

(No Model.)

D. T. ELLIS.

SELF ACTING AIR VALVE.

No. 379,889.

Patented Mar. 20, 1888.

Fig. 1.

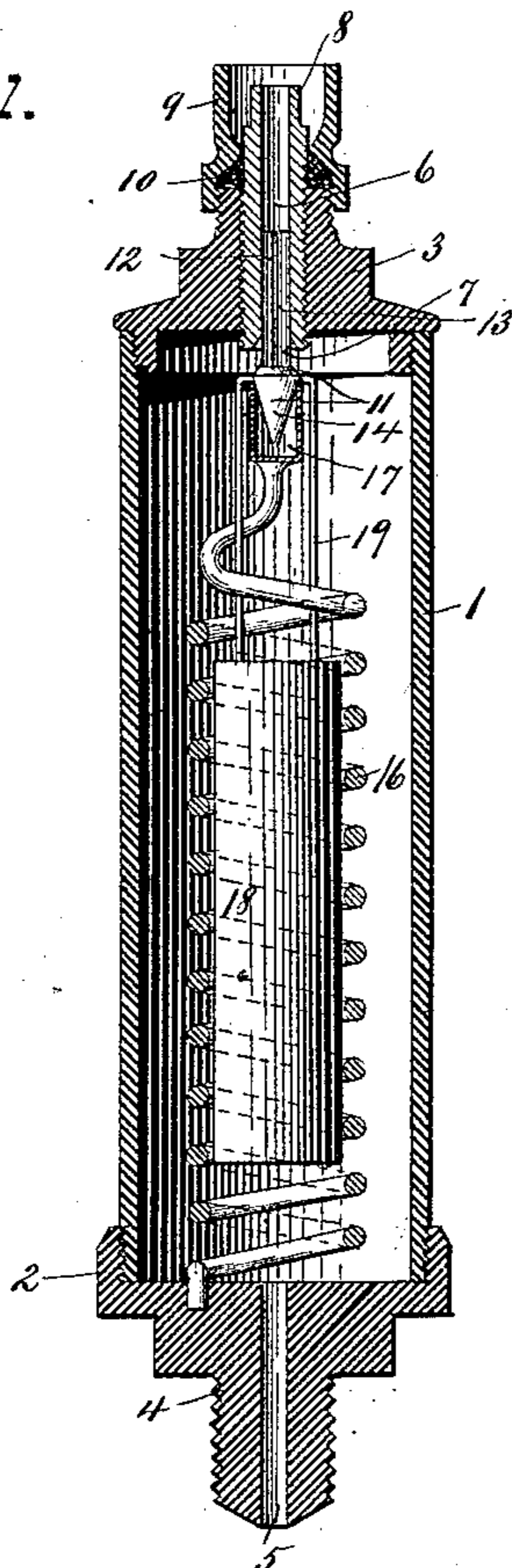


Fig. 2.

