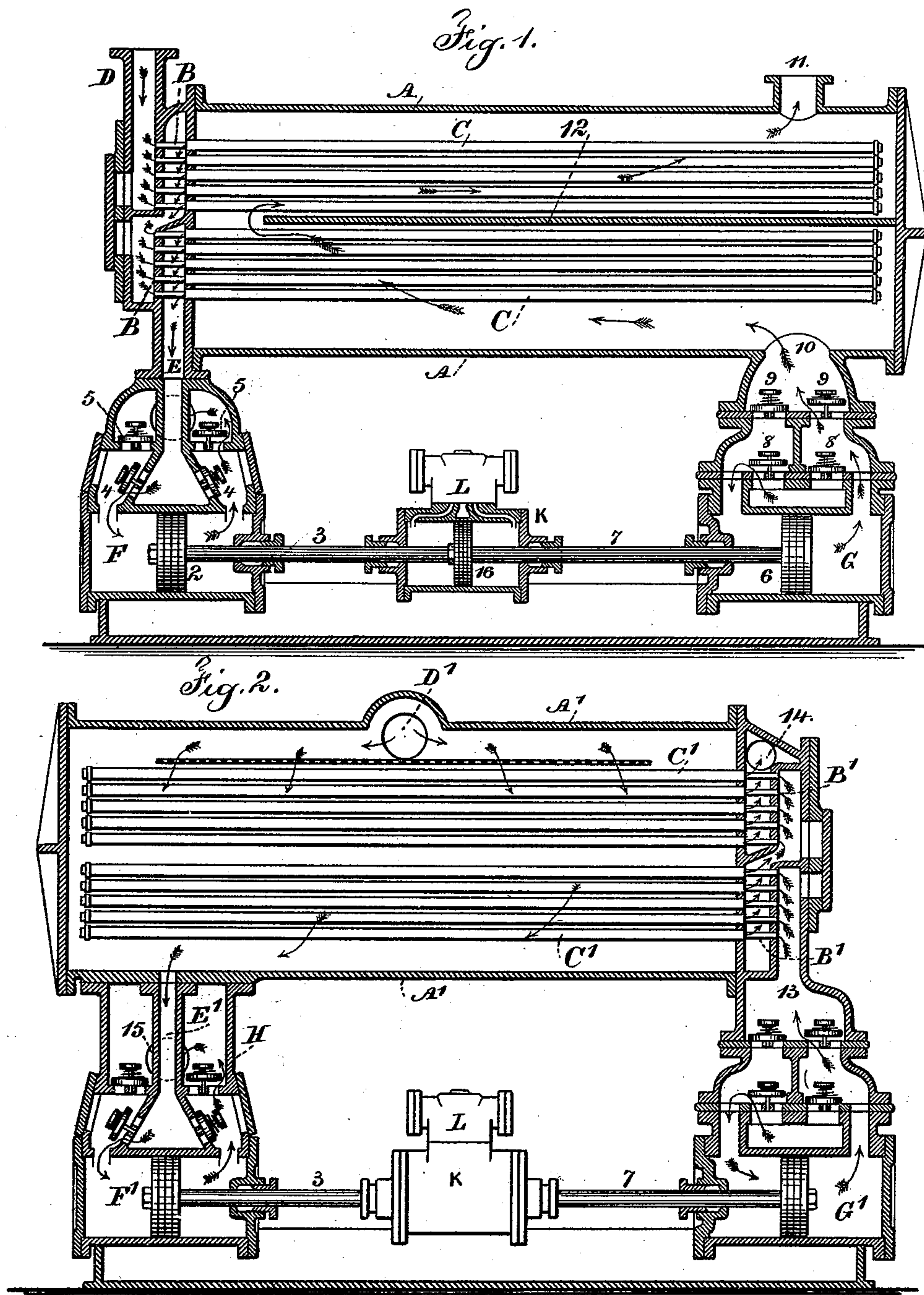


(No Model.)

F. M. WHEELER.
CONDENSING APPARATUS.

No. 510,107.

Patented Dec. 5, 1893.



Witnesses

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UNITED STATES PATENT OFFICE.

FREDERICK MERIAM WHEELER, OF MONTCLAIR, NEW JERSEY.

CONDENSING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 510,107, dated December 5, 1893.

Application filed March 16, 1892. Serial No. 425,107. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK MERIAM WHEELER, a citizen of the United States, residing at Montclair, in the county of Essex and State of New Jersey, have invented an Improvement in Condensing Apparatus, of which the following is a specification.

