No. 712,368. Patented Oct. 28, 1902.

J. L. EBNER.

STEAM WASHING AND PURIFYING APPARATUS.

(Application filed May 27, 1901.)

(No Model.)

Fig. 1.

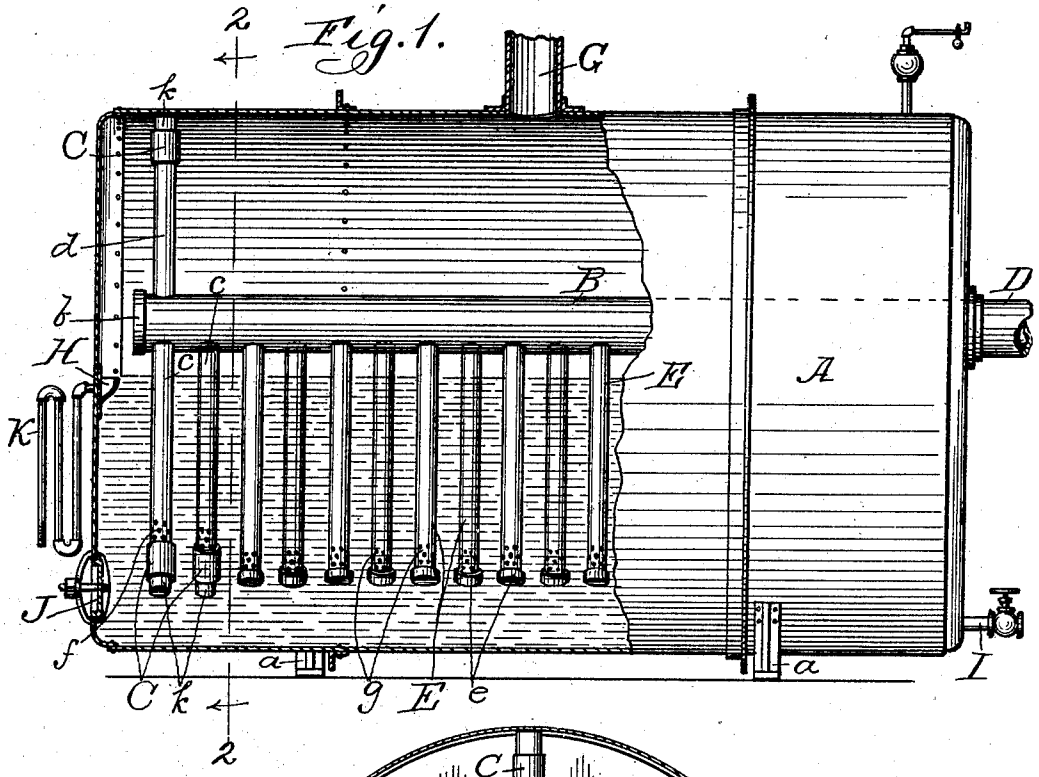
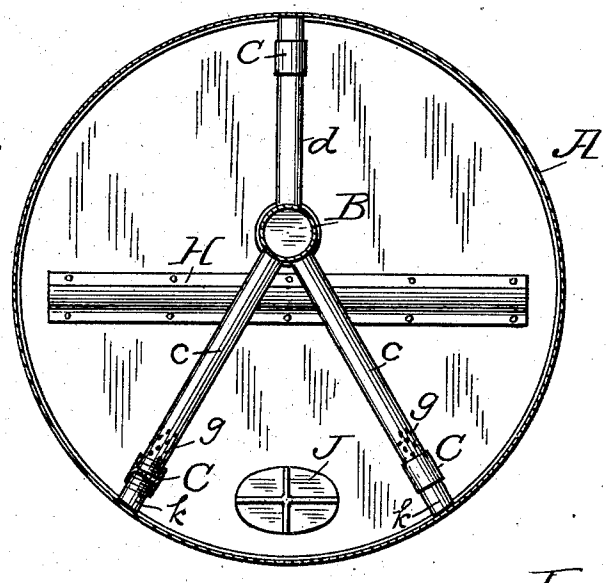


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOSEPH L. EBNER, OF VINCENNES, INDIANA.

STEAM WASHING AND PURIFYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 712,368, dated October 28, 1902.

