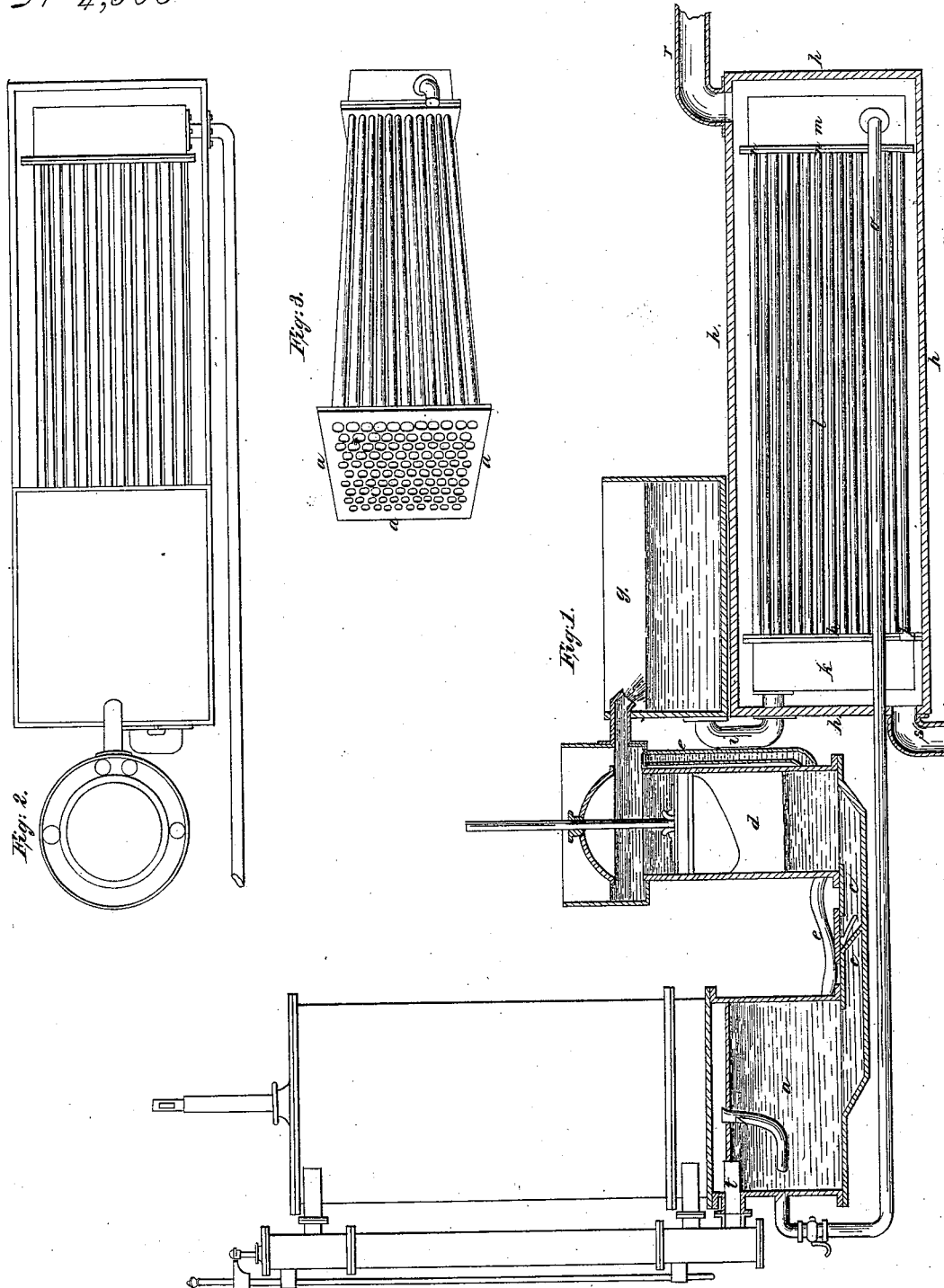


J. P. Pirsson, Jr.,
Steam-Boiler Condenser,
Patented Feb. 10, 1846.

N^o 4,383



UNITED STATES PATENT OFFICE.

JOSEPH P. PIRSSON, JR., OF NEW YORK, N. Y.

IMPROVEMENT IN CONDENSING STEAM AND FEEDING STEAM-BOILERS.

Specification forming part of Letters Patent No. 4,383, dated February 10, 1846.

