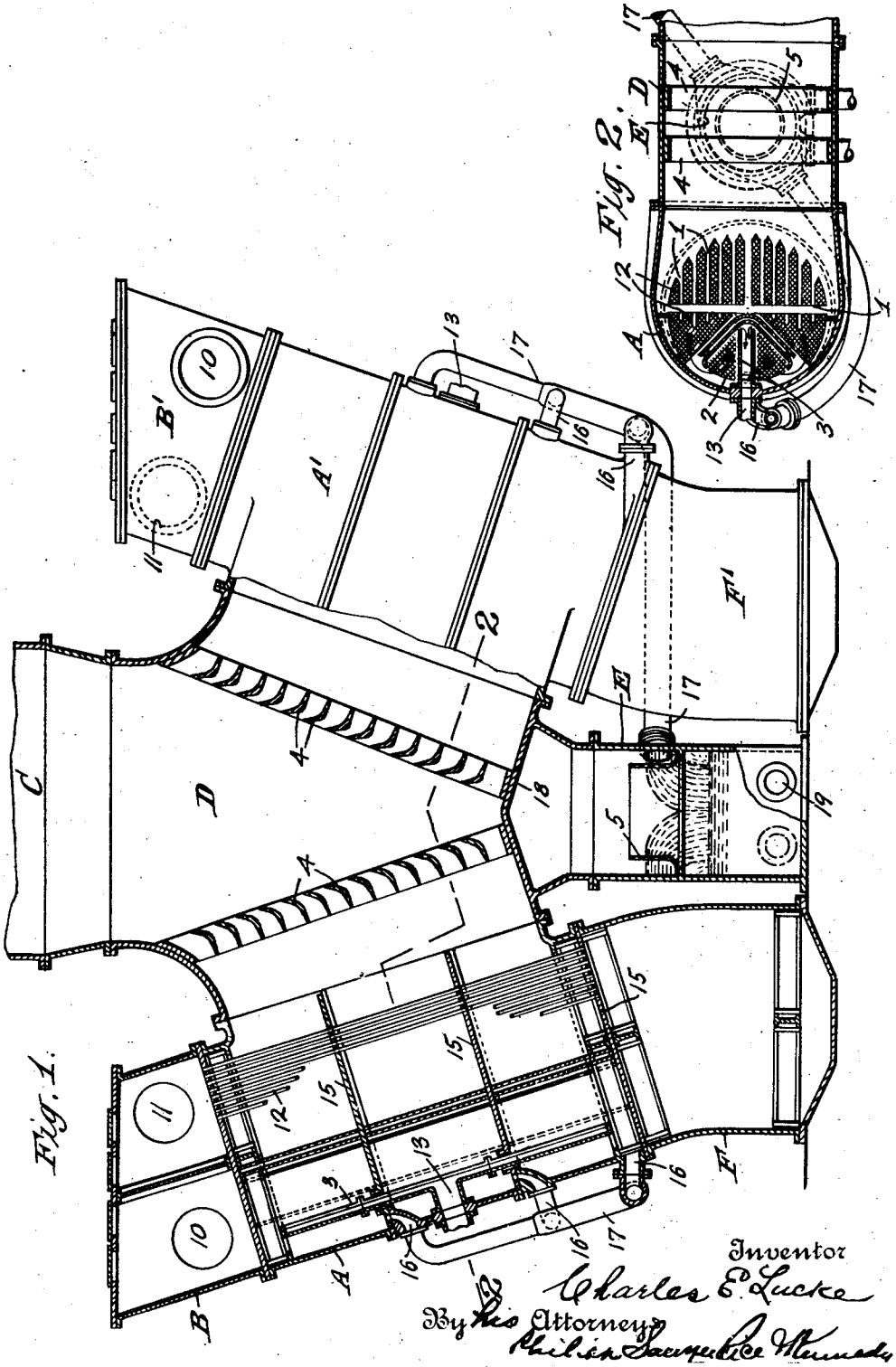
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CONDENSING APPARATUS

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CONDENSING APPARATUS.

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This invention relates to condensing apparatus of the surface type, the object of the invention being to provide a condenser of large capacity and high efficiency, while occupying but small floor space.

In accordance with my invention, I arrange two vertical condensers side by side, with a common exhaust chamber between them, these condensers preferably being inclined so as to approach each other at their lower ends, and I preferably employ a common hot well for the two condensers arranged between them and below the steam chamber. I thus secure a very compact and efficient construction of large capacity, and enable provision to be readily made for uniform distribution of exhaust steam over the tubes of the two condensers.

For a full understanding of the invention, a detailed description of a construction embodying all the features of the same in a preferred form will now be given in connection with the accompanying drawings forming a part of this specification, and the features forming the invention then be specifically pointed out in the claims.

In the drawings, which show diagrammatically for purpose of illustration a condensing apparatus of a preferred form,—

Figure 1 is a sectional elevation of the apparatus, and

Figure 2 is a cross-section on the broken line 2—2 of Fig. 1.

