed and has been devised to provide a compact and reliable apparatus for indicating the temperature degrees and further capable of being so adjusted that any appreciable change of temperature within the expansion range of the metal operates at a predetermined degree to occasion the functioning of electrically actuated or controlled apparatus associated with the same, as for instance an electric bell alarm.

A further object of the invention is the provision of means whereby two separate indications are given of temperature, one at a lower temperature than the other and at points remote from each other the degree at which each indication is given being separately adjustable.

Briefly stated the essential feature of the invention consists of a chain or linked strips of the metal mentioned, one end of the chain being held stationary and the other terminating in attachment to one end of an extended lever actuating, on extension of the chain consequent upon expansion, means for indicating temperature.

A further object of the invention consists in the provision of apparatus comprising means whereby said chain actuates a lever controlling visually indicating temperature means or when predetermined degrees of temperature have been reached effects closure of the circuit or circuits of electrically actuated or controlled apparatus, or the apparatus according to this invention may comprise both of such objects.

A practical application of the said chain and the integers actuated thereby for effecting the objects stated will be hereinafter described with reference to the accompanying sheet of drawings, the novel features being defined in the appended claims.

Figure 1 is a plan of apparatus embodying this invention with the cover removed and other parts broken the associated electric bells and circuits being diagrammatically illustrated.

Fig. 2 is a vertical section on line II—II of Fig. 1 and

Fig. 3 an enlarged fragmentary detail of an electric contact shown in Fig. 2.

The chain C of expansible links is made up in horseshoe or nearly circular formation and each link is composed of a plurality of short thin strips of metal 1 possessing a high co-efficient of expansion. The pivotal pin 3 at each link junction passes through one end of a radial arm 4 of material, preferably metal, having a low co-efficient of expansion, connected by a pivot 5 to lugs 6 formed on the outside of a metal bowl 7 formed centrally of the metal base plate 8. Said links 4 being disposed tangentially to the center of the chain.

One end of the chain of links is connected to a bolt 9 secured to a stout lug 10 formed integral with the bowl which is also composed of metal having a co-efficient of expansion relatively low when compared with the metal of the links. The other end of the chain is pivoted to the shorter arm of a lever 11 mounted by means of a pivot 12 on a lug on the bowl 7. By such arrangement the chain is caused to assume when expanding, a decreasing diameter to accord with the required arc of movement of the shorter arm of the lever 11. To maintain the chain in taut condition a coil spring 30 is attached to said lever 11 and to a short fixed post 31 in the bowl. The lever 11 extends through a slot 27 in the bowl and diametrically across same and is connected with the arm 13, carrying but insulated from, a toothed quadrant 14, said arm being formed integral with a double ended pivot 15 mounted in a footstep bearing 16 and an overhead plate 17 provided in the bowl.

The connection between the arm 13 and the lever 11 in the form of a slotted connection being effected by means of a pin 18 fixed to a slotted slide 19 adjustable longitudinally along said arm and clamped by means of a screw 20. A slot 21 is provided in the arm 13 to permit adjustment of the pin 18 which projects downwardly into and effects mechanical and electrical engagement with a longitudinal slot 22 formed in the outer end of the lever 11.

By means of these adjustable contrivances

the relative leverage between the lever 11 and the quadrant arm may be adjusted as required.

The quadrant 14 gears with a pinion 23 located centrally in the bowl and mounted on a spindle 24 journaled in a bridge support consisting of two separated metal plates 25, 26 mounted on posts 60 and insulated therefrom. Said spindle carries a needle pointer 28 controlled by a hair spring 29 and operating over a disk 30 marked with temperature graduations 51.

The arm 13 of the quadrant carries a contact leaf spring 32 which will contact with a finger 33 insulated from and mounted on an adjustable slide block 34 engaging with undercut grooves 35 in a guide way 36 and operated by a screw 37. The shank 38 which extends through the bowl is sided at the extremity for engagement by a key. By means of this construction contact between the spring 32 and finger 33 may be regulated to occur at a predetermined degree of temperature. The bowl is provided with a transparent cover face 39 fitted to a rotatable metal ring 40 formed with a flange 41 seated on a shoulder 42 formed in the upper edge or lip of the bowl. A circular cover 43 fits over the mechanism described, being seated on the base plate 8 and curved inwardly at the top to rest on the shoulder 42 with its edge bearing against the flange 41 of the ring 40. The cover is provided with a plurality of apertures 44 for the free circulation of the surrounding atmosphere and screws 45 pass through the upper rim of the cover and engage an annular groove 46 formed in the flange 41 of the ring thus holding same down upon the edge of the bowl while permitting rotation of the same which is knurled or milled as at 47 to insure a finger grip of the same.