To all whom it may concern:

Be it known that I, JOSEPH P. PIRSSON, Jr., of the city, county, and State of New York, have invented a new and Improved Condensing Apparatus for Steam Machinery and for Supplying Steam-Boilers with Fresh Water; and I do hereby declare that the following is a full and exact description.

The nature of my invention consists in a refrigerating apparatus attached to the cylinder of the steam-engine, wherein the water for condensation and the condensed steam are so distributed that a constant supply of fresh water is returned to the boilers, and also of cold water for the condensation of its steam.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

Beneath or near to the ordinary cylinder of the steam-engine, I construct a hollow chamber of iron, (of which *a*, Figure 1, is a sectional view, showing the interior, (into which the steam for condensation is to be exhausted. From the bottom of the chamber an opening, *b*, is made, for carrying off the condensed steam and water.

d is an air-pump communicating with the condensing-chamber by the channel *cc*. From the top of the pump two pipes receive the water it discharges, of which *ee* is the feed-pipe for supplying the boiler, while *f* empties the surplus into the reservoir *g*, which stands on the top of the large tank *h h h h*, containing the refrigerator. From the reservoir *g* a pipe, *i*, is fixed, to communicate with the receiving-hood *k*, covering the mouths of the metal pipes.

k l m is the cooling apparatus, composed of a number of metal pipes. These pipes are arranged by inserting them into plates of metal, having a sufficient number of holes perforated to receive the ends of the pipes, as shown in *a a*, Fig. 3, the pipes to be water-tight, and inserted into the perforated plates in like manner. The hoods *k m* are boxes of metal, water-tight, and bolted to the perforated plates *a a a*, Fig. 3, *n n n*, Fig. 1, so that the whole cluster of pipes will receive and discharge into them, the water being received into *k* and discharged through the pipes into the hood *m*.

O is a pipe, attached to the hood *m*, running to the condensing-chamber *a*, into which

it terminates with an open nozzle at *p*, and is the jet-pipe for condensation.

In order to set my machine in operation, I commence by filling my boilers with fresh water until they have received the quantity usually given. I then fill, also, the cooling apparatus *k l m* with fresh water from the reservoir *g*, which is likewise to be kept filled. A stream of cold water is now turned into the water-tight tank *h h h h* through *r*, flowing over the pipes *k l m*, and discharging at *s*, but so that the pipes shall be always completely submerged. Should this machine be applied to the engines for propelling boats, the water to supply the tank can be taken through the bottom or sides of the boat, or by troughs placed under the guards behind the paddle-wheels to catch the lift-water, and so led into the tank. Steam being now raised, the engine is worked in the usual manner. The steam is exhausted from the cylinder by the pipe *t* into the condenser *a*. A jet of cold water being opened on it from the pipe *o*, it is condensed and falls to the bottom of the condenser, from whence the whole is removed by the pump *d* through the channel *cc* and discharged into the reservoir *g*. The water in the reservoir *g*, having become highly rarified, is rendered unfit for condensation if returned immediately to the condenser. Therefore it discharges itself through the pipe *i* into the receiving-hood *k*, and flowing through the pipes immersed in cold water, it arrives at *m* properly cooled for condensation. At each stroke of the engine a certain quantity of water for the reproduction of steam must be returned to the boiler. This is done by the feed-pipe *ee*, attached to the reservoir on the top of the pump, taking its supply from the water in its rarified state. In marine engines this apparatus will prevent the necessity of "blowing-off" from the boilers, in order to prevent the deposit of salt from the evaporation of sea-water, and also the formation of scale, so injurious to iron boilers, and in river-boats it will keep the boilers free from the deposit of mud and other impurities.

Figure 1 is a sectional view, showing the entire apparatus connected and in operation. Fig. 2 is a ground plan, with a top view of the air-pump, reservoir, tanks, and pipes. Fig. 3 is a perspective view of the cluster of pipes, the receiving-hood *k* being removed to

show the manner of arranging them in the plates *a a*.

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

The refrigerator, as herein described, in combination with any of the known jet-condensers, the said refrigerator receiving that portion of the water from the condenser which is not immediately returned to the boiler, cooling the same sufficiently for use in condensing, and returning it to the jet for the condensation of the steam from the cylinder, the whole being combined and operating substantially as herein set forth.

The operation of this machine may be varied in the cooling part by passing the cold water through the pipes *k l m* and discharging the water taken from the condenser, which is to be cooled, into the tank *h h h*, changing the injection and eduction pipes to suit the alteration, the result produced being the same.

JOSEPH P. PIRSSON, JR.

Witnesses:

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