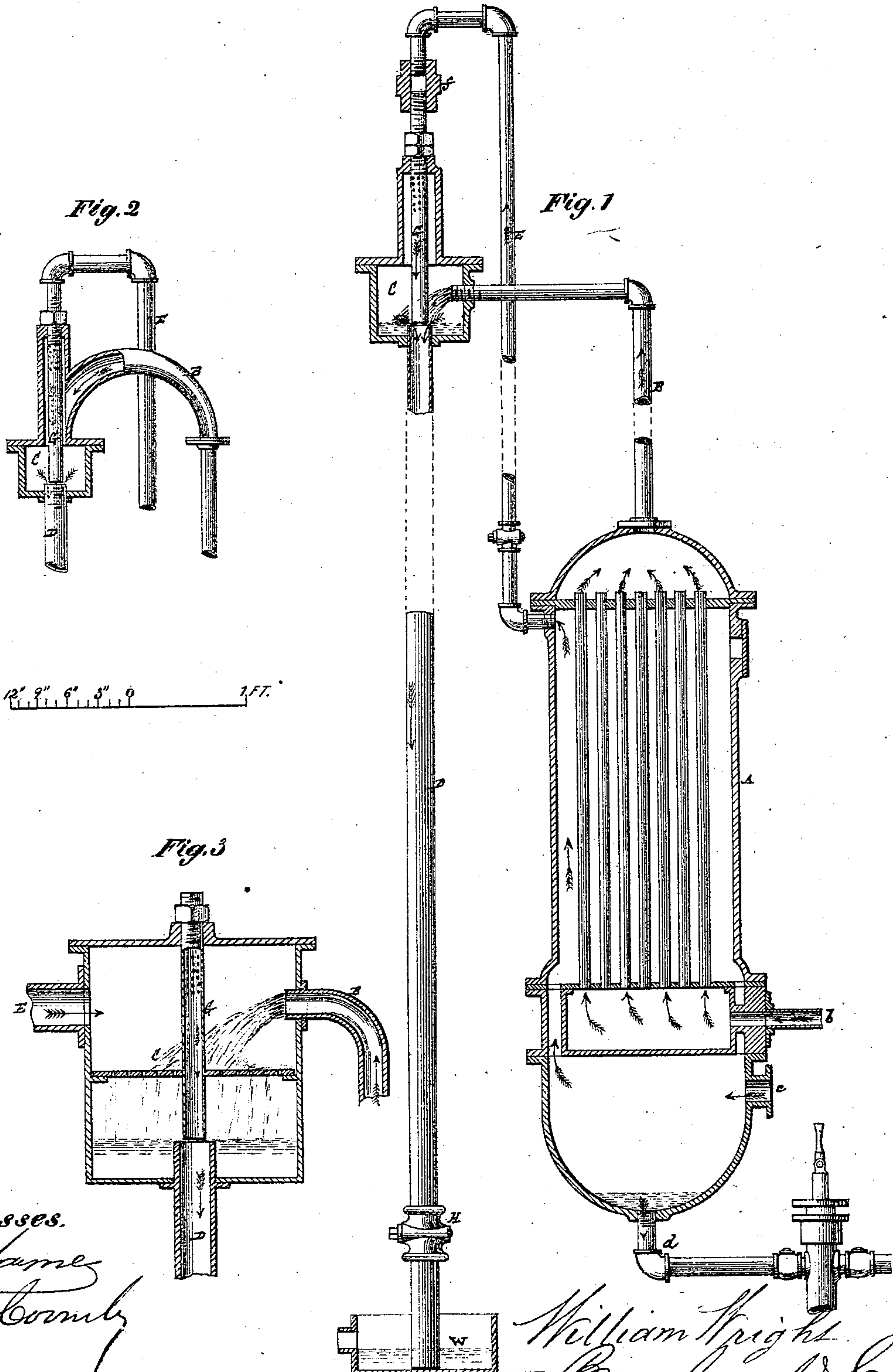


WILLIAM WRIGHT.

Improvement in Condensers for Steam Engines.

No. 123,541.

Patented Feb. 6, 1872.



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WILLIAM WRIGHT, OF NEW YORK, N. Y.

IMPROVEMENT IN CONDENSERS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 123,541, dated February 6, 1872.

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 sectional elevation of a combined jet and surface-condenser having my improvement applied to it; Fig. 2, a sectional elevation of a modification of the upper portion of the same; and Fig. 3, a sectional elevation, showing my improvement as applied to a jet-condenser constructed to operate upon the same general principles.

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

This invention mainly relates to condensers in which a Toricellian tube or the Toricellian system of action is employed in maintaining or partly maintaining the vacuum; and is more especially designed to be applied to condensers constructed to operate substantially as described in Letters Patent of the United States issued to me on the 11th day of July, 1871, and whereby the same may either wholly be made surface-condensers or combined surface and jet condensers. The invention consists in a certain combination of one or more perforated air and vapor pipes with the upper portion of the return water-conduit or jet-chamber mounted thereon, and into which latter the vapor to be condensed passes when such pipe or pipes is or are arranged in such relation to said conduit that the water as it passes down the latter will suck or draw about the end or ends of the air and vapor pipe or pipes, and so create a vacuum that will cause the air and remaining vapor to be passed off down the return water-conduit. The invention also includes an adjustable arrangement of said air and vapor pipe or pipes relatively to the return water-conduit, whereby said devices may be adjusted to obtain the most perfect result.

