J. MUNDORF.

UNSIPHONABLE MERCURY VALVE.

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1,259,122. Patented Mar. 12, 1918.

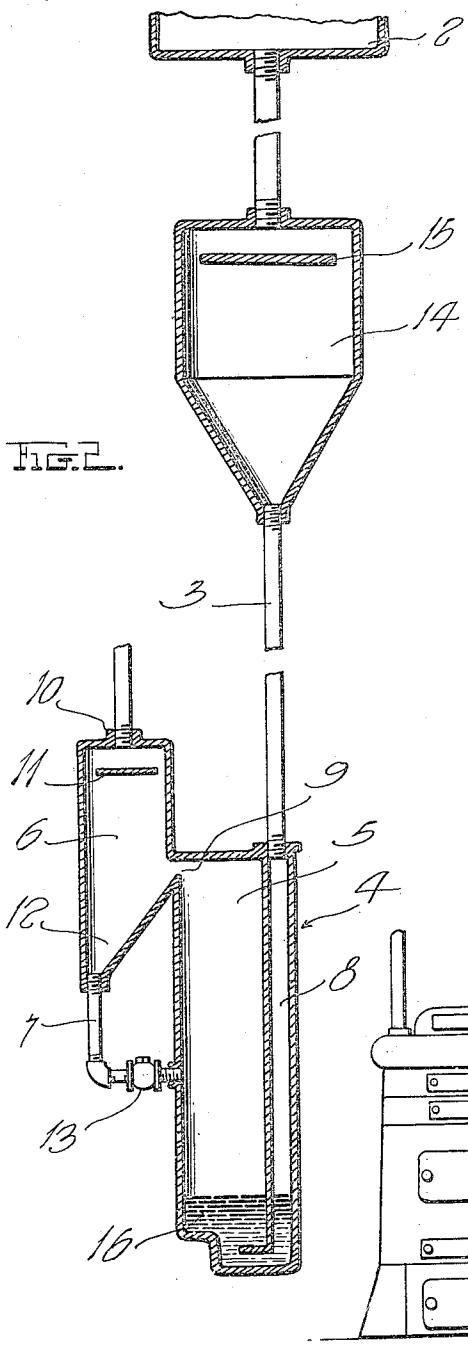


FIG. 2.

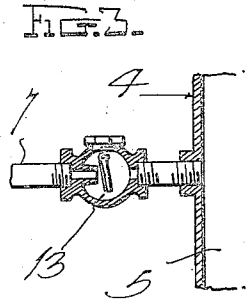


FIG. 3.

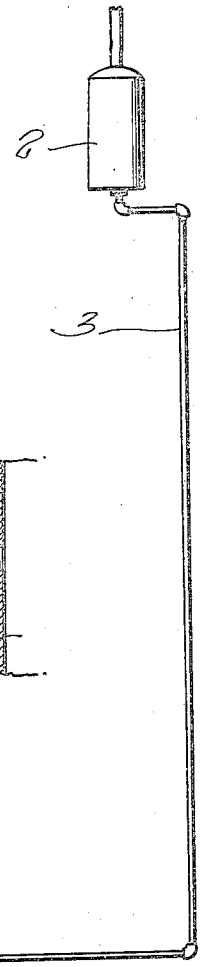


FIG. 1.

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UNSIPHONABLE MERCURY-VALVE.

1,259,122. Specification of Letters Patent. **Patented Mar. 12, 1918.**

Application filed April 30, 1917. Serial No. 165,616.

To all whom it may concern:

Be it known that I, JAMES MUNDORF, a citizen of the United States, residing at Sharon, in the county of Mercer and State of Pennsylvania, have invented certain new and useful Improvements in Unsiphonable Mercury-Valves; and I do 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 relates to that class of devices adapted to provide a mercury seal between the boilers and the expansion tanks of hot water heating systems, the object being to provide a device of this class so constructed as to positively prevent the mercury from being siphoned therefrom by passage of water through the valve casing upon automatic opening of the seal.

With the foregoing general object in view, the invention resides in the novel features of construction and unique combinations of parts to be hereinafter fully described and claimed, the descriptive matter being supplemented by the accompanying drawing which forms a part of this specification and in which:

Figure 1 is a diagram showing the application of the improved valve in the pipe line between a boiler and the expansion tank thereof;

Fig. 2 is an enlarged vertical section of the valve and the chamber in which mercury carried from the latter is separated from the water; and,

Fig. 3 is a detail section of the check valve employed in the return from the auxiliary to the main chambers of the valve.

In the drawings above briefly described, the numeral 1 designates a common type of boiler used in heating systems, while 2 has reference to an expansion tank located at a suitable elevation and connected with the boiler by way of a pipe line 3, the improved valve 4 being positioned in said line adjacent the boiler 1.

