A. S. MORRIS.

FEEDING DEVICE FOR EVAPORATORS.

APPLICATION FILED JUNE 18, 1909.

971,394.

Patented Sept. 27, 1910.

Fig. 1.

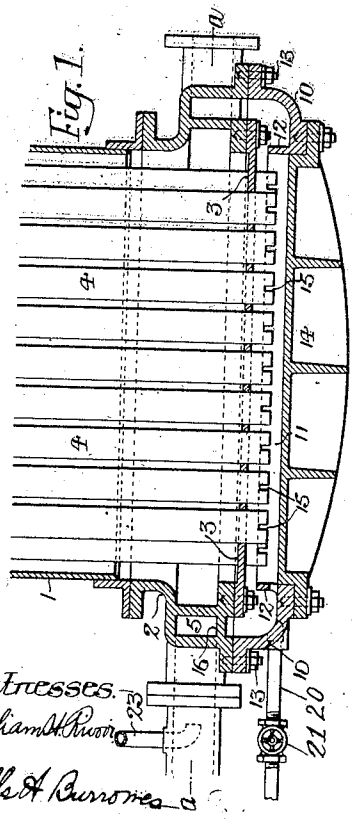
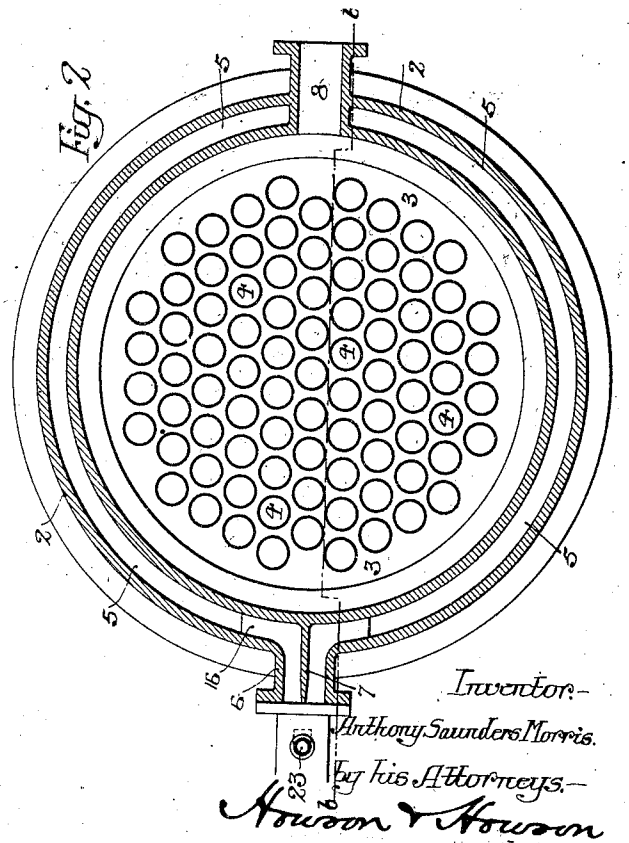


Fig. 2.



Witnesses.

William A. Rossiter

Wills A. Burrows

Inventor.

Anthony Saunders Morris.

By his Attorneys.

Howson & Howson

UNITED STATES PATENT OFFICE.

ANTHONY SAUNDERS MORRIS, OF HAVERFORD, PENNSYLVANIA, ASSIGNOR TO KESTNER EVAPORATOR COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

FEEDING DEVICE FOR EVAPORATORS.

971,394. Specification of Letters Patent. Patented Sept. 27, 1910.

Application filed June 18, 1909. Serial No. 502,945.

To all whom it may concern:

Be it known that I, ANTHONY SAUNDERS MORRIS, a citizen of the United States, residing in Haverford, Delaware county, Pennsylvania, have invented certain Improvements in Feeding Devices for Evaporators, of which the following is a specification.

My invention relates to evaporating apparatus, and consists of means for feeding the tubes of that class of evaporators in which concentration is effected by movement of the liquid in an upward direction in a series of suitable externally heated tubes.