In thus specifying the nature of the invention and description of condenser to which it is more particularly applicable, the same is

supposed to be used in connection with a steam-engine condenser, and it will be so referred to in the further description of the apparatus; which, however, may be adapted to manufacturing sugar *in vacuo* and to various condensing purposes.

Referring, in the first instance, more particularly to Fig. 1 of the drawing, A represents the surface portion of the condenser, which may be made up of vertical tubes that pass the injection-water up through them, said water being admitted, as by a pipe, *b*, to a chamber with which said tubes are in communication at their lower ends, and below which is a chamber for the admission, as by inlet *c*, of the steam to be condensed. Said steam, thus admitted, passes around the water-chamber and up and among or on the outside of the tubes in the surface-condenser A, and being there condensed, or mainly so, the water of condensation thus formed may be drawn off by a pipe, *d*, below, separate and distinct from the water by which condensation is effected. If preferred, the arrangement of parts may be reversed and the water be passed up on the outside of the tubes; or any other suitable construction of surface-condenser may be adopted. B is a pipe, forming an upward extension of the injection water-space of the surface-condensing portion A of the apparatus, and up through which said water is passed to a jet-chamber, C, or upper swelled portion of the return water-conduit D, said chamber C preferably standing at an elevation of about thirty-four feet, more or less, from the surface of the water W, in which the lower end of the conduit D is immersed. E is the pipe which establishes communication between the upper portion of the surface-condenser A and upper portion of the jet-chamber C, and which passes off upward to the latter from said condenser any uncondensed steam or vapor and air combined therewith. This construction of the apparatus, so far as has yet been described, obtains for the latter a like general operation to that described in my Letters Patent hereinbefore referred to. Thus, a vacuum having been started or formed in the condenser, and water being forced up the pipe D by the pressure of the atmosphere to a height corresponding with the condition of the vacuum, or said pipe being otherwise charged and

to an extent which stops short of the upper end of the pipe or jet-chamber C when the latter stands at a height which is in excess of that to which a column of water would be supported by mere atmospheric pressure, the condenser is in a condition for keeping up a continuous action by the flow of the injection-water through the surface-condenser A and pipe B into the jet-chamber C, the force to effect which need be no more than what is required to lift the water from the height to which the vacuum raises it to the chamber C above. The pipe E may only be used to convey so small a proportion of the steam or vapor, with air combined, to the jet-chamber C that, practically speaking, the condenser operates wholly as a surface one, or said pipe may carry off so much more of the steam or vapor that the apparatus operates both as a surface and jet condenser. The air and vapor pipe E is made to connect with the jet-chamber C by a supplementary air and vapor pipe or continuation, G. This air and vapor pipe G is arranged to dip down into the jet-chamber C to about the level or below the surface of the water therein, and to within a short distance of the upper end of the return water-pipe D, or so as to enter said pipe, with a space around it for the passage of water to and down the pipe D. Said pipe G is perforated above—that is, the portion of it which lies within the upper part of the chamber C, above the water. By means of this air and vapor pipe G the water in making its descent through the pipe D will suck or draw, or otherwise produce a vacuum on the lower end of said pipe G, and effectually carry off air and remaining vapor from the pipe E and jet-chamber C, and thus produce a more perfect vacuum in the condenser. To perfect the action of this device or air and vapor attachment G, the same is made adjustable, as, for instance, by a screw-coupling, *f*, and lock nut or nuts, to vary the depth of its immersion in the jet-chamber, or distance from the upper end of the return-pipe D, or extent of its projection therein. Furthermore, to obtain a proper action of said device and a perfect action of the condenser generally I provide at

or near the lower end of the return water-pipe D a valve or cock, H, to regulate the discharge from the return-pipe, and so that it may always be kept full of water, or, together with the jet-chamber C, be properly charged or supplied according to the amount of injection-water entering by the pipe B. This valve, together with a valve controlling the injection, may be operated automatically by means of a float or otherwise.

Fig. 2 of the drawing shows substantially a similar arrangement of devices as Fig. 1; but the pipe B is made to connect with the jet-chamber C at a point higher up, and by an arch or bend which establishes a straighter course or flow for the injection-water down over the pipe G.

Fig. 3 illustrates the perforated air and vapor pipe G as applied to a condenser operating upon the same general principle as regards maintenance of the vacuum, but which is wholly a jet-condenser—that is to say, the surface portion (A in Fig. 1) of the condenser is dispensed with, and the steam or vapor to be condensed is passed entirely or directly, by the pipe E, to the jet-chamber C, which is supplied with injection-water by the pipe B, and is mounted on the return water-pipe D for operation as when used only to condense a portion of the vapor. In this case, as in the other, the air and vapor pipe G will serve to effect a more perfect clearance of air and vapor from the jet-chamber.

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

1. The combination of the perforated air and vapor pipe G with the jet-chamber C and return water-pipe D, when arranged in relation with each other for operation, substantially as and for the purpose herein set forth.

2. The adjustable perforated air and vapor pipe G in combination with the jet-chamber C and return water-pipe D, arranged in relation with each other essentially as specified.

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