Referring to the drawings, the two condensers have the steam chambers A, A′ and end water chambers B, B′, the condensers being shown as two-pass, with the water inlets and outlets 10, 11, and the usual banks of vertical water tubes 12. The condenser is shown as of a type now well known, with the usual steam passes 1 for the admission of steam among the tubes, the central air cooler 2 in the outer portion of the condenser, with the air off-take passage 3 extending substantially the length of the condenser through the air cooler and with which is connected the air off-take pipe 13 which is connected with the usual dry air pump or other suction apparatus. It will be understood, however, that this arrangement of condenser tubes and air cooler forms no part of the present invention, and any other suitable tube arrangement and air cooler may be used. It may be found desirable, in some cases, to make the condenser of less depth, thus providing for less total dimension through the two condenser construction.

The exhaust connection C is preferably common to the two condensers and delivers the exhaust steam to an exhaust chamber D arranged centrally between the condensers, this exhaust connection expanding outward by curved portions so as to supply steam over substantially the full length of the condenser tubes, guide vanes 4 arranged in sets parallel with the condenser being provided, so as to form a decreasing steam space between them and distribute the steam over the condenser tubes. The multiplicity of guide vanes shown with comparatively small steam passages between them, are preferably used, so as to divide the steam into comparatively thin streams and thus provide for change of direction of the steam and assure of its proper distribution throughout the condensers without eddies or counter-currents. As shown, the guide vanes 4 are of angular form, with their entrance edges in line with the exhaust steam flow from exhaust connection C, and their exit edges normal to the condenser tubes, but the form of these guide vanes may be varied according to the conditions under which they are used. These guide vanes may be used with condensers of other form and arrangement.

The condensers are preferably divided into a series of steam chambers by transverse partitions 15, three such chambers being shown in the present case, each extending over a third of the length of the condenser tubes, and each of these condensing chambers is provided with an outlet 16 for the water of condensation, these outlets 16 communicating with a common pipe 17 for each condenser by which the water of condensation is delivered to the hot-well.

A single hot-well E preferably is used and arranged between the bottom circulating water chambers F, F′ of the apparatus and on the same level, so that the space between the lower ends of the condensers is utilized for the hot-well, and the vertical space occupied by the apparatus thus reduced, the hot-well being closed at the top by the bottom wall 18 of the steam chamber D. The hot-well is shown as of a usual type receiving the water of condensation from the two pipes 17 for the respective condensers and delivering it through the perforated sleeve 5 to the body of water in the hot-well,

from which the water of condensation is taken off by the usual pump through pipe 19, two discharge pipes being shown for the use of two discharge pumps for large capacity condensers.

It will be understood that the invention is not to be limited to the detail construction or arrangement of parts shown, but that different forms of condensers may be used with the arrangement illustrated, and various modifications in the arrangement may be made by those skilled in the art, within the invention defined by the claims.

What is claimed is:

1. The combination with two vertical surface condensers, of a common exhaust chamber between said condensers, and guide vanes at opposite sides of the steam chamber for distributing the steam over the condensing surfaces.

2. The combination with two vertical surface condensers, of a common exhaust chamber between said condensers, and a multiplicity of guide vanes with narrow steam passages between them at opposite sides of the exhaust chamber for distributing the steam over the condensing surfaces.

3. The combination with two vertical surface steam condensers arranged in an inclined position so as to approach each other at their lower ends, of a common exhaust chamber between said condensers.

4. The combination with two vertical surface steam condensers arranged in an inclined position so as to approach each other at their lower ends, of a common exhaust chamber between the condensers, and steam guides on opposite sides of the chamber arranged in series parallel with the condensers for distributing the steam over the condensing surfaces.

5. The combination with two vertical surface steam condensers arranged in an inclined position so as to approach each other at their lower ends, of a common exhaust chamber between the condensers, and a multiplicity of guide vanes with narrow steam passages between them at opposite sides of the chamber arranged in series parallel with the condensers for distributing the steam over the condensing surfaces.

6. The combination with two vertical surface steam condensers arranged in an inclined position so as to approach each other at their lower ends, of a common exhaust chamber between said condensers, and a hotwell between the lower ends of the condensers receiving the water of condensation from both condensers.

7. The combination with two vertical steam condensers arranged in an inclined position so as to approach each other at their lower ends, partitions dividing the condensers into a plurality of condensing chambers arranged longitudinally of the condensers, a water of condensation discharge from each condensing chamber, a common exhaust chamber between said condensers, and a hotwell between the lower ends of the condensers receiving the water of condensation from both condensers.

8. The combination with two vertical steam condensers arranged in an inclined position so as to approach each other at their lower ends, partitions dividing the condensers into a plurality of condensing chambers arranged longitudinally of the condensers, a water of condensation discharge from each condensing chamber, a common exhaust chamber between the condensers, and a multiplicity of guide vanes with narrow steam passages between them at opposite sides of the chamber arranged in series parallel with the condensers for distributing the steam over the condensing surfaces.

9. The combination with two vertical condensers, of a common exhaust chamber between said condensers and having its outlets to said condensers transverse of the inlet of steam into the chamber.

10. The combination with two vertical condensers, of a common exhaust chamber between said condensers and having its outlets to said condensers transverse of the inlet of steam into the chamber, and a multiplicity of guide vanes with narrow steam passages between them at the exhaust chamber outlets for distributing the steam over said condensing surfaces.

In testimony whereof, I have hereunto set my hand.

CHARLES E. LUCKE.