In steamboats and particularly in war vessels, the space that can be availed of for the condenser is of necessity very limited, and it is desirable to connect with the condenser itself an independent steam engine and two pumps, one pump being employed for circulating the water through the condenser and the other pump acting to take away the water of condensation from the condenser or to maintain a vacuum.

My present invention provides for connecting the pumps directly to the respective ends of the condenser and for actuating the pumps by a suitable engine, so that the condensing apparatus is rendered very compact, the pumps becoming the supports for the condenser; and the condenser is sufficiently elevated for the exhaust steam to pass in the most direct manner to the same from the engine, and the water of condensation passes by gravity into the air pump, so that the efficiency thereof is promoted, and the circulating pump controls the movement or volume of the condensing water through the condenser; and the independent engine can be kept in operation when the main engine is quiescent, so that the vacuum is not impaired and the main engine is kept in readiness for full duty.

In the drawings Figure 1 is a vertical section of the improvement as applied to a condenser in which the steam passes into the tubes. Fig. 2 is a similar view showing a condenser in which the condensing water circulates through the tubes.

The condenser shown in Fig. 1 is made with a shell or case A of suitable size and shape, and within the shell there are tubes B and C, and the steam passes from the inlet D through the tubes B, returning by the tubes C, the water of condensation passing by the port E to the pump F, which pump F is of any desired construction and it is provided with a piston 2, piston rod 3, induction valves 4 and

education valves 5. I find it convenient to arrange these parts in the manner represented in the drawings, but do not limit myself to the details of construction or to the proportions of the parts.

The circulating pump G is provided with a piston 6, piston rod 7, induction valves 8 and education valves 9, and the condensing water is pumped into the condenser through the port 10 and passes into the case A and circulates around the tubes and escapes by the water outlet 11, and it is advantageous to make use of a partition or diaphragm 12 to insure a complete circulation of condensing water through the condenser.

In Fig. 2 the shell A', the tubes B' and C' are similar to those before described, except that the steam inlet D' passes into the shell A' and the circulating pump G' is connected by the port or passage way 13 with the open ends of the tubes B', and the water outlet 14 is connected with the chamber into which the upper ranges of tubes C' open, and in this figure the condensed water port E' opens from the case or shell A' into the valve chamber of the air pump F', and the outlet 15 for the water of condensation is from the valve chest H.

The engine cylinder K is provided with a piston 16 connected with the respective piston rods 3 and 7, and this engine cylinder is provided with a suitable valve chest L and valves of any desired character and actuated in any usual manner, so that the steam engine is made to act directly upon the pistons 2 and 6 of the respective pumps, and the condensers are supported directly by the circulating pump and air pump, and the circulating water is passed into the condenser at the bottom and escapes near the top, and the steam passes into the condenser near the top and the water of condensation is taken away by the air pump from the bottom of such condenser, thereby not only insuring compactness, but the circulating pump and air pump are in the best position in relation to the condenser for the most efficient service.

I am aware that in some instances the air pump has been at a lower level than the condenser, and that the condenser has been supported by the frame of the engine. In my present invention the pumping engine itself

becomes the support for the condenser and the water ways of the condenser rest directly upon the water ways of the pump and the parts are bolted together, thereby lessening the distance the fluid has to travel and increasing the efficiency of the pumps and of the condenser.

I claim as my invention—

1. The combination with a direct acting steam engine of two pumps driven by such engine and having ports and valve chests above the cylinders, a surface condenser having pipes opening into a chamber at one end which chamber is directly connected to the valve chest of one pump and the casing of such condenser having an opening into the valve chest of the other pump substantially as specified.

2. The combination with a horizontal surface condenser, of a water circulating pump beneath one end of the condenser and an air pump beneath the other end of the condenser, such pumps being provided with the valves

and the ports thereof opening directly into the condensing water space of the condenser and to the space for the steam and water of condensation respectively, and an intermediate direct acting steam engine connected to the piston rods of the respective pumps, substantially as set forth.

3. The combination with a surface condenser having tubes opening into a chamber at one end, of two pumps beneath the condenser and upon which such condenser is directly supported, the case of the condenser opening into the valve chamber of one pump and the end chamber of the condenser opening into the valve chest of the other pump and an actuating steam engine between the pumps and directly connected with them substantially as specified.

Signed by me this 22d day of February, 1892.

FREDK. MERIAM WHEELER.

Witnesses:

FLORENCE W. WHEELER,
CLIFTON H. WHEELER.