

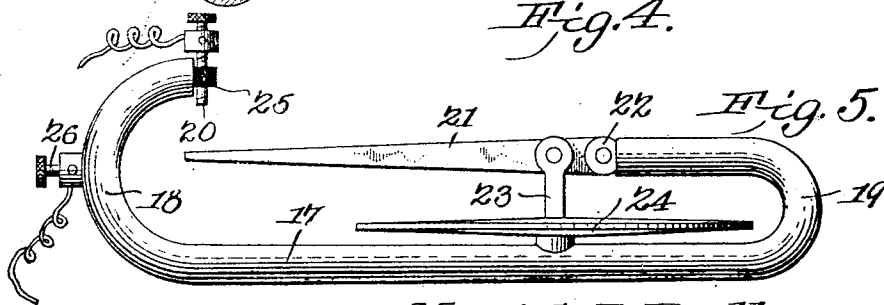
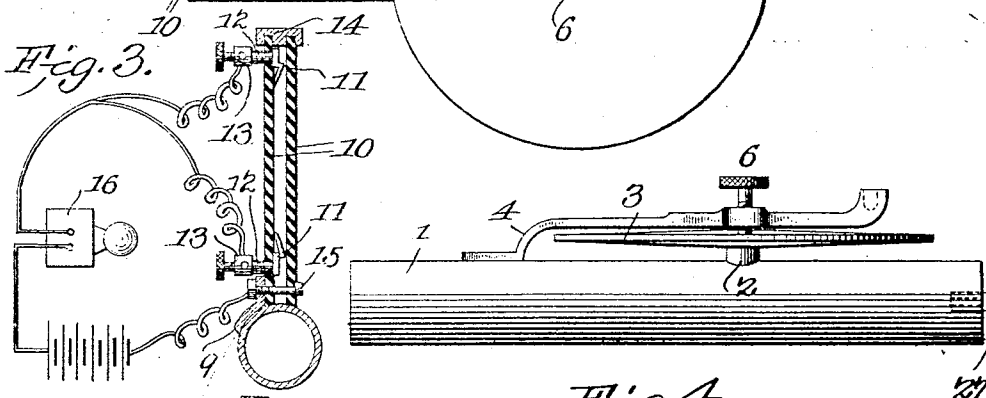
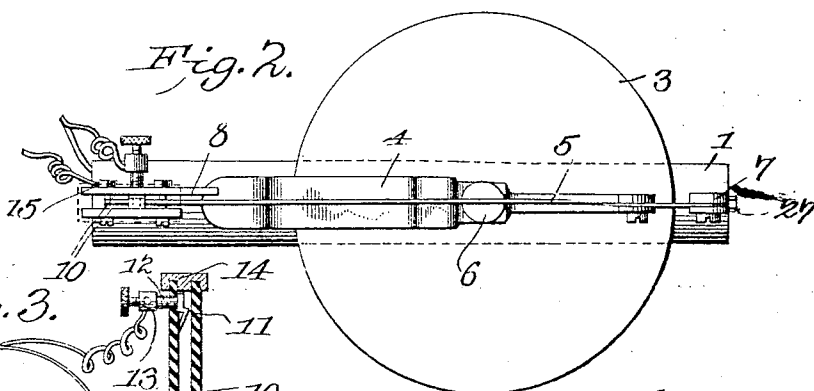
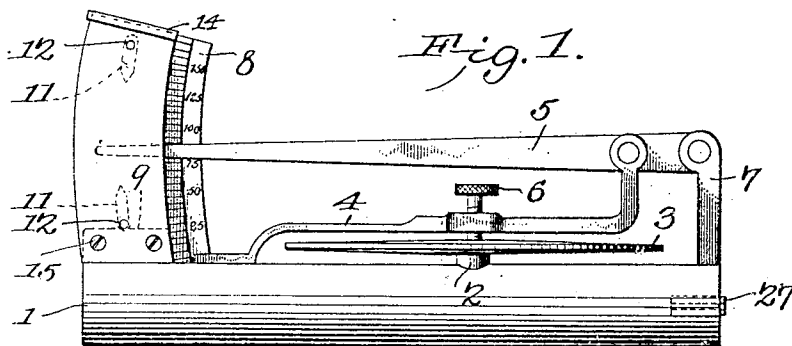
No. 853,826.

PATENTED MAY 14, 1907.

M. L. POULTER.

FIRE ALARM OR TEMPERATURE INDICATOR.

APPLICATION FILED JUNE 4, 1906.



Micaiah L. Poulter,

INVENTOR.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

MICAJAH L. POULTER, OF STOCKPORT, IOWA.

## FIRE-ALARM OR TEMPERATURE-INDICATOR.

No. 853,826.

Specification of Letters Patent.

Patented May 14, 1907.

Application filed June 4, 1906. Serial No. 320,216.

