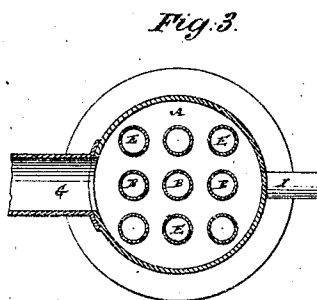
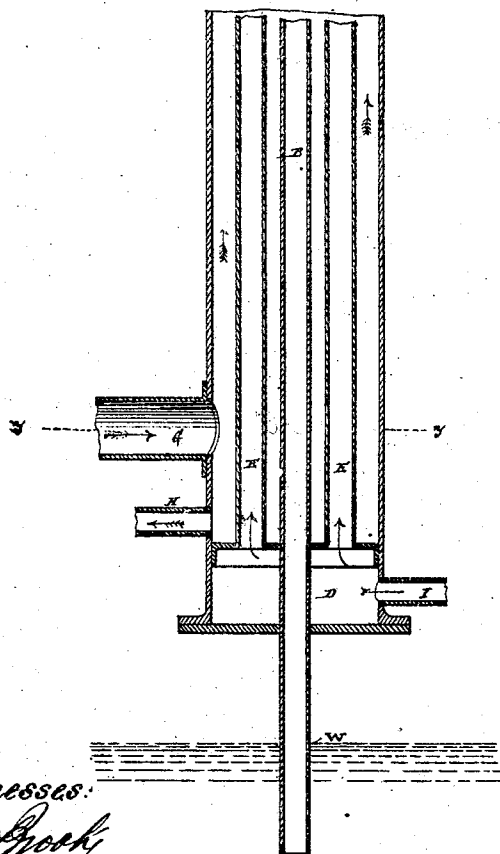
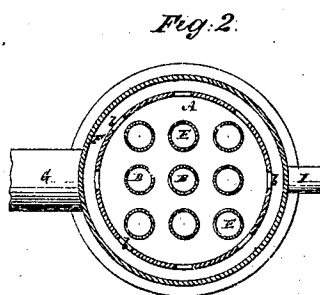
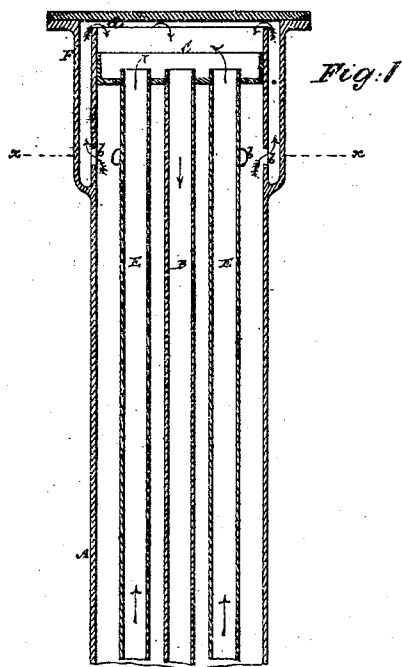


William Wright. Imp^t in Condensers.

116909

PATENTED JUL 11 1871



Witnesses:
H. M. Hook
A. Gregory

Wm Wright

UNITED STATES PATENT OFFICE.

WILLIAM WRIGHT, OF NEW YORK, N. Y.

IMPROVEMENT IN STEAM-CONDENSERS.

Specification forming part of Letters Patent No. 116,909, dated July 11, 1871.

To all whom it may concern:

Be it known that I, WILLIAM WRIGHT, of the city, county, and State of New York, have invented a new and useful Improvement in Condensers for Steam-Engines and other purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a vertical section of a condenser constructed in accordance with my invention; Fig. 2, a horizontal section through the line *xx*; and Fig. 3, a horizontal section through the line *yy* in Fig. 1.

Similar letters of reference indicate corresponding parts throughout the several figures.

My invention relates to condensers in which the Torricellian principle of action is brought into play; and consists in a novel construction of said condensers, whereby they may either wholly be made surface-condensers or combined surface and jet-condensers. While applicable to other purposes or uses, it will suffice here to describe the invention as used in connection with a steam-engine for the purpose of condensing the exhaust steam of the engine to obtain the benefit of a vacuum on the reverse side of the piston to that on which the steam acts; and, as thus applied to an engine, I am enabled by my improvement to keep the water of condensation, either wholly or in part, separate and distinct from the water by which condensation is effected, and thereby, as in other surface-condensers not employing the Torricellian principle, am able to use the same water over and over again in the boiler, thus, in the case of an engine of a sea-going vessel, excluding saline matter from the boiler. The construction, also, is such that little or no air can lodge in the upper portion of the condenser, and a vacuum, perfect or nearly so, is attained, and the structure generally is comprised within a single outer conduit or pipe, through which the exhaust steam passes, and that may be readily supported as against the side of a building or otherwise.