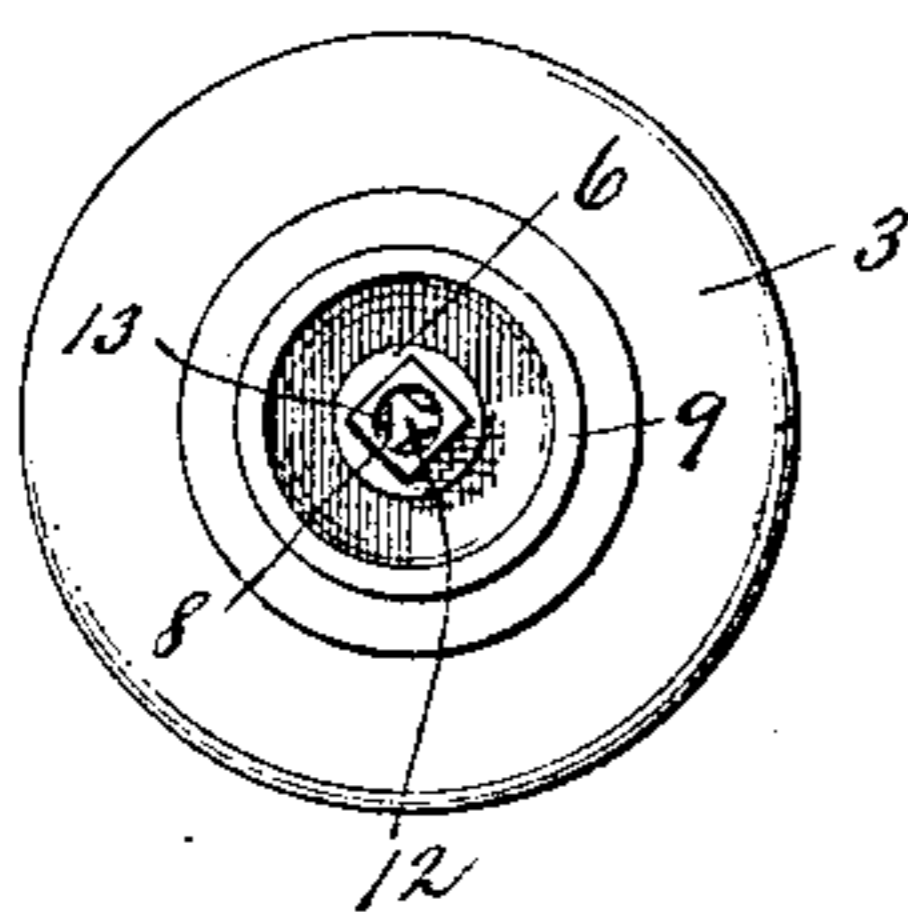


Fig. 5.

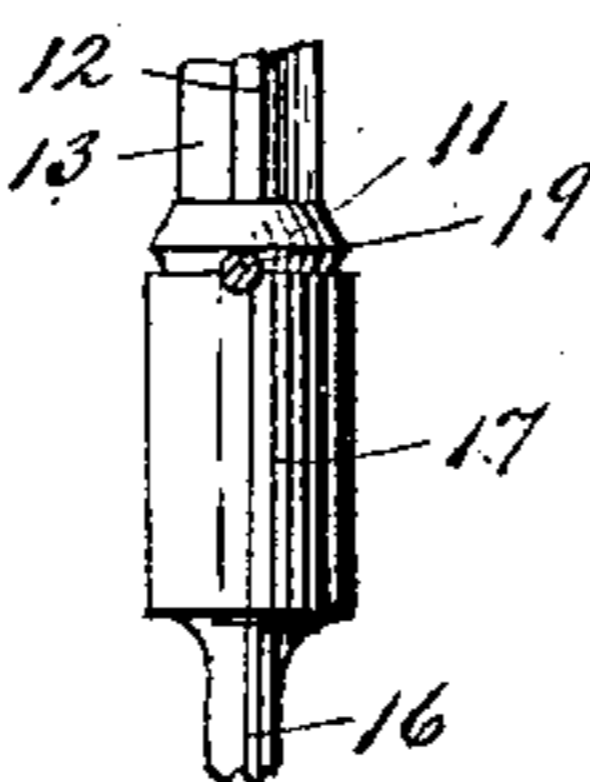


Fig. 4.

