(No Model.)

F. B. STEVENS & J. L. BOND.

MARINE TEMPERATURE INDICATOR.

No. 284,774. Patented Sept. 11, 1883.

Fig. 2.

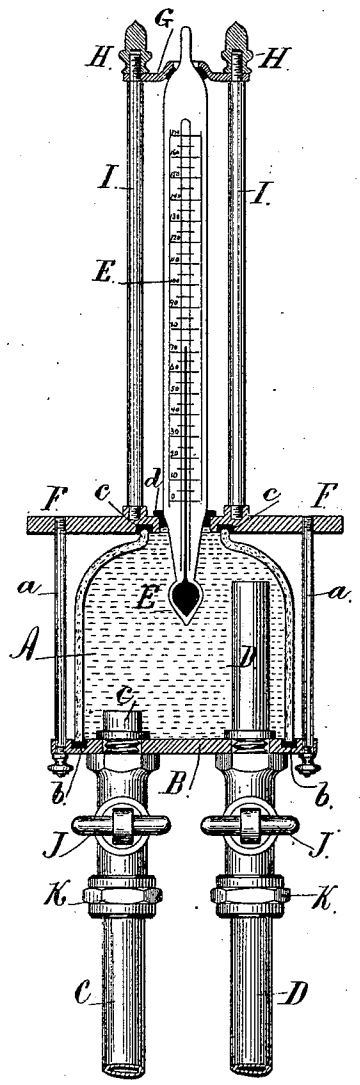
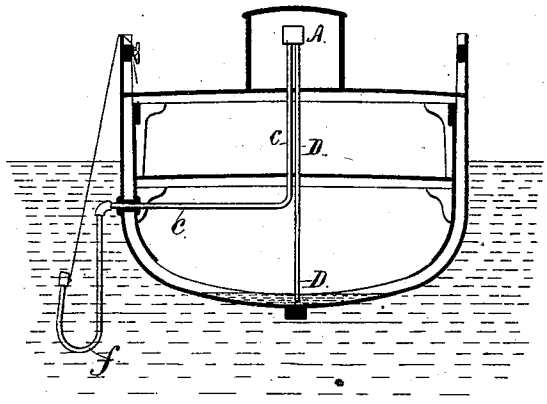


Fig. 1.



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UNITED STATES PATENT OFFICE.

FRANKLIN B. STEVENS AND JOSEPH L. BOND, OF PORT HURON, MICHIGAN, ASSIGNORS TO SAID STEVENS AND THEODORE F. CARMAN, OF MENLO PARK, NEW JERSEY.

MARINE TEMPERATURE-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 284,774, dated September 11, 1883.

Application filed November 7, 1881. (No model.)

To all whom it may concern:

Be it known that we, FRANKLIN B. STEVENS and JOSEPH L. BOND, of Port Huron, in the county of St. Clair and State of Michigan, have invented an Improvement in Marine Temperature-Indicators; and the following is declared to be a description of the same.

Our invention consists of a new and improved means for ascertaining the temperature of water at any required depth in the ocean, in lakes, or in rivers, the main object being to increase the safety of ocean navigation, both in steam and sailing vessels, by showing the decrease of temperature in water at a given depth when approaching an iceberg during the night or in foggy weather, or the increase when in shallow water, any variation being at once shown by the thermometer, which forms a part of the device. The apparatus may be placed in any part of the vessel most convenient for observation. We attain this object by the mechanism illustrated in the accompanying drawings, wherein—

Figure 1 is a cross-section of a vessel, showing the position and general arrangement of the apparatus; and Fig. 2 is a vertical section of the temperature-indicator, with some parts in elevation.

A is a vessel, which is preferably made of glass, and resting upon a packing, *b*, in the lower head or plate, B, and it is covered by the upper head or plate, F, also made with a packing, *c*, for the vessel; or said vessel A may be made of metal and cast in one piece with heads B and F, if preferred. Through the lower plate, B, two pipes, C and D, are inserted, C being the supply-pipe and passing from the inner surface of plate B through the side or bottom part of the vessel. D is the discharge-pipe, the upper end of which passes through plate B, and projects above the bulb of the thermometer E E sufficiently to keep the bulb containing the mercury constantly immersed in the water passing through vessel A. The lower end of this pipe passes down into the bilge-water in the hold of the vessel, below the water-line, the two pipes thus arranged forming a siphon, by means of which a constant flow of water around the mercury of the thermometer is secured. A cock or valve is placed in each pipe below the vessel A. By closing these cocks or valves simultaneously the operation of the device will be stopped and the water retained in the pipes, ready for starting instantly upon opening the valves. The lower end of the thermometer E E passes through plate F, the enlarged part of the thermometer holder or case above the bulb resting upon the rubber packing *d*, and said thermometer is held firmly in place by the cap G, at the top of the same, over which nuts H H are screwed upon rods I I, fastened in the plate F. The thermometer can be easily removed or replaced.

a a are screw-rods passing through the plates B and F, holding them firmly together and clamping the vessel A, and making a water-tight joint by means of the packings *b c* aforesaid between the respective ends of the vessel A and plates B F.

J J are the cocks or valves through which the water passes to and from cylinder A.

K K are couplings connecting the supply and discharge pipes with said cocks or valves J J. The water may also be supplied to vessel A, through pipe C, by means of a force-pump.

We provide a pipe, *f*, outside the vessel, and connecting with the supply-pipe C at the side or bottom of the vessel, and we provide a rope or chain or other suitable means for raising the said pipe *f*, or lowering it, as may be desired, to a greater depth, so that the inlet end of the pipe *f* will be at whatever depth in the water the temperature is to be ascertained. In ascertaining the temperature at a great depth the supply-pipe *f* should be covered with a poor conductor of heat—such as gutta-percha—thus preventing other temperatures through which it descends having any effect upon the water passing through the pipe.

We claim as our invention—

1. The combination, with the closed vessel A and thermometer E, of the pipes C D, that open at their upper ends into the vessel A, the valves or cocks J J to said pipes, and the supply-pipe C, extending to water outside the vessel and to the desired depth, for the purposes and substantially as specified.

2. The combination, with the vessel A and

thermometer E, of the pipes C and D and cocks or valves J J, a movable pipe, *f*, outside the vessel, and mechanism for raising and lowering the same, so as to take in water at any desired depth, substantially as specified.

3. The combination, with the thermometer E, rods I, movable cap-piece G, and elastic washer *d*, of the plates B and F, glass vessel A, open at top and bottom, the elastic washers *b c*, and screw-rods *a*, substantially as set forth.

4. In a marine temperature-indicator, the combination, with the closed vessel A, of a thermometer, E, mechanism for holding the same in place and allowing for insertion into or removal from the vessel A, the inlet-pipe C, extending to the outside of the vessel, the discharge-pipe D, extending up into the vessel A, above the bulb of the thermometer, and discharging at its lower end into the bilge-water of the vessel, and a cock or cocks to regulate the flow of water, substantially as specified.

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