### *To all whom it may concern:*

Be it known that I, MICAJAH L. POULTER, a citizen of the United States, residing at Stockport, in the county of Van Buren and State of Iowa, have invented a new and useful Fire-Alarm or Temperature-Indicator, of which the following is a specification.

This invention relates to a device adapted for use as a fire alarm or temperature indicator of that type in which a confined body of air or other elastic medium is adapted to control by expansion and contraction suitable mechanism for indicating certain predetermined limits of temperature, by visual or audible signal devices, as desired.

One of the objects of the invention is to improve and simplify apparatus of the character described so as to lessen the cost of manufacture, reduce the number of parts, and provide an arrangement which is effective and reliable in operation.

A further object is the provision of a temperature responsive device which may be adapted for use as a fire alarm, as an indicator for certain extremes of heat and cold, or as a regulator such as is commonly employed in incubators for regulating an air damper or the source of heat.

With these objects in view, and others, as will appear as the nature of the invention is better understood, the invention comprises the novel features of construction and arrangement of parts, described hereinafter and set forth with particularity in the claims appended hereto.

In the accompanying drawing, which illustrates certain embodiments of the invention, Figure 1 is a side elevation of apparatus for indicating extremes of temperature. Fig. 2 is a plan view. Fig. 3 is a section on line 3-3 of Fig. 1. Fig. 4 is a side elevation of the device adapted for use as an incubator regulator. Fig. 5 is a side elevation of a further modification.

Corresponding parts in the several figures are indicated throughout by similar characters of reference.

Referring to the drawings, 1 designates what forms at once a supporting structure or frame and a container or receptacle for a suitable elastic medium, such as air. The part 1 may be of any suitable form, such as a straight tube closed at its ends, as shown in Figs. 1 to 4, which is desirable because of its cheapness and simplicity; or it may be made

of a tube curved at its ends, as shown in Fig. 5, to form supporting arms for certain parts of the apparatus, as will hereinafter appear. At an intermediate point in the straight tube 1 is a perforated boss 2 that communicates with the interior of the tube or body 1. Supported on this boss is an expansible device 3 comprising two resilient sheet metal disks soldered or otherwise secured together at their edges to form a diaphragm. The lower one of the disks is soldered or otherwise suitably secured to the boss 2. The diaphragm is weighted by a spring 4 that is anchored at one end on the body 1 and connected at its opposite end is the needle 5, thereby serving as a lever for transmitting motion from the diaphragm to the needle. The spring is adjustably connected with the diaphragm by a set screw 6, the same permitting the tension of the spring acting on the diaphragm to be adjusted to any amount. The needle is fulcrumed on an upright arm 7 arranged at one end of the body 1.

The needle may be used in connection with a dial for indicating visually the temperature to which the body 1 is subjected. Such a dial is indicated at 8 arranged on the body adjacent the free end of the needle. In addition to the segmental dial 8, or without the dial, a suitable audible signaling mechanism may be employed, such as an electric bell, the circuit of which being closed by the movement of the needle 5. For this purpose, two segmental strips of suitable insulating material are arranged on the body 1 and slightly spaced apart from each other to form a pocket for receiving the free end of the needle. These strips are supported on the body 1 by means of a bracket 9, the strips being indicated at 10. The lower ends of the strips and the bracket are perforated to receive a screw for holding them in place. Adjacent the upper and lower ends of the pocket between the strips are contact pieces 11 supported on threaded binding posts 12, which latter carry binding screws for connection with the wires of the electric circuit, as indicated at 13. The upper ends of the strips are capped by a member 14 which serves to exclude dust from the pocket so that the contact between the needle and contact pieces 11 will be good electrically. The electric circuit is grounded at one side to the instrument by means of the screws 15, so that when the needle comes in contact with either

of the contact pieces 11, the circuit will be closed, causing the bell 16 to be actuated. The above arrangement for indicating two extremes of temperature is shown clearly in Fig. 3. When it is desired to employ the apparatus as a fire alarm, the lower contact piece and circuit connected therewith are dispensed with, since the alarm is intended to be sounded only by a rise in temperature which, heating the receptacle 1, expands the air therein and through the diaphragm moves the needle into contact with the upper contact piece 11. The circuit is then completed and the signal sounded.

In the modification shown in Fig. 4, which is adapted for use in regulating an incubator, and similar purposes, the combined spring and lever 4 has its free end bored and tapped for providing connection with the incubator regulating means. The air in the receptacle 1 is subject to expansion and contraction under rise and fall in temperature and acts through the diaphragm to raise or lower the free end of the lever and thus actuate the regulating means.