My invention is fully shown in the accompanying drawings, in which:

Figure 1, is a sectional elevation of the feeding device embodying my invention, and Fig. 2, is a sectional plan view of the same, taken on the line *a*—*a*, Fig. 1.

In the evaporation of liquids in the class of evaporators referred to when a superheated liquid is fed to the bottom of one set of tubes, it undergoes a fall in temperature, with a consequent large production of vapor. Unless means are provided for taking care of such vapor, there is danger of the liquid feeding unevenly to the tubes; and the object of my invention is to provide means that will insure to the greatest extent possible, a uniform feed of such liquid to each tube; a further object being to provide a construction that will permit ready examination of the tubes and tube sheet for cleaning, repairs and other purposes.

In Fig. 1, 1 represents the shell or casing of an evaporator, and 2 a suitable annular member, which may be a casting, at the bottom of the same, to which such shell is secured. A plate 3, secured to the underside of said member 2 forms the bottom of the steam chamber and such plate is apertured for the reception of tubes 4, which pass through said plate; their lower ends extending below the plate.

The member 2 is provided with a chamber 5 extending substantially the entire distance around the same, with an inlet 6, which, in the present instance, is provided with a central division plate 7, whereby the entering liquid is divided and sent to opposite parts of said chamber simultaneously. The member 2 is also provided with an outlet 8 for the passage of condensation from the heating medium delivered to the shell 1. Secured to the member 2 is an annular member 10, which may also be a casting, having an enlarged central opening 11, and an internal annular wall 12 surrounding said opening and forming a channel with which the chamber 5 communicates and into which liquid passes from the inlet 6. The member 10 is secured to the casting 2 in any suitable manner, preferably by means of stud bolts 13. The opening 11 referred to is large enough to permit examination of all the tubes, and to effect removal or cleaning of any of the same. Under working conditions such opening is closed by means of a bottom plate 14, which may or may not be provided with a draining outlet. The lower ends of the tubes are notched at 15, in the manner shown and described in Patent No. 882,322, dated March 17, 1908; such notches being for the same purpose as disclosed in said patent.

To insure the passage of the liquid in opposite directions around the annular chamber 5, the inlet opening is provided with a floor or horizontal wall 16, extending part way into said chamber on both sides of the division plate 7. The liquid passing to the channel formed by the annular wall 12, overflows the same into the central part of the feed chamber. The lower ends of the tubes extend into this portion of the chamber and the entering liquid passing to said tubes rises therein under the influence of the heating medium surrounding the same. The feed chamber may be provided with a discharge outlet or drain 2', controlled by a suitable valve, as 21.

In the shell or casing surrounding the tubes to which the heating medium is directed, a certain amount of air or other non-condensable vapor may be mixed with the steam. To get rid of this vaporous body, I may arrange to discharge it into the liquid inlets. For this purpose, I may provide a pipe 23, the upper end of which communicates with the shell or casing 1 (the connection therewith not being shown), but being preferably located near the top of the same.

I claim:

1. In a vertical tube evaporator, the combination of a shell or casing, an annular member secured to the bottom of the same, said member having an inlet and forming

a chamber for the reception of the liquid under treatment, a plate carried by said member, tubes carried by said plate and projecting below the same into said chamber, an annular wall secured to said member larger in diameter than the area occupied by said tubes, and a bottom plate for said wall, the latter with said wall forming a well into which the tubes dip.

2. In a vertical tube evaporator, the combination of a shell or casing, an annular member secured to the bottom of the same, said member having an inlet and forming a receiving chamber for the liquid under treatment, a plate carried by said member, tubes mounted in said plate and projecting below the same, an open ring having an inner annular flange forming a channel secured to said member, said flange lying outside the area covered by the tubes, and a bottom plate for said ring, said flange and plate forming a well into which the tubes dip, and said annular member having an outlet from the steam space surrounding the heating tubes.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ANTHONY SAUNDERS MORRIS

Witnesses:
J. B. ALLEN,
CHAS. H. FULMER.