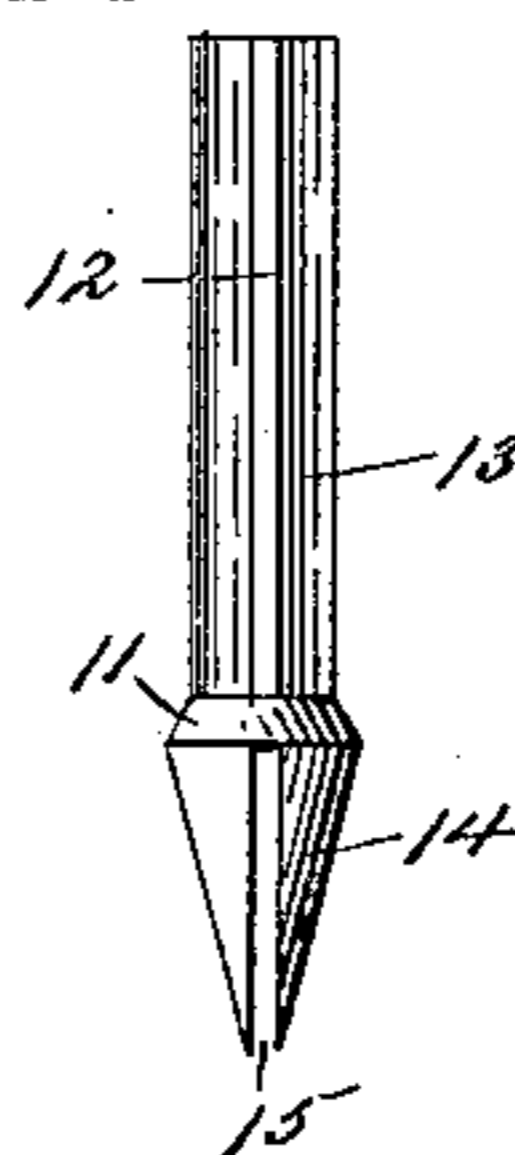
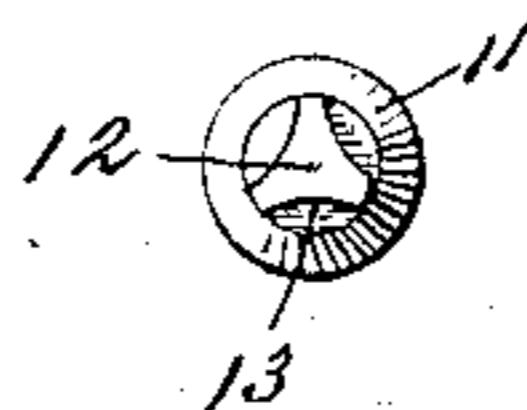


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

DAVID T. ELLIS, OF BRIDGEPORT, CONNECTICUT.

SELF-ACTING AIR-VALVE.

SPECIFICATION forming part of Letters Patent No. 379,889, dated March 20, 1888.

Application filed October 17, 1887. Serial No. 252,555. (No model.)

To all whom it may concern:

Be it known that I, DAVID T. ELLIS, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Self-Acting Air-Valves; 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.

My invention has for its object to produce a device of this class which shall be simple in construction, economical in cost, thoroughly automatic in its action, practically impossible to get out of order, and which will, moreover, act as a perfect cut-off to prevent escape of water from the radiator should it become filled from any cause whatever. It has heretofore been a serious objection to this class of valves that they were clumsy and unsightly in appearance, and, moreover, that they allowed large quantities of water to escape, so that it has invariably been necessary to provide drip-pans for the overflow, and even then serious damage has frequently resulted from the escape of water from the radiator through carelessness in filling the boiler and from various other causes. In order to overcome this objection and provide a self-acting valve that shall be neat and compact in appearance and afford a perfect check against the escape of water from radiators, thus rendering unsightly drip-pans wholly unnecessary, I have devised the simple and novel construction of which the following description, in connection with the accompanying drawings, is a specification, numbers being used to denote the several parts.

Figure 1 is a central section of the device complete, the float and valve being in elevation; Fig. 2, a plan view; Fig. 3, a plan view of the valve detached; Fig. 4, a side elevation thereof; and Fig. 5 is an elevation of the cup and valve detached, the point of view being at a right angle to that in Fig. 1.

1 denotes the case, ordinarily made of brass; 2, the lower cap, and 3 the upper cap, both ends of the case being either internally or externally screw-threaded to engage corresponding threads upon the caps.

4 denotes a hub on the lower cap for adjust-

ment to the radiator, and 5 a passage through the lower cap, by which air and steam from the radiator, and water likewise, under certain circumstances, enter the case.

6 denotes a tube extending through the upper cap and screw-threaded to engage therewith. At the lower end of this tube is a valve-seat, 7. The upper end of this tube is squared, as at 8, for the attachment of a key or wrench whereby the tube may be turned to adjust the valve-seat either up or down.

9 is a guard threaded to engage the upper cap, which serves to protect the end of tube 6 and prevent its being tampered with.

10 denotes packing held between the upper cap, tube, and guard, which prevents the escape of steam through the upper cap outside of the tube.

