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A. J. NERAD

1,759,133

MERCURY BOILER

Filed July 11, 1927

Fig. 1.

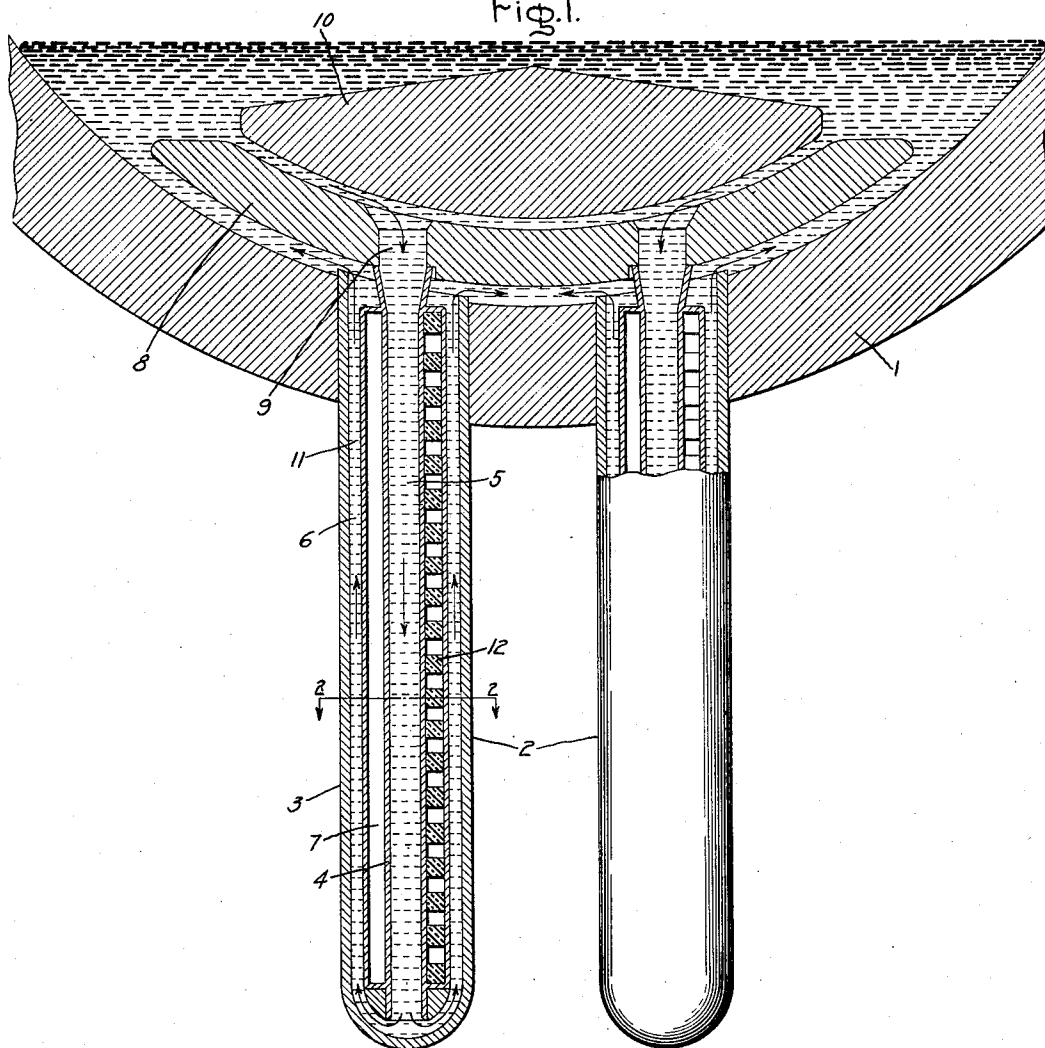
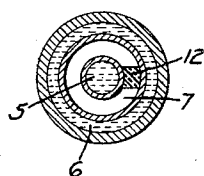


Fig. 2.



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UNITED STATES PATENT OFFICE

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MERCURY BOILER

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In connection with the use of mercury as a liquid for boilers a serious problem arises due to its relatively high cost, and efforts to meet this problem have been by way of limiting to a minimum the liquid spaces in the boiler and boiler tubes. However, when the practical limit has been reached there is required still a large amount of mercury so that the cost of the mercury for a mercury boiler is a considerable sum.

