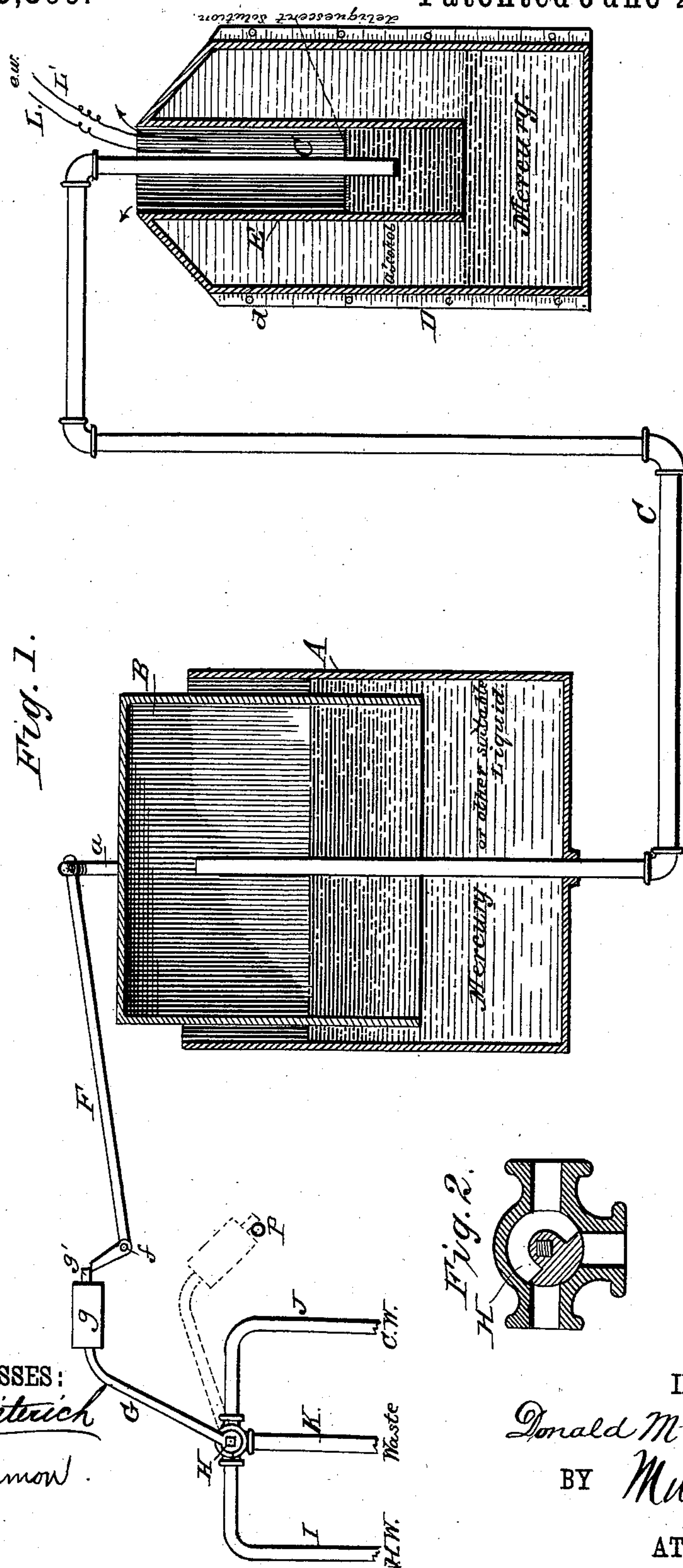


(No Model.)

D. McDONALD.  
TEMPERATURE ALARM.

No. 365,399.

Patented June 28, 1887.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

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## TEMPERATURE-ALARM.

SPECIFICATION forming part of Letters Patent No. 365,399, dated June 28, 1887.

Application filed December 28, 1885. Serial No. 186,863. (No model.)

*To all whom it may concern:*

Be it known that I, DONALD McDONALD, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Temperature-Alarms, of which the following is a specification, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of the apparatus, partly in section; and Fig. 2 is an enlarged detail view showing the cock.

The invention will first be described, and then specifically pointed out in the claims.

A represents a vessel partly filled with mercury or other suitable liquid for supporting the bell or air-containing float B, into which extends a vertical arm of the pipe C, which is open at both ends, the said arm extending to a point about in line with the top of the vessel A.

D is a casing provided with graduations *d*, and having a tube, E, sealed air-tight to the top thereof at its upper end. The tube E is shorter than the casing D, and does not extend to the bottom thereof. Mercury is placed in the lower part of the casing D and extends up into the tube E, and the air-tight space between the tube and casing above the mercury is filled with alcohol or other suitable volatile liquid. The pipe C extends from the bell or air-float B, as described, down into the tube E and into the open column of mercury therein for a predetermined distance. The open column of mercury is protected from the effects of oxidation by means of a small quantity of a deliquescent solution—such as chloride of magnesium, for instance—which would remain in a liquid condition by absorbing moisture from the atmosphere and prevent the air from reaching the mercury.

