E. Lynch,

Steam-Boiler Condenser

No. 5,668. Patented July 18, 1848.

Fig. 3.

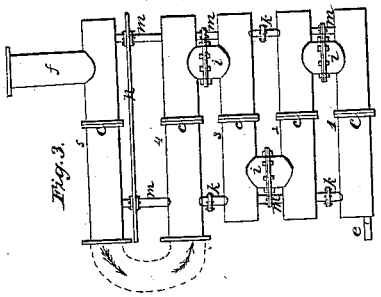


Fig. 2.

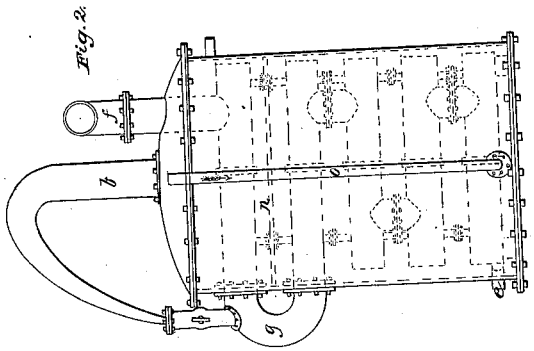


Fig. 4.

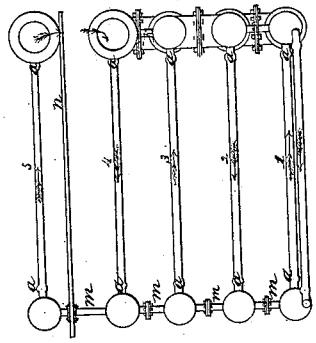


Fig. 1.

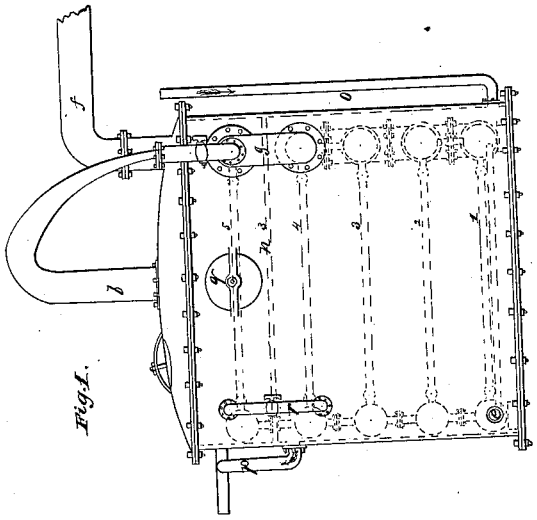
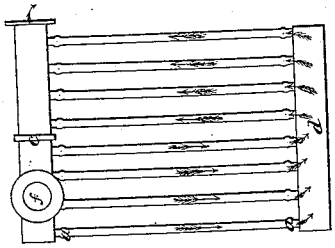


Fig. 5.



UNITED STATES PATENT OFFICE.

EDWARD LYNCH, OF BROOKLYN, NEW YORK.

EVAPORATOR AND CONDENSER.

Specification forming part of Letters Patent No. 5,668, dated July 18, 1848; Reissued March 11, 1851, No. 194.

To all whom it may concern:

Be it known that I, EDWARD LYNCH, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Condenser and Evaporator Combined; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a side elevation of the tank. Fig. 2 is an end elevation of the same. Fig. 3 is an end view of the tiers of pipes. Fig. 4 is a side view of the same and Fig. 5 is a top view of one of the clusters.

The nature of my invention consists chiefly in the construction of a condenser and evaporator combined in one apparatus, by which I am enabled to cause the heat derived from the vapor condensed, to vaporize a certain portion of the condensing water.

