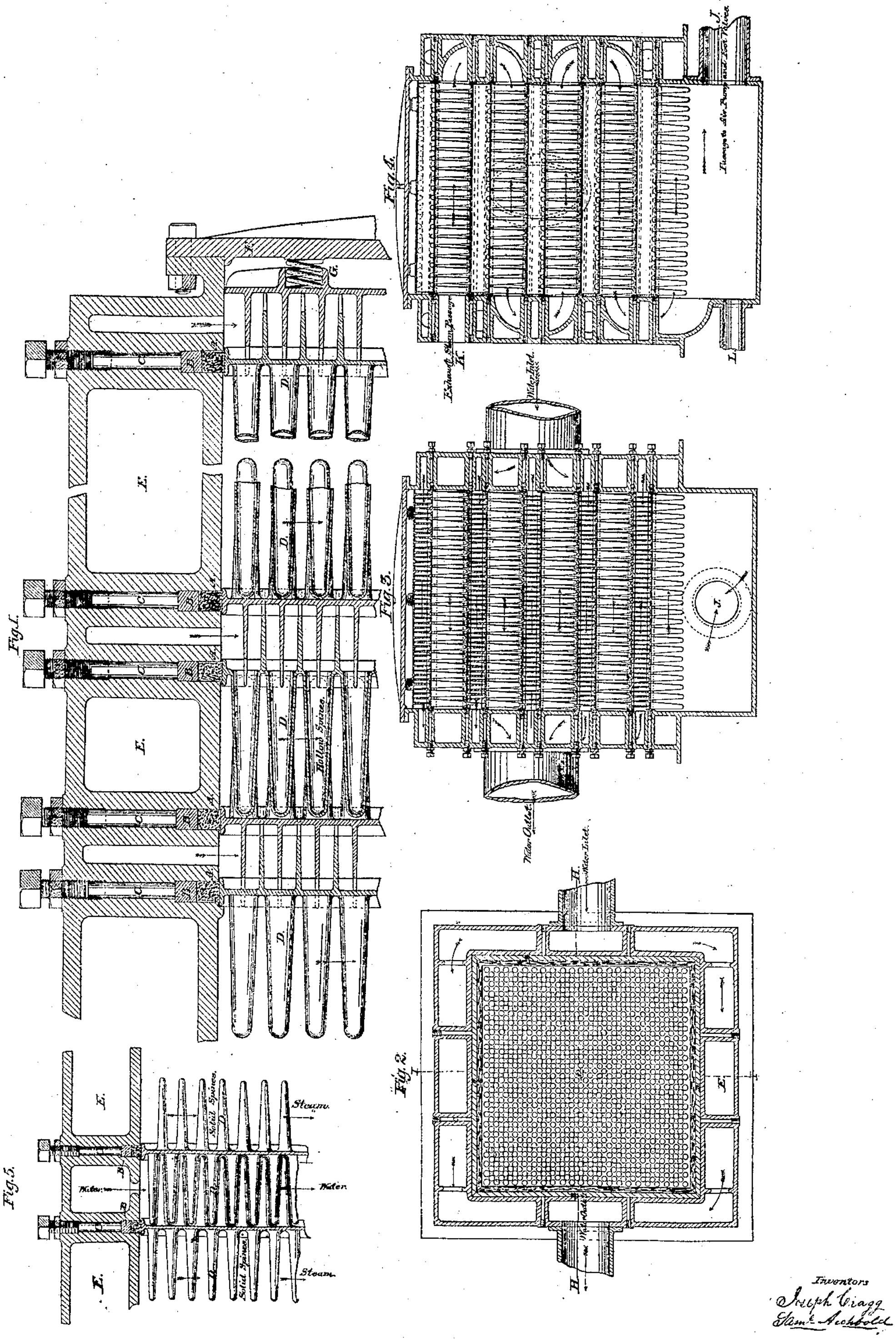
Cragg & Archbold,

Steam-Boiler Condenser.

No. 31,441. Patented Feb. 19, 1861.



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J. CRAGG, OF BALTIMORE, MARYLAND, AND SAML. ARCHBOLD, OF WASHINGTON, DISTRICT OF COLUMBIA.

SURFACE CONDENSER FOR STEAM-ENGINES, &c.

Specification of Letters Patent No. 31,441, dated February 19, 1861.