F is a supporting-lever, the long arm of which is connected to the top of the float B, preferably by an eye, *a*.

I and J represent pipes leading from the cold and hot water supply pipes, and K is a waste or outlet pipe.

H is a three-way cock, which, when opened, affords communication between the hot and cold water pipes and the waste-pipe, as clearly shown in Fig. 2. The lever G is connected at

its lower end to the cock and inclines upward, and is provided with a weight, *g*, having a projection, *g'*, which rests, when raised, on the short arm of the supporting-lever F, as clearly shown in Fig. 1.

L L' are wires in an electric circuit and leading into the upper open end of the tube E. The wires are connected with an electric alarm or a key, for a purpose to be presently described.

When the parts are in the positions shown in Fig. 1, and the temperature of the room lowers to a point determined upon, the alcohol will contract sufficiently to allow the column of mercury in the tube E to fall below the lower open end of the pipe C. Thereupon the compressed air contained in the pipe C and bell or air-float B will pass out of said lower open end into and out of the tube E, and the float will now descend far enough to draw down the long arm of the lever F and release its short arm from the projection *g'*, so that the weighted lever will fall to the position shown in dotted lines, where it will be supported by a stop, P. This action of the lever G will open the three-way cock H and allow the water from pipes I J to flow out through the waste-pipe K. On the other hand, should the temperature rise to a point determined upon, the alcohol will expand and force the mercury up through the tube E and touch the wires to close an electric circuit and sound an alarm or turn a key or cock, as the case may be. The apparatus may be used without this electrical connection or with it, and, if it is desired, the casing D and tube E, provided with mercury and alcohol, as described, may be used alone with the electrical devices. In any case it may be said that a connection is formed between an alarm or cock which is put into operation by the open column of mercury and the alcohol contained in a space communicating with the mercury, but otherwise sealed. The apparatus may be again set for operation by raising the float above the liquid in vessel A, so that it will again be filled with air. The lever G is also raised, its projection *g'* engaging the short arm of supporting-lever F.

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



1. The combination, in a temperature-alarm, of a casing closed at its upper end, having an open tube projecting down into it and sealed to its upper closed end, mercury being placed in the casing and sealing the lower end of the tube, and a volatile liquid in the space between said tube and casing above the mercury, and connecting devices leading into the upper end of said tube and connected to a cock or alarm to be operated, substantially as set forth.

2. The combination, with an open column of mercury or analogous material, of the liquid-containing vessel, the bell or air-float suspended in said vessel by compressed air, a pipe entering the said air-space at one end and sealed at its opposite end in the open column of mercury, and a cock or other operating mechanism operated by the downward movement of said bell or float, substantially as set forth.

3. The combination, with the bell or air-supported float and means for exhausting the air therefrom, of a pivoted supporting-lever connected at one end to the upper part of the bell or float, and a cock or key having a lever connected to it and supported at its outer end by the other arm of said supporting-lever, substantially as set forth.

4. The combination, with an open column or body of fluid expansible and contractible by changes in temperature, and the cock, key, or alarm to be operated, of a bell suspended by compressed air, substantially as described, a pipe leading from the air-space within the bell into the said fluid body or column, and mechanism connecting the said bell with the device to be operated upon a change of temperature, substantially as set forth.

5. The combination, with the casing, the

open tube sealed at its upper end to the top of said casing and projecting therein to a point above its bottom, mercury being placed in said casing and sealing the lower end of the tube, and a volatile fluid in the space between said tube and casing above the mercury, of a fluid-containing vessel and air-bell suspended therein by compressed air, a pipe leading from said air-space down into the mercury in said tube, a supporting-lever connected to the upper end of the bell, a weighted lever supported at its outer end by said supporting-lever, a three-way cock, to which the opposite end of the weighted lever is connected, and hot and cold water pipes and a waste-pipe connected by said cock, substantially as set forth.

6. The combination, in a temperature-alarm, with a liquid-containing vessel, a bell supported therein by compressed air, and a cock connected thereto by intermediate mechanism, of a tube containing column of mercury, a pipe leading from the compressed-air space into the tube and sealed by the mercury, and electric wires connected to a key or alarm and leading into the tube above the normal position of the mercury, whereby the mercury in contracting will fall below the tube and cause the bell to operate its connected mechanism, and expansion of the mercury will cause it to contact with the electric wires and close the electrical circuit, substantially as and for the purpose set forth.

In testimony whereof I have set my hand this 26th day of December, 1885.

DONALD McDONALD.

Witnesses:

KENNETH McDONALD,  
OSCAR REUTER.