The inner side of the ring 40 is formed with a slot 48 through which extends a spring contact 49 fixed to the ring and provided with an insulation tip 50 on its reverse side. When the temperature reaches a predetermined degree the point of the pointer 28 bears against the spring contact 49 and completes an electric bell circuit hereinafter described. By rotating the ring the position of contact between the indicator and the spring may be regulated. Contacts 32 and 33 and contacts 28 and 49 complete the circuits of two separate bells L and F, the former being local and the latter situate at a distance from the installation of the thermostatic device as for instance at a fire station, it being arranged as an illustration, that upon rise of temperature of 20 degrees, the local bell L will ring and upon a rise of 40 degrees the fire station bell F will ring and indicate the location of the fire. As illustrated an insulation contact block 52 is located in a separate chamber 72 formed integral with the base 8 and the wires 53, 54 from the bells are attached to terminals 55, 56 on the block and wire 53 continues through a conduit 57 into the bowl and is connected to a terminal projection on the contact finger 33, wire 54 being connected to a screw 58 on the bridge plate 26. Another wire 59 connected with one pole of a battery 60 leads to a screw 61 screwed into a metal sleeve 62 passing through the block and in electrical contact with the base plate 8 on the frame of the instrument. Wires 63, 64 connect the opposite pole of the battery with the bells L and F.

In use a rise in temperature causes extension of the chain C which operates the lever 11 which in turn actuates the quadrant 14 causing partial rotation of the pinion 23 and swinging the pointer 28 over the graduated disk. The movement of the arm 13 of the quadrant causes contact between spring 32 and finger 33 so that the circuit of bell L is completed from battery 60, wire 63, bell L wire 53, contacts 32, 33, arm 13, pin 18, lever 11 to bowl frame and so through sleeve 62 screw 61 wire 59 to battery.

Upon a further increase of temperature, pointer 28 engages contact 49 and the completed circuit of bell F is from battery 60, wire 64, bell F, wire 54, bridge plate 26, spindle 24, indicator 28, contact 49, ring 40, bowl frame, sleeve 62, screw 61, wire 59 to battery.

I claim:—

1. In temperature indicators, a chain composed of links of metal possessing a high co-efficient of expansion, a lever connected to the free end of said chain and operable by the expansion of the latter, and means actuated by said lever for indicating temperature.

2. In temperature indicators, a laminated pivotally conjoined series of short, thin strips of metal possessing a high co-efficient of expansion, means retaining one end of the chain stationary, a lever connected to the other end of said chain and operable by the expansion of the latter, and means actuated by said lever for indicating temperature.

3. In temperature indicators, a chain of approximately circular formation consisting of a pivotally linked series of metallic strips having a high coefficient of expansion, means retaining one end of the chain stationary, a lever connected to the other end of the chain and movable by the expansion of the latter, means actuated by said lever for indicating temperature, and means for guiding the movement of the chain longitudinally.

4. In temperature indicators, a chain of approximately circular formation consisting of a pivotally linked series of metallic strips having a high co-efficient of expansion, means retaining one end of the chain sta-

tionary, a lever connected to the other end of the chain, means actuated by said lever for indicating temperature, means for maintaining the chain taut and means for guiding the movement of the chain longitudinally.

5. In temperature indicators, a chain of approximately circular formation consisting of a series of metallic strips having a high co-efficient of expansion, pins pivotally connecting said strips, means retaining one end of the chain stationary, a lever connected to the other end of the chain and movable by expansion of the latter, means actuated by said lever for indicating temperature, and radial arms connected one to each of the pivots in said chain and arranged tangentially to the center of the chain.

6. In temperature indicators, a chain composed of links of metal possessing a high co-efficient of expansion and extensible longitudinally under increase of temperature, a lever actuated by said chain, a pivoted arm connected to said lever, means for adjusting the position of connection of said arm to said lever, and means actuated by said pivoted arm for effecting temperature indication.

7. In temperature indicators, a chain composed of links of metal possessing a high co-efficient of expansion and extensible longitudinally under increase of temperature, a lever actuated by said chain, a pivoted arm connected to said lever, a slotted plate adjustably attached to said pivoted arm, a pin dependent from said plate and registering in slots in said arm and lever, and means actuated by said arm for effecting temperature indication.

8. In temperature indicators, a chain composed of links of metal possessing a high co-efficient of expansion, a lever connected to the free end of said chain, means actuated by said lever for indicating temperature, a bowl located within the chain length and containing said lever and the means actuated thereby, a base plate extending beyond said bowl, means longitudinally guiding said chain arranged outside said bowl, a rotatable cover closing said bowl and an apertured cover about said chain.

9. In a temperature indicator, a chain composed of links of metal possessing a high co-efficient of expansion and extensible longitudinally under increase of temperature, a lever actuated by said chain, a pivoted arm, a pin and slot connection between said arm and lever and means operated by said arm to indicate temperature.

10. In a temperature indicator, a chain composed of links of metal possessing a high co-efficient of expansion, a two-armed lever one arm of which is connected to the end of said chain, and a retracting spring connected to the other arm, a pivoted arm, an arcuate rack on said arm, an adjustable pin and slot connection between said pivoted arm and lever and means operated from said pivoted arm for indicating temperature.

Dated this first day of September A. D. 1919.

OLOF HENRY OLSON.