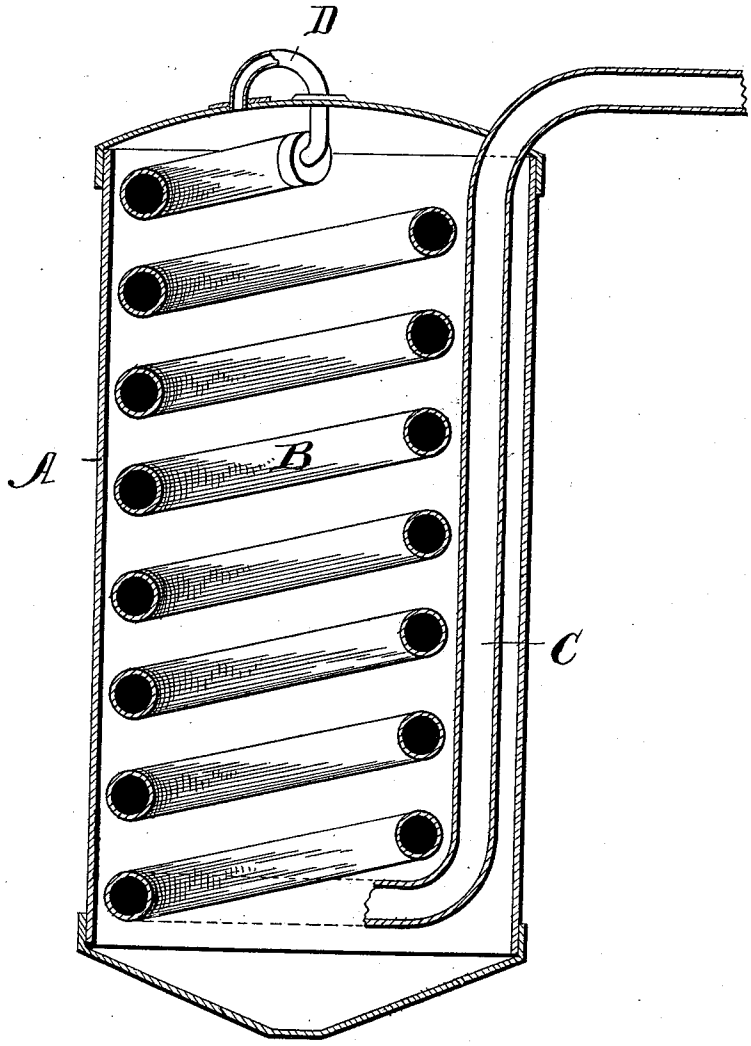
(No Model.)

F. L. DYER.

APPARATUS FOR PREPARING EXPANDED AND REHEATED STEAM.

No. 522,157. Patented June 26, 1894.



Witnesses:
J. B. McGiver.
A. L. Sohon.

Inventor:
Frank L. Dyer.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FRANK L. DYER, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO WILLIAM F. JOBBINS AND JOSEPH VAN RUYMBEKE, OF CHICAGO, ILLINOIS.

APPARATUS FOR PREPARING EXPANDED AND REHEATED STEAM.

SPECIFICATION forming part of Letters Patent No. 522,157, dated June 26, 1894.

Application filed March 7, 1894. Serial No. 502,695. (No model.)

To all whom it may concern:

Be it known that I, FRANK L. DYER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Apparatus for Preparing Expanded and Reheated Steam; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in apparatus for preparing expanded and reheated steam for industrial purposes. Expanded and reheated steam is especially adapted for distilling, purifying and concentrating liquids, for desiccating solid substances, and for kindred and other uses.

The accompanying drawing illustrates in section one form of my approved apparatus.

A, is an ordinary cylindrical boiler heated in any suitable way, which is shown without tubes for simplicity of illustration.

B, is an expansion coil mounted within the boiler and supported therein in any suitable way.

C, is a steam pipe from the lower end of the expansion coil leading to the still, concentrator, or other heating apparatus.

D, is a steam pipe leading from the upper end of the boiler and opening into the upper end of the expansion coil B, and of less diameter than said expansion coil.

This apparatus operates as follows: Steam is generated within the boiler A, and passes through the steam pipe D under pressure. From the pipe D steam enters the expansion coil B, and rapidly expands therein, its temperature being lowered according to the extent of expansion. The said expansion coil B, being within the boiler and heated by the water and steam therein, will heat the expanded steam in the expansion coil approximately to its own temperature. The steam within the expansion coil B which has thus been expanded and reheated passes out through the pipe C to be used for the desired purpose. Expanded and reheated steam prepared as I have described, carries a large amount of latent heat and is therefore well adapted for distilling, purifying, and concentrating liquids, for desiccating solids, for heating steam radiators and for other uses. Such steam being expanded and of a consequent low pressure also has the advantage of expanding but slightly in the heating apparatus so as not to absorb heat from the same.

It is to be understood that the apparatus shown in the figure is merely for the purpose of illustrating the general principles of my invention. The boiler used may be either horizontal, vertical or inclined, and may be either with or without tubes. A water tube boiler may also be used. If a tubular boiler is used the expansion coil B, may either surround the tubes or be surrounded by the tubes; or one or more of the tubes may be used instead of the expansion coil. It is also obvious that the expansion coil B, may extend from one end of the boiler to the other so as to be heated by both the water and steam of the boiler, or said expansion coil may be mounted in the lower end or upper end of the boiler so as to be heated by the water or steam respectively therein. It is further evident that instead of making use of the steam pipe D leading from the steam space of the boiler into the expansion coil, such a pipe may be dispensed with, and that the upper end of the expansion coil may be contracted so as to form a smaller inlet opening therein for the steam to enter, than its outlet opening through which the steam is withdrawn. It is still further evident that more than one expansion coil may be used, arranged in any desirable manner.

What I claim, and desire to secure by Letters Patent, is as follows:

1. An apparatus for generating expanded and reheated steam, consisting of a boiler, an expansion pipe or pipes within the boiler, supplied with steam from the boiler, the inlet opening into the expansion pipe or pipes being smaller than the outlet opening thereof, as and for the purposes mentioned.

2. An apparatus for generating expanded and reheated steam, consisting of a boiler, an expansion pipe or pipes within the boiler adapted to be heated by the water and steam within the boiler and supplied with steam from the boiler, as and for the purposes described.

3. An apparatus for generating expanded and reheated steam, consisting of a boiler, an expansion pipe or pipes within the boiler and a steam pipe connecting the boiler with said expansion pipe or pipes, and of a smaller diameter than the same, as and for the purposes described.

4. An apparatus for generating expanded and reheated steam, consisting of a boiler A, an expansion coil B, therein, a steam pipe D, connecting the boiler with said expansion coil, and a pipe C from said expansion coil, of larger diameter than the steam pipe D, substantially as described.

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

FRANK L. DYER.

Witnesses:
A. L. SOHON,
A. G. REESE.