(No Model.)

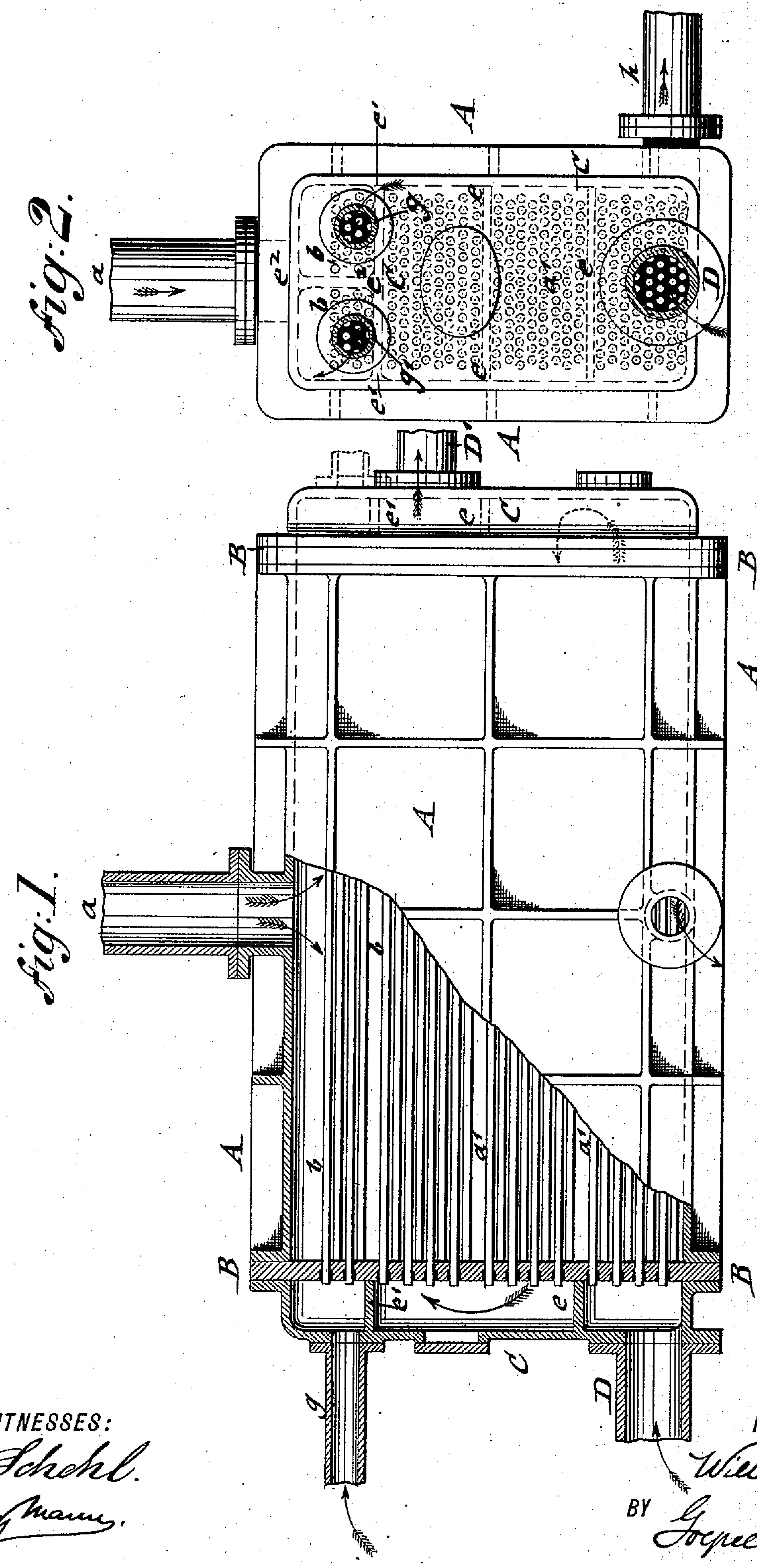
W. E. VOLZ.

SURFACE CONDENSER AND WATER HEATER.

No. 384,944. Patented June 19, 1888.

Fig. 2.

Fig. 1.



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WILLIAM E. VOLZ, OF NEW YORK, N. Y.

SURFACE-CONDENSER AND WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 384,944, dated June 19, 1888.

Application filed December 28, 1887. Serial No. 259,230. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. VOLZ, of the city, county, and State of New York, have invented certain new and useful Improvements in Surface-Condensers and Water-Heaters, of which the following is a specification.

