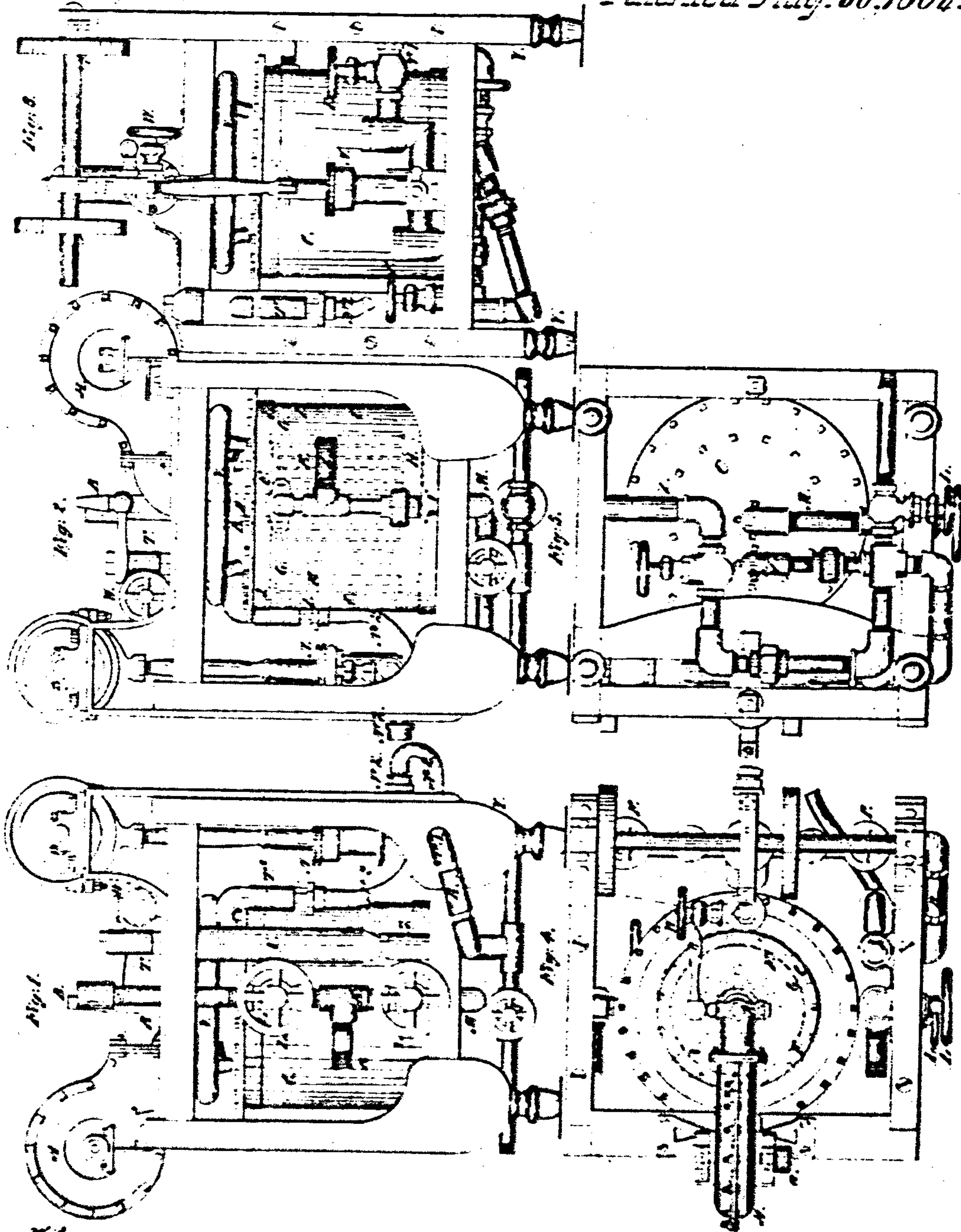


J. P. F. Dutchy,
Steam-Boiler Condenser.

No 13,956.

Patented Aug. 30, 1864.



Witnesses:
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UNITED STATES PATENT OFFICE.

JEAN PAIRE FLORIMOND DATICHIZ, OF NEW YORK, N. Y.

IMPROVEMENT IN HYDROATMOSPHERIC CONDENSERS.

Specification forming part of Letters Patent No. 43,976, dated August 30, 1864.

To all whom it may concern:

Be it known that I, JEAN PAIRE FLORIMOND DATICHIZ, of New York city, county and State of New York, have invented new and useful Improvements in Hydroatmospheric Condensers; and I do hereby declare the following to be an exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the application of water or air, separate or together, so as to condense the exhaust-steam of an engine and return the same to the boiler by means of a ventilator or blower at top, so arranged as to conduct the air around the pipe containing the water into the air-chamber of the condenser (which is a double cylinder) containing pipes and tubes, with a gauze-wire top, and inverted chamber beneath, and an outside air-column having four valves, two above and two below, the upper ones working in opposite directions to the lower ones, so as to discharge the air alternately, according to the escape of any air, and thereby entirely dispensing with the use of an air-pump.

