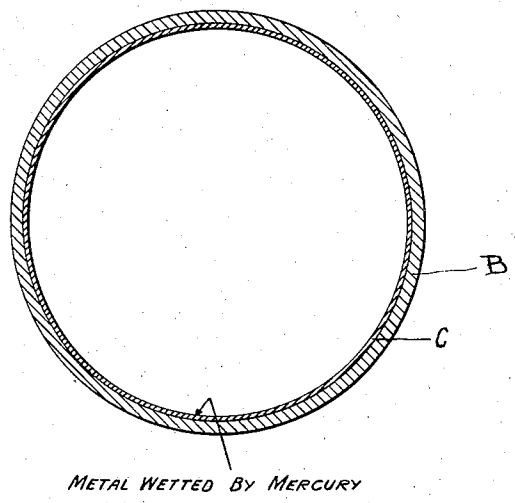
Feb. 17, 1931. W. E. TRENT 1,792,784

MERCURY VAPOR BOILER

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UNITED STATES PATENT OFFICE

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MERCURY-VAPOR BOILER

Application filed May 2, 1928. Serial No. 274,879.

This invention relates to a method of, and means for, increasing the efficiency of mercury-vapor boilers, and more particularly to a method of so treating the surfaces of the boiler that mercury will wet these surfaces.

An object of this invention is to provide means that will secure a better heat transfer to the mercury than has hitherto been possible.

A further object is to prepare a boiler surface of a type that will be wetted by mercury.

Other objects which I have attained will appear as the description proceeds.

Mercury vapor is becoming increasingly useful as a pressure expansion fluid and as a heat carrier, its efficiency being considerably greater than that of steam.

It is well known, however, that mercury does not wet steel or iron surfaces. Due to this fact, a certain amount of the gases or vapors present in the boiler may form a film between the steel shell and the liquid mercury, which film will naturally cause a retardation of heat transfer between the boiler tubes and the liquid thereby decreasing the efficiency of the boiler.

If, however, all parts of the boiler which come in contact with mercury are formed of a substance which is wetted by mercury, it can readily be seen that the heat conductivity will be much increased and the efficiency of the boiler correspondingly raised.

My invention embraces the coating of the steel or iron surfaces with any substance which is wetted by mercury, and is stable under the temperature and pressure conditions prevailing in a mercury boiler. Chief among these substances are the metals and alloys, practically all of which aside from the ferrous group, are so wetted. More specifically, I contemplate the use of silver to attain the desired end, although by no means limiting myself to this metal.

The silver, or other metal, can be applied in any desired fashion; thus, the surfaces might be electroplated; the metal might be applied by chemical reduction, similar to the "silvering" of mirrors; a lining or shell of the metal might be prepared and fitted to the steel boiler tubes; or any other suitable means could be used. Alloys, as well as pure metals, might be employed.

Instead of plating or otherwise coating all the surfaces of the boiler the advantages of the invention may be obtained by coating only those surfaces through which it is intended to conduct heat from the source of heat to the mercury. In fact, it may be desirable to omit coating those portions of the boiler through which it is not desired to transfer heat, particularly any such surfaces which may come in contact with mercury in liquid form.

It is not even necessary that the metal to be wetted be applied to a steel or iron base. The boiler tubes themselves may be constructed entirely of the metal or alloy which has been selected provided such metal possesses the requisite strength and other properties required of a metal to be used in forming a boiler. An important advantage of such a construction might, by careful selection of materials, be found in the intrinsic heat conductivity of the metal or alloy chosen. Thus while iron has a heat conductivity in the neighborhood of 0.15, the conductivity of silver is approximately 1.0. Other metals and alloys would be useful in this connection in proportion to their heat conductivities.

In the accompanying drawing, the single figure is an enlarged cross-sectional view of a boiler tube in connection with which I have chosen to illustrate my invention. The boiler tube B or like instrumentality for containing mercury to be heated is adapted to be exteriorly heated by any suitable means as, for example, by being disposed in a furnace. The interior surface is provided with a coating C of any substance which is wetted by mercury, such as silver, as above described. By reason of this coating, the transfer of heat from the exterior of instrumentality B to the mercury therein will be increased and the efficiency of the boiler correspondingly raised.

It is to be understood that I do not limit myself to a metal of any particular heat conductivity; my principal object, wetting of

the surface by mercury, being attained irrespective of this factor.

It is to be further understood that I do not limit myself exclusively to the use of metals; any substance which is wetted by mercury is contemplated as comprised in my invention, which is to be considered as limited only by the prior state of the art and the appended claims.

I claim:

1. The method of increasing the rate of heat transfer of a mercury vapor boiler which comprises surfacing the interior of the boiler with a substance which is wetted by mercury.

2. The method of facilitating the rate of heat transfer of a mercury vapor boiler which comprises surfacing all parts exposed to mercury with a metallic substance which is wetted by mercury.

3. The method of facilitating the rate of heat transfer of a mercury vapor boiler which comprises surfacing all parts exposed to mercury with a metal which is wetted by mercury.

4. The method of facilitating the rate of heat transfer of a mercury vapor boiler which comprises surfacing all parts exposed to mercury with a non-ferrous metal which is wetted by mercury.

5. The method of facilitating the rate of heat transfer of a mercury vapor boiler which comprises surfacing with silver all parts which come in contact with the mercury.

6. In a mercury vapor boiler, heating surfaces composed of a substance which is wetted by mercury at all points which come in contact with mercury.

7. In a mercury vapor boiler, heating surfaces composed of a metallic substance which is wetted by mercury at points exposed to mercury.

8. In a mercury vapor boiler, heating surfaces composed of silver at all points which come in contact with mercury.

9. In a mercury vapor boiler, heating surfaces coated at points exposed to mercury with a non-ferrous metal which is wetted by mercury.

10. In a mercury vapor boiler heating surfaces plated with silver at points exposed to mercury.

In testimony whereof, I have signed my name to this specification this 28th day of April, 1928.

WALTER E. TRENT.