

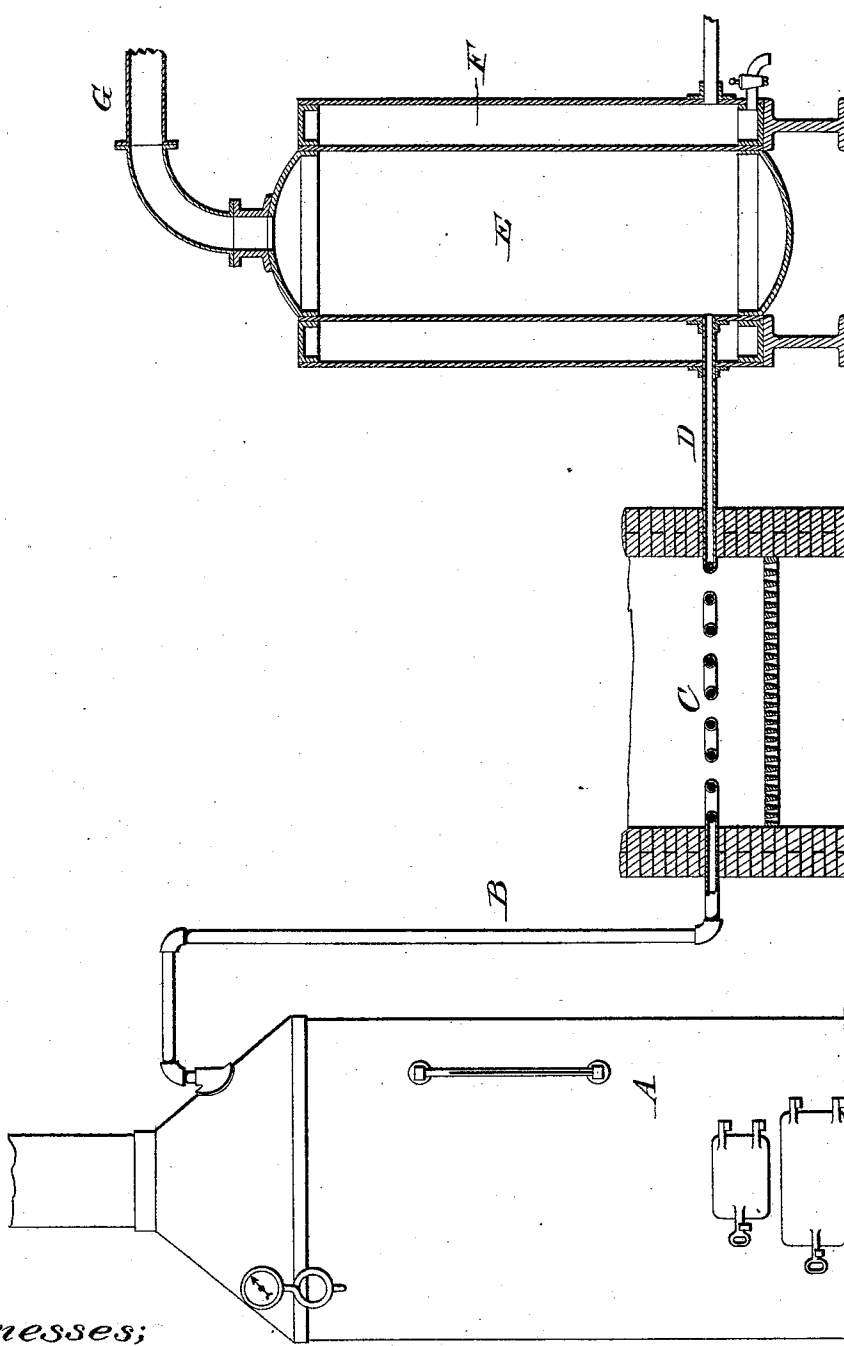
(No Model.)

F. L. DYER.

PREPARING STEAM FOR INDUSTRIAL PURPOSES.

No. 538,901.

Patented May 7, 1895.



Witnesses;

J. F. Coleman
A. D. Rose

Inventor

Frank L. Dyer

UNITED STATES PATENT OFFICE.

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

PREPARING STEAM FOR INDUSTRIAL PURPOSES.

SPECIFICATION forming part of Letters Patent No. 538,901, dated May 7, 1895.

Application filed March 7, 1894. Serial No. 502,696. (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 Processes of and Apparatus for Heating, Distilling, Desiccating, and Purifying; 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.

This invention relates to a process of and apparatus for heating, distilling, desiccating and purifying by means of superheated steam, and is especially adapted for use in connection with steam radiators, in the distillation of liquids, such as glycerine, oils, fats and fatty acids, in the desiccation of solids, such as bones and garbage, and in the purification of oils, fats and grease.

