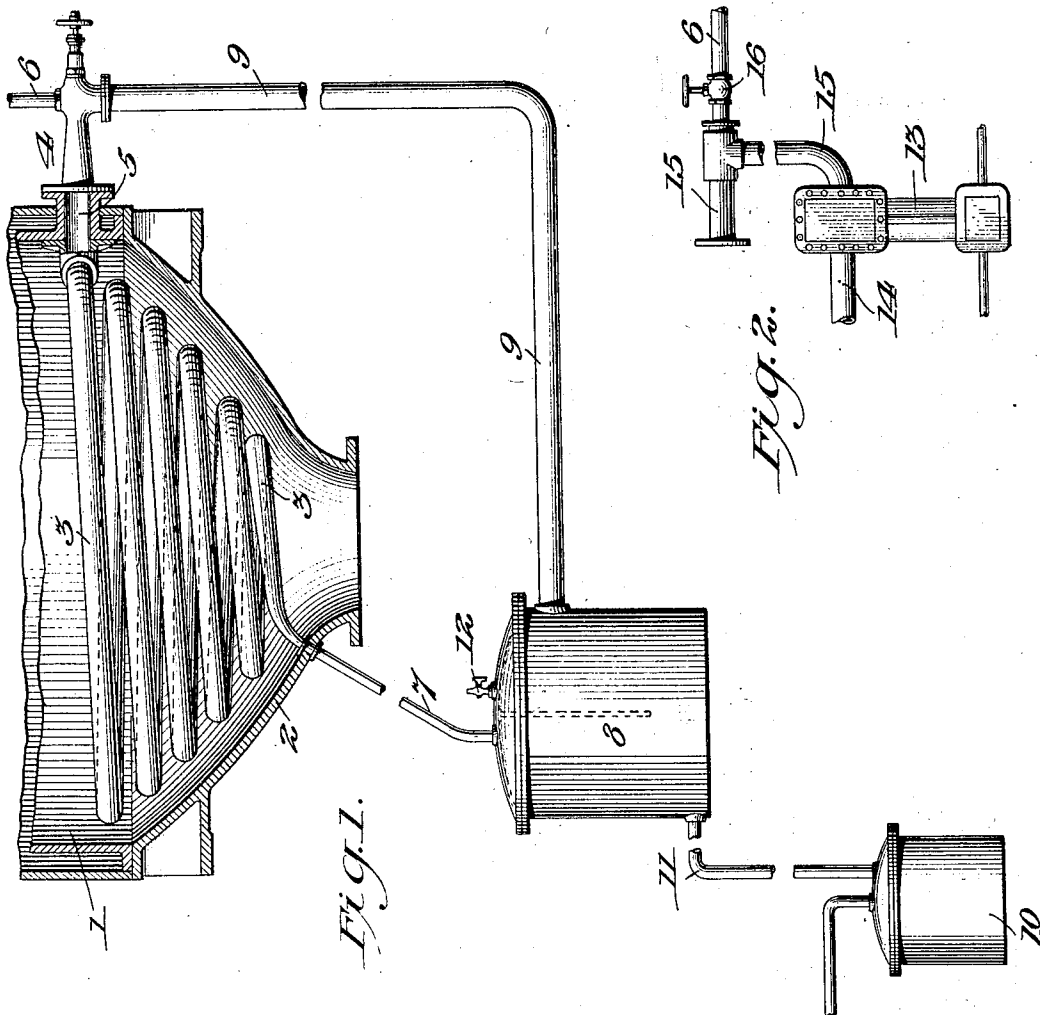


A. GARTLEY.
VACUUM PAN.
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1,005,533.

Patented Oct. 10, 1911.



Witnesses:
E. L. Schumann
[Signature]

Inventor:
A. Gartley
By [Signature] attys

UNITED STATES PATENT OFFICE.

ALONZO GARTLEY, OF HONOLULU, TERRITORY OF HAWAII.

VACUUM-PAN.