Figure 1 represents a side elevation, exhibiting the blower, high and low pressure wheel-valves, air-column, condensing-cylinder, and fly-wheels; Fig. 2, a side elevation exhibiting the blower, fly-wheels, and condensing-cylinder with its inner cylinder and tubes; Fig. 3, another side elevation representing the pump with its fly-wheels at top and its branch pipes and valves beneath; Fig. 4, a top view of the machine; Fig. 5, a bottom view.

A represents the ventilator or blowing-machine at top, of any proper shape or construction, connected with a blast-pipe B and leading into the surface condenser C, which is a double cylinder. The small and inner pipe D receives its supply of water at the mouth B from an outside tank or reservoir, which is conducted into the inner chamber of the condenser C with the air, and by the action of the air a thick mist is formed, which in passing through the chamber and the tubes E produces condensation.

F is a gauze-wire top of the inner cylinder c, as seen at Fig. 2, surrounded by a border or

rim, for the purpose of retaining the water and keeping the top tube-sheet G cool. The top and bottom tube-sheet G, with the center pipe B and the tubes E surrounding it, with the inverted chamber underneath, form an independent combination by itself for the purpose of allowing the tubes E and center pipe B to expand or contract at leisure, and is suspended at the top on the angle-iron I, to which it is fastened by screw-bolts J. The exhaust-steam from the engine enters at the pipe K, as seen at Fig. 1, between the two wheel-valves L, the object of the top valve L being to work the engine at high pressure in case of disarrangement of the condenser. By opening the lower valve L and closing the upper valve L the engine is transferred from a condensing to a non-condensing engine.

In connection with the pipe K is a lower pipe M, leading into the center of the bottom of the condenser, as seen at Figs. 1 and 5, through which the steam passes against the inverted bottom H, as seen at Fig. 2, and spreads itself around the tubes E and top of tube-sheet G, also around the inside of the inner cylinder C, which is surrounded by water discharged through the tubes E, and transforms the exhaust-steam into condensed water.

The apparatus is furnished with an ordinary feed-pump N, (see Figs. 1, 2, and 3,) that communicates with a suction-pipe leading to the condensed water, which pipe has four branches, numbered 1, 2, 3, and 4, two branches having wheel-valves P P, the purpose of the shortest branch, No. 1, being to let out the air and condensed water and act as a waste-pipe while starting the engine. The longer branch, No. 2, is an auxiliary feed-pipe, the object of which is to replace the amount of water which might be lost through the ordinary leakage of boilers or engines. The pipe continues up to the top of the air-column, and discharges the water through a waste-pipe at top. The third branch, No. 3, attached to the pump, and which passes through the frame, is provided with a check-valve R, acting in the direction of the suction of the pump. Attached to the fourth branch of this pipe is a similar check-valve S in a reverse and vertical position, No. 4, at the lower end of air-column U, so as to close itself at the same time with the valve R when the pump forces.

At the upper end of air-column U, as seen at Figs. 1 and 2, is a similar vertical valve T, working in an opposite direction to the lower valve S. The upper branch from said column leading to the pump has likewise a valve T², similar to the valve T, and working in the same way. When the pump sucks, all the lower valves are opened, while the upper valves T and T² are closed. By this operation the condensed water from the condenser C is withdrawn and at the same time forming a vacuum in the air-column U, and as the pump N forces the lower valves are closed, and in case any air has collected through leakage of the packing of the pump or otherwise it will be discharged through the upper valves T T² and escape at top of the air-column U.

The top of the condenser consists of a crown-sheet having four branches leading into a circular main pipe V, which is furnished with a wheel-cock W, as seen at Fig. 4, for the purpose of regulating the escape of the hot air. A smaller pipe X, as seen at Figs. 2 and 4, leading from the inner condenser, passes through the crown-sheet and connects with a common vacuum-gage.

The apparatus is permanently secured to a square frame Y.

Z is the discharge, hot-water, and outward-delivery pipe.

Z² is an auxiliary feed-pipe.

α is a band-wheel to drive the fan of the blower.

I take the water from the condenser C (as

discharged from the pump) through a super-heater placed in a furnace to the boiler, thereby returning the feed-water under a very high temperature, purifying the water, and preventing incrustation in the boiler.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The application of water or air, separate or together, so as to condense the exhaust-steam of an engine and return the same to the boiler, by the means and devices herein described.

2. A ventilator or blower at top so arranged as to conduct the air around the pipe, conducting the water into the air-chamber of the condenser. The air may be used with the water or the air alone and the water alone, as herein described, and for the purposes set forth.

3. The air chamber or column U, having four valves independent of the valves of an ordinary pump—two of them above and two below—the upper ones working in opposite directions to the lower ones, so as to pump and discharge the air alternately, according to the escape of any air, as herein described.

4. The arrangement and construction of the double condenser, with its center pipe and tubes surrounding it, in combination with its wire-gauze top, and chamber underneath, for the purposes set forth.

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Witnesses:

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