The object of my invention is to provide a substance for use in a mercury boiler whereby the amount of mercury required is greatly reduced.

According to my invention, I substitute for mercury in a mercury boiler an amalgam or an adulteration of mercury with some other substance. For example, I may utilize mercury and some other substance such as lead, the amalgam being one which at the temperature and pressure at which the boiler operates, remains in the form of a liquid. With this arrangement, the amalgam forms the liquid for the boiler and functions to keep up the circulation, the mercury being vaporized. As a result, I am enabled to reduce greatly the amount of mercury required to charge the boiler.

In the drawing, Fig. 1 is a sectional view of a portion of a boiler charged with an amalgam in accordance with my invention, and Fig. 2 is a detail sectional view taken on line 2-2, Fig. 1.

Referring to the drawing, 1 indicates a boiler shell and 2 indicates boiler tubes connected to the shell and depending therefrom. Tubes 2 comprise outer tubes 3 and inner tubes 4 which define central down passages 5 and surrounding annular up passages 6. Each inner tube 4 comprises two spaced walls between which is a sealed chamber 7 which serves to retard transfer of heat from passage 6 to passage 5. The upper ends of inner tubes 4 are connected to a baffle plate 8 provided with openings 9 through which liquid is fed to passages 5. Above baffle plate 8 are suitable filler blocks 10. The boiler construction as so far described, is shown only by way of example and is to be taken as typical

of any suitable boiler construction adapted generally for use as a mercury boiler.

According to my invention, the boiler is charged with an amalgam 11 which, as pointed out above, may comprise mercury and lead in suitable proportions. Or it may comprise mercury and any other suitable substance which forms an amalgam with mercury.

When the boiler is cold, the amalgam may solidify wholly or partly and preferably I provide a special means in connection with the boiler tubes for transferring heat from outside the tubes to the substance inside the down tubes so that when starting up the substance inside the down tubes will be readily liquefied. To this end, I may provide a number of heat-conducting blocks 12 in the chambers 7 which serve to convey heat directly across chambers 7 into the substance in down tube passages 5.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. A boiler for generating mercury vapor, said boiler being charged with a substance consisting of mercury and adulterating material to which the heat is applied for vaporizing the mercury of the substance.

2. A boiler for generating mercury vapor, said boiler being charged with an amalgam to which the heat is applied for vaporizing the mercury of the amalgam.

3. A boiler for generating mercury vapor, said boiler being charged with an amalgam comprising mercury and lead to which the heat is applied for vaporizing the mercury of the amalgam.

4. A boiler tube for a boiler adapted to be charged with an amalgam, said tube comprising inner and outer tubes defining a central down passage and an annular up passage, and said inner tube comprising spaced annular walls which define between them a non-heat-conducting space, and means associated with such space to provide for transfer of heat across it.

5. A boiler tube for a boiler adapted to be charged with an amalgam, said tube comprising inner and outer tubes defining a central down passage and an annular up passage, and said inner tube comprising spaced annular

walls which define between them a non-heat-conducting space, and heat-conducting blocks in said space to provide for transfer of heat across it.

6. The combination with a boiler adapted to be charged with an amalgam, said boiler comprising down tubes having walls of poor heating-conductivity, of means associated with said tubes whereby a limited amount of heat may be conveyed directly to the interior of said down tubes.

7. A boiler for generating mercury vapor, comprising a drum, boiler tubes connected to the drum, and a substance in the drum and tubes comprising mercury and an adulterating material to which heat is applied for vaporizing the mercury of the substance.

8. A boiler for generating mercury vapor comprising a drum, boiler tubes connected to the drum, and an amalgam in the drum and tubes to which heat is supplied for vaporizing the mercury of the amalgam.

9. A boiler for generating mercury vapor comprising tubes to which heat is applied, and a substance in the tubes comprising mercury and an adulterating material, the heat applied to the tubes serving to vaporize the mercury of the substance.

10. A boiler for generating mercury vapor comprising tubes to which the heat is applied and an amalgam in said tubes, the heat applied to the tubes serving to vaporize the mercury of the amalgam.

In witness whereof, I have hereunto set my hand this 8th day of July, 1927.

ANTHONY J. NERAD.