In this process, superheated steam prepared in the ordinary way is passed into a pipe or other vessel the outlet from which is greater than the inlet so that the superheated steam will expand prior to use, the amount of expansion being so gaged that in its expanded form, while carrying the same amount of heat units as before expansion, it will have suffered any desired reduction in temperature and pressure.

In the accompanying drawing I show a diagrammatic view of a convenient form of apparatus, in which my said process may be carried out, and wherein—

A, is a boiler of any suitable construction.

B is a steam delivery pipe from the boiler.

C, is a superheater of any well known form, the steam coil of which is connected with the pipe B.

D, is a pipe connecting the steam coil of the superheater with an expansion chamber E.

F, is a jacket surrounding the expansion chamber for heating the expanded superheated steam therein either by the combustion gases of the superheater C, or boiler A, or by steam from either the superheater or boiler or by other means; and G, is a delivery pipe for the expansion chamber E, for

conveying the expanded superheated steam therefrom.

The pipe D, should either be of smaller diameter than the delivery pipe G, or else should be provided with a valve so that the inlet opening into the expansion chamber E may be made less than the outlet opening of the same, and may have any desired relation to the latter opening, so as to make it possible to obtain any desired expansion of the steam from the superheater.

In this apparatus the steam is generated in the boiler A in the usual way, and is conducted by the pipe B, to the superheater C, by which the steam is superheated to any desired temperature, its pressure being correspondingly increased, as will be understood. From the superheater C, the superheated steam is conducted by means of the pipe D, to the expansion chamber E, and by reason of the large size of the latter, the steam rapidly expands, its pressure and temperature being correspondingly diminished. From the expansion chamber E, the steam which has been thus expanded is conveyed by means of the pipe G, the outlet from which being large enough to permit the expanded steam to escape as fast as introduced into the expansion chamber so as to keep its pressure reduced.

To make this process still more effective, the expanded steam may be subjected to a process of reheating preferably by means of live steam from the boiler A, in the jacket F, or in any other suitable way, by which part of the reduction in temperature suffered by the expansion may be regained. It is understood however that by making the exit pipe from the expansion chamber of larger diameter than the inlet pipe thereto, and of sufficient size, this reheating will not produce an undesirable pressure of the expanded steam.

When it is not desired to reheat the expanded steam, as explained, the expansion chamber is preferably surrounded by some good insulating material, such as asbestos, so as to retain the heat of the steam introduced therein.

By means of my invention, steam for indus-

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trial purposes can be economically obtained having an extremely low pressure and being of any desired temperature. Such superheated and expanded steam may be used for all purposes where ordinary superheated or ordinary saturated steam is now used for producing heat, and may be applied for all purposes of heating, desiccating, distilling and purifying, the advantage obtained in all cases being that a great amount of latent heat is carried by the steam without having an excessively high temperature and pressure.

The advantage of superheating the steam before it is allowed to expand is that on account of the high pressure with which it enters the expansion chamber it circulates through the latter at a rapid rate, whereby the steam may be passed through the radiator, still or other vessel in which it is to be used, with great rapidity.

The low pressure of the expanded steam whether reheated or not is of great use in that form of distillation in which steam is passed through a liquid being distilled whether such distillation is effected with or without a vacuum for the reason that the steam will expand but slightly in the still, and its entire heating effect will be utilized.

I do not claim broadly as an apparatus, a superheater in combination with an expansion chamber, as I am aware that Patent No. 155,865 to Thomas B. Field, October 13, 1894, shows a superheating coil and a dome or drum connected therewith in which latter steam might expand. I am not aware however, that any one prior to my invention has described

a process of preparing steam of low pressure and high temperature as above set forth, and I shall therefore claim such a process broadly.

What I claim is—

1. In the art of preparing steam for industrial purposes, the improvement which consists in generating steam, then in superheating the steam whereby its pressure and temperature will be increased, and finally in allowing the superheated steam to expand in a confined space prior to using it, whereby steam will be obtained of low pressure and high temperature, substantially as described.

2. In the art of preparing steam for industrial purposes, the improvement which consists in generating steam, then in superheating the steam whereby its pressure and temperature will be increased, then in allowing the superheated steam to expand in a confined space, and finally in reheating the superheated expanded steam prior to using it, whereby steam will be obtained of low pressure and high temperature, substantially as described.

3. In an apparatus for preparing steam for industrial purposes, the combination of the boiler or generator A, the superheater C, the expansion chamber E, and means for heating said expansion chamber, 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.