To all whom it may concern:

Be it known, that we, JOSEPH CRAGG, of Baltimore, State of Maryland, and SAMUEL ARCHBOLD, of the city of Washington and District of Columbia, have invented a new and improved mode of surface condenser for steam-engines, which can also be applied for the cooling or frigerating the condensed steam and water from the condensers and air-pumps of steam-engines, so that said condensed steam and water can again be continuously applied, when cooled, as injection-water, and which can also be applied as a feed-water heater for steam engines and boilers and for the distillation of sea-water or other fluids or the frigeration or cooling or heating of wines or other non-elastic fluids and of steam, air, and other elastic fluids by the use of cold or hot, elastic or non-elastic fluids; and we hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a half size section of the "surface condenser," A, vulcanized rubber joints or other elastic material, compressing against the spine plates, and forming a steam-tight joint. This spine plate has projecting flanches on the water side, dipping into the hollow spines on the steam side, in order to produce a thorough circulation of the water or other fluids, in the upper and lower spines; B, wrought iron, or other metallic followers, pressing against vulcanized india rubber or other elastic material; C, bolts, set screws, and jam nuts, for regulating the pressure upon the followers, and compressing the india rubber, or other elastic material, against the spine plate flanches; D, spine plate with a series of projecting flanches on the opposite sides of spines, to be cast in one piece with spines and flanches thereon, or the spines and flanches, may be manufactured separately, and secured to the plates by screwing on or otherwise, but the former mode is preferred; E, outside casing of surface condenser, to be made hollow, in one casting of iron or other metal, with steam, and water passages, and recesses, for followers and packings cast therein, or may be built up of several pieces of metallic castings, or forged, or rolled metallic plates; the former is preferred. This casing is to be kept full of water, when the condenser is in operation; F, cover to condenser; G, spiral springs on upper bracket plates, for regulating the expansion and contraction of the spine and bracket plates; these springs may be of either the spiral or elliptic variety, or of vulcanized rubber, or other elastic material.

Fig. 2, sectional plan of "surface condenser," showing outside casing E, with the water inlet and outlet:—arrows marked in blue. A, india rubber, (or other elastic material) joint; B, wrought iron, or other metallic followers; C, bolts for regulating followers; D, spine plate, with position of spines (when in place) showing steam passages between, by red arrows.

Fig. 3, sectional elevation through condenser, marked on plan H, H. The water passages are shown in blue arrows, and the steam passages, in red arrows.

Fig. 4, sectional elevation through condenser, marked on plan I, I. The steam passages are shown in red arrows, and the water passages in blue arrows,—the passage of condensed water to air pump, is shown at J, exhaust steam passage from cylinder, shown at K.

Fig. 5, section of surface condenser, with india rubber packings and followers, as shown in the other figures, except that the spine plate has solid spines on each side of the plates, steam and water between alternate spaces, and always moving in opposite, or rectangular direction.

Description of apparatus when used as a frigerator.—The opening marked K, of the apparatus, is secured to the delivery passage of the air pump of steam engines, and the condensed water from said pump is forced, or allowed to flow through the passages marked with red arrows, and is thereby cooled. This water then passes to the condenser again, through passage L, Fig. 4, and again condenses the steam from the cylinder, and so on continuously. In this case, the passage J, is closed. The water for cooling purposes, pursues the same course as described in "surface condenser."

When the apparatus is to be used for distilling sea water, or the frigeration, or cooling of wines or other liquids, the steam from the sea water, passes through the opening marked K, of the apparatus, and through the passages marked with red arrows, and falls as fresh water, to the bottom passage, marked J, which may lead to the water

tanks, or other receptacle, the passage L, being closed, the water for cooling purposes enters at the water inlet, and out at the outlet, as shown in blue arrows, and as before explained as "surface condenser." When used for cooling "wines, or other liquids," they enter into passage K, as described in the "Distilling of sea water," and the water or air used for cooling purposes, as therein described.

When used as a feed-water heater for steam-engine boilers.—The steam, or hot water, passes through the passage K, following the red arrows (see Fig. 4,) and out at L. The feed water to be heated, passes from the force pump, at the water inlet passage, and out by the water outlet passage to the boiler, with passage J closed, or the process may be reversed.

What we claim as our invention, and desire to secure by Letters Patent for a "surface condenser," and the other different purposes herein specified, is—

1. The form and general arrangement of the outside casing marked E with the steam and water passages.

2. The mode of making a water, and steam tight joint between the casing, and spine plates.

3. The mode of arranging the spine plates for the purpose of obtaining, with little cost, a large quantity of surface in a small space, and a thorough circulation of the steam, water, or other elastic, or non-elastic fluids, using for the purpose herein specified, an apparatus, as herein substantially described.

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