In building my apparatus I prepare a number of metal tubes, which I prefer to be of copper or like material and small in size, and in order to prepare for expansion I bulge the pipes near each end as seen at (*a a*). I then take several pipes thus prepared and braize or otherwise insert their ends into the sides of two larger pipes (*c d*). The large pipe at (*c*) is divided in the center by a partition, so that no vapor can flow directly through it, and the pipe (*d*) has on its lower side two small openings for the insertion of two pipes to be hereafter more fully described. This forms a series of pipes as seen in Fig. 5. I then take a number of forms thus made, and attach them together as seen in Figs. 3 and 4. In building them up, all those cross pipes which are divided, at (*c*) must be laid one above the other. The lower cluster of pipes contains the exhaust pipe (*e*) while the upper one contains the injecting or steam pipe (*f*). All these pipes connect by vertical pipes except the top and second pipes, or 4th and 5th clusters which communicate by a bent pipe (*g*). The forms are connected with each other by two different sized pipes one of which is large and the other small, the large connecting pipes are only inserted, in the pipes (*c*), and these alternately on either side of the partition contained within it as seen in Fig. 3, letter (*i*) and at the opposite end of the same pipe is inserted a small pipe, *k*. The pipes (*d*) are connected in the tier by the small pipes (*m*). The pipes are then encased within a proper tank, as seen in Figs. 1 and 2. In placing the pipes in the tank, the clusters 1, 2, 3, 4, are first put in, this done I divide the tank in two parts by inserting a partition plate (*n*) within it, and on the top of this partition, I put cluster No. 5. A cover is next put upon the tank, which contain several openings one for the injection pipe (*f*) one for the evaporating pipe (*b*) and one for a "man-hole." The other appendages to the tank are (*o*) feed pipe for cold water, (*p*) waste pipe, this pipe is inserted below the partition but rises on the outside above it, so as to have its discharge sufficiently high to cause the level of the water inside to be above the partition plate (*n*) and pipes (*q*). "Man hole plate" (*r*) pipe communicating the tank above and below the partition, (*e*) is the exhaust pipe.

The operation is as follows: A current of cold water is kept running through the tank by the pipes (*o p*), the cold water entering in at the bottom of the tank and flowing out at the top, the cock in the pipe (*r*) being opened to allow the water to flow over the partition plate (*n*) and the top cluster of pipes. Steam is now admitted into the pipe (*f*) and flows through the pipes in a circuitous manner, entering at (*f*) it passes along in the direction of the arrows to (*d*) thence returning by the other half of the pipes to (*c*) but enters the pipe (*c*) on the opposite side of the division plate, from this plate the steam passes into the pipe (*g*), and flows through the pipes in the order described until at the bottom it is completely condensed and is pumped or otherwise taken off at (*e*). The small pipes (*k*) are inserted for the purpose of removing the condensed water, as fast as it accumulates in the pipes, by a short passage to the exhaust pipe, thus avoiding the necessity of conveying it through the pipes, affording at the same time always a clear surface to act upon the steam. It will be seen that the steam first passes through a cluster of pipes, lying in that part of the tank cut off by the partition (*n*), here the pipes are exposed to the action of a small quantity of water, and the steam acts upon this water at its highest temperature, this causes vapor to rise upon it, which vapor is carried off by the pipe (*b*) which connects with the bent pipe (*g*), and flows from thence into the condensing

pipes and is condensed along with the steam directly injected through (*f*) by means of the pipe (*r*) the upper division of the tank is always kept supplied with the water requisite for this purpose.

The use to which I propose to apply this apparatus is for the purpose of maintaining a full supply of fresh water for the generation of steam, where the water used would otherwise be salt or contain injurious impurities. The boiler in this case would be supplied in the first instance with pure water, and the tank for condensing with saline or other impure water. Now by reason of the arrangements here shown for using a portion of the disengaged heat of the steam to evaporate the impure water with and convey the vapor thereof into the condenser and condense it along with the rest, I am able to provide for all loss by waste and leakage and keep the first supply undiminished, without additional expense bulk or weight.

What I claim as my invention and improvement and desire to secure by Letters Patent is—

1. Combining the several distinct clusters of pipes as seen in Fig. 5 together by both the large, and small tubular connections (*i* and *k*, *m*,) for the several purposes herein described.

2. I claim the partition (*n*) within the tank for the purpose of dividing the water contained therein, and for the formation of the evaporating reservoir. The whole being constructed and operating substantially as herein set forth.

EDWARD LYNCH.

Witnesses:
JOSEPH P. PIRSSON,
T. G. FRENCH.

[FIRST PRINTED 1913.]