This invention relates to an improved surface-condenser in which a portion of the tubes is used as a feed-water heater, so as to dispense with a separate feed-water heater, the condenser and heater being inclosed in one casing.

The invention consists of a surface-condenser which is provided above the condensing-tubes with a series of feed-water-heating tubes, which are supplied with feed-water by an inlet and outlet pipe, the water-spaces of the condensing and feed-water-heating tubes being separated by horizontal partition-plates in the bonnets, which are further provided with a vertical partition-plate intermediately between the feed-water inlet and outlet pipes, as will appear more fully hereinafter, and finally be pointed out in the claim.

In the accompanying drawings, Figure 1 represents a side elevation, partly in section, of my improved surface-condenser; and Fig. 2 is an end elevation of the same.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the casing, B the tube-heads, and C the bonnets, of a surface-condenser of the well-known construction generally used in connection with marine engines. The exhaust-steam enters into the condenser through a pipe, *a*, at the top of the casing A, and is condensed by contact with a large number of condensing-tubes, *a' a'*, which are kept cool by water pumped through the same. The cooling-water enters through an inlet-pipe, D, at the lower end of the bonnet C and passes out through an outlet-pipe, D', at the upper part of the opposite bonnet C, it being conducted through one group of condenser-tubes after the other by the usual horizontal partition-plates, *e e*, in the bonnets C C.

The casing A of my improved surface condenser is made somewhat higher than usual in condensers, so as to gain additional space at the upper part for arranging a series of feed-water-heating tubes, *b b*, above and parallel to the condensing-tubes, said heating-tubes being supported by suitable packing-glands in the tube-heads B B in the same manner as the condensing-tubes *a a*, and separated by horizontal partition-plates *e'* in the bonnets C C from the water space of the condensing-tubes. If desired, separate bonnets for the condensing and feed-water-heating tubes may be used, which arrangement facilitates the cleaning of the condensing and feed-water-heating tubes and the repairing of their packing-glands, as it permits the independent removal of the bonnets. The feed-water is supplied to the heating-tubes *b b* by a pipe, *g*, and conducted first through one group of tubes to the opposite bonnet C, then back through the other group of heating-tubes to the outlet-pipe *g'* of the first bonnet, which outlet-pipe is arranged sidewise of the inlet-pipe and separated from the same by a vertical partition-plate, e^2. When the outlet-pipe *g'* is located at the opposite bonnet, as shown in dotted lines at the right-hand side of Fig. 1, a vertical partition-plate has to be arranged in each bonnet. From the outlet-pipe *g'* the feed-water is returned to the boiler. The water of condensation is conducted through an outlet-pipe, *h*, at the lower part of the casing to the hot well and then forced by a feed-pump through the feed-water-heating tubes *b b* back to the boiler.

By combining the surface-condenser with a feed-water heater in the manner described the combined condenser and feed-water heater can be furnished at a small additional expense over the cost of an ordinary surface-condenser. The feed-water is quickly and effectively heated during its passages through the heating-tubes, as the same are acted upon by the exhaust steam while it is in its hottest condition directly after entering into the condenser. In this manner a considerable amount of space is saved in the hold of vessels and the increased cost of an independent feed-water heater dispensed with.

I am aware that surface-condensers in which the feed-water heater is arranged on top of the condenser have been used heretofore, and I do not claim this feature, broadly. In these condensers, however, the feed-water-heating

tubes are arranged transversely to the condensing-tubes and require, therefore, separate tube-heads, while in my condenser the extended tube-heads of the condenser are used for supporting the feed-water-heating tubes. This not only simplifies the construction of the condenser, but also facilitates the connection of the condenser and feed-water heater with the water supply and discharge pipes, which are all arranged at the ends of the condenser-casing.

Having thus described my invention, I claim as new and desire to secure by Letters Patent--

In a surface-condenser, the combination, with a series of condensing-tubes arranged at the lower part of the condenser-casing, of a series of feed water-heating tubes located above and parallel with said condensing-tubes, tube-heads supporting both the heating and condensing tubes, and bonnets provided with horizontal division-plates for separating the water-spaces of the condensing and feed-water-heating tubes, and with a vertical partition-plate located in the bonnet or bonnets of the feed-water-heating pipes intermediately between the feed-water supply and discharge pipes, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

WILLIAM E. VOLZ.

Witnesses:

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