Application filed May 27, 1901. Serial No. 62,054. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH L. EBNER, a citizen of the United States, and a resident of Vincennes, in the county of Knox and State of Indiana, have invented certain new and useful Improvements in Steam Washing and Purifying Apparatus, of which the following is a full, clear, and exact specification.

My invention relates more particularly to apparatus for distilling water for ice-making purposes, although obviously capable of use for other purposes, if desired. Heretofore the distillation of water, particularly for the industrial and domestic arts, was accomplished by condensing the aqueous vapors taken direct from the boilers.

The object of my invention is to clarify such vapors, either in their pristine state or after they have been utilized either in an engine or other apparatus, and remove therefrom all impurities, whether originally contained therein or subsequently acquired, in such manner that the waters of condensation resulting therefrom will be perfectly pure. This I accomplish by the means hereinafter fully described and as particularly pointed out in the claims.

In the drawings, Figure 1 is a longitudinal central section through my invention. Fig. 2 is a transverse vertical section taken on dotted line 2 2, Fig. 1.

Reference being had to the drawings, A represents a horizontally-disposed cylindrical or other shaped tank, which is supported by suitable legs *a a* or in any other manner desired. This tank is provided with a longitudinal inlet-pipe B, which enters it at one end and extends to or nearly to the other end thereof, where said pipe is closed by a suitable cap *b*, screwed thereon, or otherwise. The closed end of pipe B may be supported in any of the numerous ways that would suggest themselves to a skilled mechanic. I prefer, however, to employ struts *c c* and *d* for this purpose. All of these struts consist of sections of smaller piping having one end communicating with and secured to pipe B and radiating therefrom at different angles. The outer ends of these strut-sections of pipe could extend clear to and connect with the shell of the tank. I prefer, however, to have them terminate a short distance therefrom and to adjustably connect them by means of the couplings C to alining-stubs *k*, secured to and projecting in from the shell of the cylinder. Strut *d* is shown extending vertically upward from pipe B and struts *c c* projecting downward at corresponding angles therefrom, one on one side and the other on the other side of the vertical plane of the pipe. Thus by properly manipulating couplings C the closed end of pipe B can be perfectly positioned.

By supporting the closed end of the inlet-pipe B by means of the struts *c c* and *d* and not uniting it to the adjacent head of the tank the expansion of pipe B, which occurs when the apparatus is in operation, is accommodated without straining the tank.

The outer end of pipe B is connected to the exhaust-pipe D of a steam boiler or engine or apparatus connected therewith and deriving steam therefrom, and between the end of the tank through which pipe B enters and the struts supporting the closed end of said pipe it is provided with a series of pendent discharge-pipes E, which are preferably arranged in staggered position and extend at about the same angles from pipe B as the struts *c c*, first on one side and then the other of the vertical plane of said pipe B. The discharge-pipes E could extend clear to and connect with the shell of tank A. I much prefer, however, to terminate them at a short distance from said shell, so that their expansion will not strain the shell when heated, and to close their outer ends with a suitable cap *e* or otherwise and provide their outer end portions with perforations *g*. The struts *c c* can readily be converted into discharge-pipes by providing the outer ends of the longer sections thereof with similar perforations *f*, if desired.

In operation the steam under pressure enters the inlet-pipe B and passes therefrom into the discharge-pipes E and struts *c c* and out through the perforated outer ends thereof into a body of water that fills the lower half of the tank. As it bubbles up through this water the steam is clarified of such grease and foreign substances and odors as it may possess, and the uncondensed portion thereof, which escapes and enters the steam-chamber above the water, is perfectly pure and

passes out of the tank through the escape-pipe G to be further condensed in any suitable manner and by any suitable apparatus.

It is desirable that the level of the water in the tank should never rise above the plane of pipe B. The continual accretion which this body of water obtains from the condensation of steam passing through it and the grease and foreign substances which are derived from the steam would cause the water to soon fill the tank unless some overflow was provided. I therefore provide the tank, preferably at that end opposite where the pipe B enters it, with a horizontal trough H, which is of any shape desired and is secured to the adjacent head of the tank by rivets or otherwise. This trough is located at such a plane that when the water rises to the high level desired it overflows into the trough and the oil and grease and other floating substances therein are skimmed off it. A drain-pipe K leads from this trough out through the adjacent head of the tank, and in order to prevent this escape of the steam through this drain it is given a double bend, as shown. Any construction of the drain-pipe, however, which will permit the overflow in the tank to escape therefrom without permitting the steam to issue therefrom would answer the purposes of my invention.