1,005,533.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALONZO GARTLEY, a citizen of the United States, residing at Honolulu, in the county of Honolulu, Territory of Hawaii, have invented certain new and useful Improvements in Vacuum-Pans; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains, to make and use the same.

This invention relates to vacuum-pans, and has for its object greater economy in steam consumption, more rapid boiling and a resulting higher efficiency in operation.

In vacuum-pans for concentrating sugar or other solutions by boiling, the heating is usually accomplished by steam in helical or spiral copper coils inside the pan, the steam being admitted to the coils through nozzles on the belt, the coils terminating in tail pipes passing through the conical bottom and through which the water of condensation in the coils passes out.

The invention contemplates injectors or exhausters for admitting the steam to the coils and for drawing the vapors from a separator into which the tail pipes discharge, the condensed water being removed from the separator by a pump, trap or other means the object being to separate the steam and vapor from the condensed water in the drains (or tail pipes) and to return the former to the heating coils, and at the same time to reduce the pressure in said drains. By this arrangement a better circulation is effected in the coils, causing more rapid boiling in the pan and a greater economy in steam consumption. A pump may be employed in lieu of an injector.

While the invention is particularly applicable to vacuum-pans, it may be employed in connection with other heating coils, for example such as are used in defecating tanks, etc.

In the accompanying drawing forming a part of this specification, Figure 1 represents a vertical section through the lower portion of a vacuum-pan embodying a preferred form of my invention. Fig. 2 shows in elevation a modification.

Referring to the drawing, 1 is the belt of the vacuum-pan, 2 is the bottom, and 3 is the lower coil. An injector 4 is connected to the inlet nozzle 5 of the coil 3 and to the

steam line by the pipe 6. The tail pipe 7 of the coil 3 is connected to the separator 8. The pipe 9 connects the separator 8 with the suction of the injector 4. A trap 10 is connected by the pipe 11 to the lower portion of the separator 8. Air may be blown out by opening the pet-cock 12 on the top of the separator 8.

In operation, steam is admitted to the coil 3 from the pipe 6 through the injector 4, and the steam or vapor in the separator 8 is drawn through the pipe 9 by the injector 4 and enters the coil 3. A circulation of steam is thus maintained in the coil 3, the condensed water being removed from the separator 8 by the trap 10. The boiling of the massecuite or other material surrounding the coil is thereby more rapidly accomplished than heretofore.

In the modification shown in Fig. 2, a pump 13 is employed in lieu of the injector 4. The pipe 14 connects the suction of the pump 13 to the separator 8, and the discharge from the pump 13 is connected by the piping 15 to the inlet nozzle 5 of the coil 3. Steam is admitted to the pipe 15 from the steam pipe 6 by the valve 16 as required to make up the loss due to condensation.

I claim:

1. In a vacuum-pan or the like, a heating coil, an injector for admitting steam to the upper end of said coil, a separator connected to the lower end of said coil and also to the suction of the injector, and means for removing water from the separator.

2. In combination with a heating coil, a system of vapor steam and condensed water pipes including a drain, a separator in the drain from said heating coil, and a steam jet exhauster operated with high pressure steam to produce a reduced pressure in said drain, by exhausting the steam and vapor in said drain after separation from the condensed water.

3. In combination with a heating coil, a system of vapor steam and condensed water pipes, a separator connected therewith, and an injector for returning to the heating coil the vapor and steam in the drain of said coil after separation from the condensed water.

4. The combination with a heating coil, of means to induce a circulation of steam therein, means to separate the outgoing

steam from the water of condensation, and means to return such outgoing steam to the coil.

5 5. The combination with a heating coil having an inlet and an outlet, of means associated with the inlet to induce a circulation of steam in the coil, means associated with the outlet to separate the outgoing steam from the water of condensation, and
10 means to return to the coil inlet the steam thus separated.

6. The combination with a heating coil, of means to supply steam to one end of the same, a separator connected with the other end of the coil, and means connecting the separator with said supply means.

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

ALONZO GARTLEY.

Witnesses:

H. G. GINACA,
ROBT. J. PRATT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."