Referring to Fig. 5, the combined receptacle and frame of the apparatus, designated by 17, has its ends turned into supporting arms 18 and 19 which support, respectively, an adjustable contact piece 20 and needle 21. The lever 21 is fulcrumed in an eye 22 on the extremity of the arm 19 and is pivotally connected with the post 23 arranged in a central position on the upper surface of the diaphragm 24. The extremity of the arm 18 is provided with a tapped eye 25 in which is threaded the contact piece 20. The contact piece is arranged to form a binding post for connection with one side of the electric circuit. The other side of the electric circuit is grounded at any suitable part, such as the binding post 26. In order that the circuit may be completed through the body 17, needle 21 and contact piece 20, from the binding post 26, the eye 25 is made of suitable insulating material. It will thus be seen that by this modified construction the supporting post 7 and insulating strips for supporting the contact pieces 11 employed in the construction shown in Fig. 1 are dispensed with. If desired, a second contact piece may be employed so as to adapt the apparatus shown in this modified construction to indicate a lower extreme of temperature in the same manner described in connection with Fig. 1.

In each of the several constructions shown, the hollow body is provided with an opening, which, while the air or other actuating medium therein is at a proper temperature, is sealed up by a plug 27 soldered in place, so as to form a perfect seal. It has been found desirable when the instrument is to be used as a fire alarm to insert the hollow body in ice water, so as to chill the air preparatory to sealing in the plug 27. This produces an in-

strument which is extremely sensitive to temperature changes and capable of accurate operation. When the apparatus is to be used for incubator purposes, a small quantity of ether or ammonia is supplied to the air in the hollow body, so as to render the operation more sensitive.

I have described the principle of operation of the invention, together with the apparatus which I now consider to be the best embodiment thereof, but I desire to have it understood that the apparatus shown is merely illustrative, and that various changes may be made, if desired, as are within the scope of the invention.

What is claimed is:—

1. The combination of a hollow tubular body containing an expansible medium, a diaphragm actuated by the variation in volume of the medium, a spring supported on the body for weighting the diaphragm and to be moved thereby, and means connected with the spring for receiving motion therefrom.

2. The combination of a hollow body containing an expansible medium, a diaphragm connected with the body and actuated by changes in volume of the medium, a spring supported at one end on the body and extending over the diaphragm, a connection between the spring and diaphragm, and mechanism supported on the body and actuated by the spring.

3. The combination of a hollow tubular body containing an expansible medium, a diaphragm arranged to be actuated by changes in volume of the medium, a spring arranged to weight the diaphragm and receive motion therefrom, a needle connected with the spring to receive motion therefrom, means on one end of the body for pivotally supporting the needle, and a signaling mechanism supported at the opposite end of the body to be controlled by the needle.

4. The combination of a hollow body containing an expansible medium, a diaphragm on the body and arranged to be actuated by changes in volume of the medium, a spring on the body and arranged to weight the diaphragm and receive motion therefrom, an adjustable device connecting the spring with the diaphragm and arranged to vary the tension of the spring, a needle supported on the body which is connected with the spring to receive motion therefrom, and a signal mechanism supported on the body which is controlled by the needle.

5. The combination of a hollow body containing an expansible medium, a needle, and means arranged between the body and needle for actuating the latter by the variations in volume of the medium, said means comprising a diaphragm supported on the body, a lever extending diametrically of the diaphragm and having a resilient end anchored

on the body, a connection between the diaphragm and lever, and means for attaching the lever to the needle.

6. The combination of a straight tubular body having closed ends for containing an expansible medium, an arm extending from one end of the body, a needle disposed at one side of the body and extending approximately parallel therewith, a hinge connection between the arm and lever, a diaphragm sensitive to the variations in volume of the medium in the body, means for supporting the diaphragm on the body, a spring connected with the needle, an adjusting screw between the spring and diaphragm for adjusting the effect of the spring on the latter, a strip of insulating material extending from the end of the body opposite from the said arm and arranged in the path of the free end of the needle, contact means on the said strip arranged in coöperative relation with the needle, and an electric circuit connected with the contact means and grounded on the said body.
7. The combination of a hollow body containing an expansible medium, a needle, means arranged between the body and needle for actuating the latter by variations in volume of the medium, and an electric signal

device controlled by the needle, said device comprising strips of insulating material spaced apart on the body to form a pocket to receive the free end of the needle, means for securing the strips directly to the body, and a contact piece arranged between the strips.

8. The combination of a hollow body containing an expansible medium, a needle, means arranged between the body and needle for actuating the latter by variations in volume of the medium, and an electric signal device controlled by the needle, said device comprising strips of insulating material arranged to receive between them the free end of the needle, means for connecting the strips with the body, a cap on the ends of the strips, and contact pieces arranged between the strips for connection with one side of an electric circuit, and means for grounding the other side of the circuit on the body.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

MICAJAH L. POULTER.

Witnesses:

WILLIAM H. FULLER,  
ELVIN C. MENDENHALL.

Barney,	516,043,	C. C. T.,
Browne,	465,829,	" " "
Baulien,	343,687,	" " "
Butz,	510,889,	" " " F.,
Boyle,	374,581,	" " " "
Facer,	613,062,	" " " "