11 is a valve, which is ground to engage seat 7. A stem, 12, projects upward from the valve into the tube, and is provided with grooves 13, to permit free passage of air and steam when the valve is not in engagement with the seat, the ribs of the stem between the grooves being of suitable size to engage the interior of the tube and hold the valve steady by preventing lateral motion.

14 is a cone below the engaging portion of the valve, which is provided with a transverse slot, 15, as clearly shown in Fig. 4.

16 denotes a metallic coil within the case, the lower end of which is attached to the lower cap, and which carries at its upper end a cup, 17, of sufficient size to receive the cone, so that the steam can under no circumstances act directly on the cone to close the valve, which can only be closed by the raising of the cup by means of expansion of the metal of the coil when heated by the steam.

The operation of this portion of my invention is as follows: Supposing steam to be turned on in the radiator, the first effect would be to drive the air in the radiator out through the valve, the normal position of which is at sufficient distance below the seat to permit free passage of air out through the tube, as clearly indicated in Fig. 1, the air in escaping passing through the channels in the valve-stem. As soon as steam enters the case, however, it acts to expand the metal of the coil, which raises the cup, and with it the valve, which it closes firmly against the seat. The length of

the coil is of course adjusted approximately in manufacturing, the final adjustment being secured by raising or lowering the valve-seat, as may be necessary. So long as steam remains in the radiator the coil will be kept expanded and the valve will be held against the seat. As soon, however, as steam is shut off, the cooling of the metal of the coil contracts it, and the cup, and with it the valve, drops down to the open position, as shown in Fig. 1.

18 is a float made of light sheet metal and air-tight, or, if preferred, of cork or other suitable material. A rigid loop, 19, extends upward from the float and over the top of the cup, notches being preferably provided in the top of the cup to hold it against rotation, as shown in Fig. 5. This loop lies in slot 15 in the cone, which, in fact, straddles it, as clearly shown in Figs. 1 and 5. Should the radiator become filled with water from any cause whatever, it will of course be forced out into the valve-case. The effect of this will be to raise the float, and by the engagement of the loop with the valve the latter will be raised against the seat, thus effectually closing the passage and preventing the escape of water.

I do not of course desire to limit myself to the exact details of construction shown and described, as they may be considerably varied without departing from the spirit of my invention.

I claim—

1. A self-acting valve consisting of a case having a seat, a detachable valve, a metallic coil supporting said valve, and a float having a rigid loop, which also engages the valve, whereby the entrance of either steam or water acts to raise the valve against the seat—the former by expansion of the coil and the latter by raising the float.

2. A self-acting valve consisting of a case having a seat, a valve adapted to engage the seat, a cup engaging the valve, and a metallic coil carrying the cup, whereby entrance of steam into the case raises the valve against the seat by expansion of the coil, but the di-

rect action of steam upon the valve is prevented, substantially as described.

3. The combination, with the case having a seat, of a coil, a detachable valve carried thereby, and a float having a rigid loop engaging the valve, substantially as described.

4. The combination, with the case and an adjustable valve-seat, of a valve adapted to engage said seat, and a cup carried by a metallic coil, upon which the valve rests, so that expansion and contraction of the coil raises and lowers the valve.

5. The combination, with the case and an adjustable valve-seat, of a valve adapted to engage said seat, a cup upon which the valve rests, a metallic coil carrying the cup, and a float having a rigid loop, also engaging the valve, so that the entrance of steam closes the valve by expansion of the coil and the entrance of water closes it by raising the float.

6. The valve-case having upper and lower caps, and a threaded tube passing through the upper cap and having a valve-seat at its lower end, in combination with a valve, a cup upon which the valve rests, and a metallic coil carrying the cup.

7. The case having upper and lower caps and a threaded tube passing through the upper cap and having a valve-seat at its lower end, in combination with a valve adapted to engage the seat and having a grooved stem passing into the tube, and a cup upon which the valve rests, and a metallic coil carrying the cup.

8. The combination, with the seat, of a valve having a cone with a slot, 15, a cup upon which the cone rests, a metallic coil carrying the cup, and a float having a rigid loop, which passes over the cup and lies in the slot, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

DAVID T. ELLIS.

Witnesses:

A. M. WOOSTER,
B. E. LEE.