Referring to the accompanying drawing, A represents an outer conduit or pipe, which is mostly close and may be of any desired length, but which, being preferably arranged to occupy a vertical position, should be so placed that its upper end stands at an elevation of thirty-four feet (more or

less) from the surface of the water W in which the condenser is immersed below, as by one or more conduits or tubes, B, arranged to extend upward through the pipe A to nearly the top of the latter, where is arranged a jet-chamber, C, and said outer conduit or pipe furthermore provided at its bottom with what may be termed a cold-water well or receiving-chamber, D. Arranged also within the pipe A are one or more, preferably a series, of conduits or tubes, E, disposed to connect the cold-water space or chamber D with the jet-chamber C. The upper portion of the pipe A is incased by a cap, F, in communication below—as, for instance, by perforations *b*—with the interior of the pipe A, and leaving a contracted space or spaces outside of the latter in communication above with the jet-chamber C, as, for instance, by a contracted space, *d*, lying between the upper edge of the pipe and under side of the lid of the cap. G is the inlet for the exhaust steam of the engine to the outer conduit or pipe A, which latter is furthermore provided, below the level of the inlet G but above the chamber D, with a draw-off pipe or outlet, H, for the water of condensation, and the chamber D provided with an inlet, I, for cold water, that may be injected under a head or by pump, as desired.

The operation is as follows: A vacuum having been started or formed in the condenser, as by the condensation of exhaust steam entering by the inlet G, water is forced by atmospheric pressure up the tubes B to a height corresponding with the condition of the vacuum, and which stops short of the upper end of the pipe A. A supply of cold water is then or simultaneously established through the inlet I, said supply filling the chamber D and rising up the tube or tubes E to the chamber C, where it forms a jet, and from whence it is returned, together with any condensed vapor, down the tube or tubes B. In this way a circulation of water is kept up through the condenser, only a force, however, being necessary to establish the same equal to the power requisite to lift the water from the height to which the vacuum raises it to the chamber C above; and the exhaust steam entering by the inlet G, is condensed by surface contact with the tube or tubes E and the tube or tubes B, or either, and pipe A, thereby maintaining the vacuum in the upper portion of the latter or chamber C above, with which the pipe A communicates. All remaining vapor,

if any, which has not been condensed by contact with the outer pipe and inner tubes, passes off by the openings *b* and *d* to the chamber C, where it is condensed by the jet or jets established by the flow of water from the tube or tubes E into said chamber, such water, together with any water of condensation, being returned or retired down the tube or tubes B. Thus the condenser may operate either wholly as a surface one and the water of condensation be passed off or returned by the outlet H to the boiler, separate and distinct from the water by which condensation is effected, the bottom of the pipe A above the chamber D forming what may be termed a hot-water well, or the condenser may operate partly and mainly, or preferably so, as a surface one, and partly as a jet-condenser, any deficiency of water supply or feed to the boiler over and above what is furnished by the outlet H being drawn, if desired, from the well into which the water from the tube or tubes B is delivered or enters. By reason of the contracted size of the chamber C, owing to much or most of the steam having been condensed in the pipe A, and in part, or preferably so, by reason of the upper communication for remaining vapor into said chamber being immediately under the lid of the cap F, but little air can collect in the chamber C, and what little there is will readily be passed off with the water down the tube or tubes B; consequently a perfect, or nearly so, vacuum is obtained in the condenser.

I do not restrict myself to the precise construction and arrangement of parts here shown, as these may be more or less varied, especially as regards the shape, disposition, or number of conduits or tubes within the outer pipe or conduit A, and disposition or number of the several inlets

and outlets; likewise, arrangement of the chamber D, if such be used, and construction of the jet-chamber C, with the communications that establish connection between it and the pipe A; but it is an essential feature of my invention that the conduit or conduits E, and preferably the conduit or conduits B, or either, is or are arranged within the outer conduit or pipe A, up which the vapor to be condensed passes, and that such conduits be made to connect with the upper or jet-chamber C, to make of the condenser, when using the Torricellian principle of action, either wholly a surface-condenser or combined surface and jet one.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The arrangement, within the conduit or pipe A, up which the steam or vapor to be condensed passes, of the cold-water conduit or conduits E and return-water conduit or conduits B, or either, in combination with a chamber, C, above, with which said conduits are made to communicate, substantially as and for the purpose or purposes herein set forth.

2. The combination of the inner water-conduits or tubes B E, the outer conduit or steam-pipe A, the steam-inlet G, the condensed-water outlet H, the cold-water inlet I, and the jet-chamber C, in communication with the pipe A and tubes B and E, essentially as described.

3. The combination of the cap F and openings *b d* with the pipe A, the jet-chamber C, and tubes B E, substantially as specified.

WM. WRIGHT.

Witnesses:

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A. GREGORY.