At one end of the tank I provide a suitable blow-off I, and preferably at the other end I place a covered manhole J. These features, as well as a suitable inlet-pipe through which the water could be fed to the tank, could in addition to the means already shown and described be provided, although no invention is claimed therein.

It will of course be understood that my improved apparatus can be used singly or in batteries. Sometimes the condition of the exhaust-steam would require more than one tank before the resultant waters of condensation would be fit for use. My invention contemplates all such duplications, as well as all mechanical changes and substitution of parts, which the practical adaptation of the same require.

What I claim as new is—

1. In a steam-purifying apparatus, the combination with a tank having a suitable steam-outlet in its upper portion, of a horizontally-disposed steam-inlet pipe a series of pendent pipes taking therefrom and discharging the steam from their lower ends, and a suitable overflow located on a plane above the point of discharge of said pendent pipes.

2. In a steam-purifying apparatus, the combination with a tank having a suitable steam-outlet in its upper portion, of a horizontally-disposed steam-inlet pipe a series of staggered pendent discharge-pipes connected therewith and projecting therefrom which are imperforate except at their lower ends and extend at an angle first on one side and then the other of the vertical plane of the inlet-pipe, and a suitable overflow located on a plane above the point of discharge of said discharge-pipes.

3. In a steam-purifying apparatus, the combination with a tank having a suitable steam-outlet in its upper portion, of a horizontally-disposed steam-inlet pipe the closed end of which is not connected with the adjacent end of the tank a series of pendent pipes taking therefrom and discharging the steam from their lower ends, and a suitable overflow located on a plane above the point of discharge of said pendent pipes.

4. In a steam-purifying apparatus the combination with a tank having a suitable steam-outlet in its upper portion, of a horizontally-disposed steam-inlet pipe the closed end of which is not connected with the adjacent end of the tank, a series of staggered pendent discharge-pipes connected therewith and projecting therefrom but not touching the shell of the tank, which are imperforate except at their lower ends and extend at an angle first on one side and then the other of the vertical plane of the inlet-pipe, and a suitable overflow located on a plane above the point of discharge of said discharge-pipes.

5. In a steam-purifying apparatus, the combination with a tank having a suitable steam-outlet in its upper portion, of a horizontally-disposed inlet-pipe entering one end of said tank but the closed end of which does not attach to the other end of the tank struts supporting the closed end of said inlet-pipe a series of pendent discharge-pipes projecting from said inlet-pipe which are imperforate except at their outer end portions and an overflow located at a plane above the point of discharge of said discharge-pipes.

6. In a steam-purifying apparatus, the combination with a tank having a suitable steam-outlet in its upper portion, of a horizontally-disposed inlet-pipe entering one end of said tank but the closed end of which does not attach to the other end of the tank, adjustable struts supporting the closed end of said inlet-pipe a series of pendent discharge-pipes projecting from said inlet-pipe which are imperforate except at their outer end portions and an overflow located at a plane above the point of discharge of said discharge-pipes.

7. In a steam-purifying apparatus, the combination with a tank having a suitable steam-outlet in its upper portion, of a horizontally-disposed inlet-pipe entering one end of said tank but the closed end of which does not attach to the other end of the tank adjustable hollow struts imperforate except near the outer ends of those extending below said pipe which support the closed end of said inlet-pipe a series of pendent discharge-pipes projecting from said inlet-pipe which are imperforate except at their outer end portions and an overflow located at a plane above the point of discharge of said discharge-pipes.

8. In a steam-purifying apparatus, the com-

bination with a tank having a suitable steam-outlet in its upper portion, of a horizontally-disposed steam-inlet pipe a series of pendent pipes taking therefrom and discharging the steam from their lower ends, a horizontal trough, arranged transversely at one end of the tank the overflow edge of which is on the plane of the high-water level, and a water-trap-drain pipe leading therefrom.

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