The valve 4 consists briefly of main and auxiliary casings 5 and 6, respectively, connected by a return 7, the two casings being preferably formed of a single casting as illustrated. The casing 5 is elongated vertically and is provided with an outlet passage 8 leading from its lower end upwardly along one of its sides, the upper end of said passage being tapped for the reception of one section of the pipe line 3. The upper end of the casing 5 is formed with a lateral opening 9 which communicates with the auxiliary casing 6, between the ends of the latter, the upper end of said auxiliary casing preferably having a tapped boss 10 for connection with the pipe line 3.

Extending across the upper end of the auxiliary casing 6 and positioned immediately below the boss 10, is a baffle 11 which will in most cases be employed although the device has been found to operate successfully without such a baffle. The lower end of casing 6 is in the form of a hopper 12 from whose lower end the return 7 extends, said return discharging into the main casing 5 between the ends of the latter and having a check valve 13 which opens toward said main casing.

A chamber 14 is provided in the pipe line 3 at a suitable distance above the valve 4, it being in this chamber that any mercury carried from the valve by the passage of water therethrough, is separated from such water, the latter then flowing to the expansion tank 2. A baffle 15 is preferably employed at the upper end of the chamber 14 in order to prevent the possible discharge of mercury from the upper end thereof.

In use, the device is installed as shown in Fig. 1, a sufficient quantity of mercury having been poured into the casing 4 as indicated at 16 in Fig. 2. This mercury will now form a seal to prevent escape of water from the boiler into the expansion tank, until such water has reached a predetermined temperature, (say 257 degrees Fahrenheit). As soon as this takes place, however, the seal is broken and the hot water passes through the valve and escapes through the passage 8 and pipe line 3 into the chamber 14, necessarily carrying with it a quantity of the mercury 16. The chamber 14, being larger than pipe 3, the rate of movement of the water is decreased so that the mercury will drop by gravity in the chamber and will return therefrom to the casing 5, when the force of the water current recedes sufficiently. On account of the suddenly released pressure in the boiler, the water will be expelled therefrom with high force, and will thus rise considerably above the appropriate level in the expansion tank 2. This causes a partial vacuum in the boiler, and the combined action of the high level of

water mentioned and this vacuum, causes the water to surge downwardly from the tank 2, through the valve 4 and again into the boiler. When this takes place, some of the mercury 16 will be carried upwardly with the water through the casing 5 but since the water current must turn horizontally and pass through the comparatively narrow passage 9, the velocity of the same is decreased with the result that the mercury will fall by gravity into the hopper 12, whereas the water will pass from the casing 6 into the boiler.

The return surging of the water through the valve holds the check valve 13 against opening but as soon as the water has again quieted down, the weight of the trapped mercury in hopper 12 will automatically open said valve so that said mercury is returned to the lower end of the casing 5, the valve being now in readiness for further operation whenever necessary. Since the check valve 13 remains closed during the return movement of the water through the device, no suction will be created in the lower end of the hopper 12 and thus there will be no force exerted which will tend to remove the trapped mercury therefrom.

The device has been given rigid tests and under all conditions encountered in the operation of such a valve, it has been found impossible to siphon the mercury from the device, this being due to the novel construction of parts shown and described. On account of the proven advantages of this construction, it constitutes the preferred form of the valve, but I wish it understood that within the scope of the invention as claimed, numerous minor changes may be made without sacrificing the principal advantages.

I claim:—

1. A mercury valve comprising a chamber to contain a quantity of mercury, a passage rising from the lower end of said chamber, a lateral passage at the upper end of said chamber, a mercury trap below said lateral passage, a water connection at the upper end of said trap, and a return from the lower end of said trap to said chamber.

2. A mercury valve comprising a chamber to contain a quantity of mercury, a passage rising from the lower end of said chamber, a lateral passage at the upper end of said chamber, a mercury trap below said lateral passage, a water connection at the upper end of said trap, a return from the lower end of said trap to said chamber, and a check valve in said return opening toward said chamber.

3. A mercury valve comprising a vertically elongated main casing having a passage leading from its lower end upwardly along one of its sides, said lower end of the casing being adapted to contain a quantity of mercury and the upper end of said casing having in one side an opening, an auxiliary casing on the exterior of the main casing and having at its upper end a water connection, said opening communicating with said auxiliary casing between its ends, and a return from the lower end of said auxiliary casing to said main casing.

4. A mercury valve comprising a vertically elongated main casing having a passage leading from its lower end upwardly along one of its sides, said lower end of the casing being adapted to contain a quantity of mercury and the upper end of said casing having in one side an opening, an auxiliary casing on the exterior of the main casing and having at its upper end a water connection, said opening communicating with said auxiliary casing between its ends, a return from the lower end of said auxiliary casing to said main casing, and a check valve in said return and opening toward said main casing.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JAMES MUNDORF.

Witnesses:
GEORGE GONLER,
JOHN MUNDORFF.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."