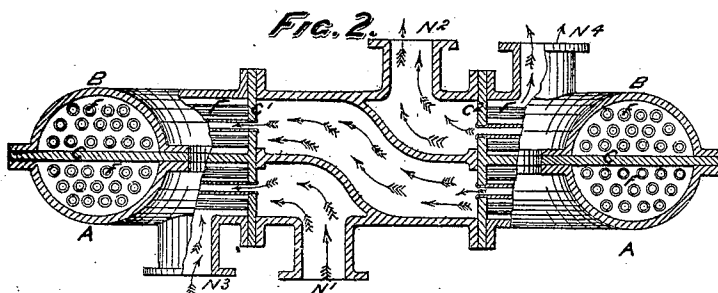
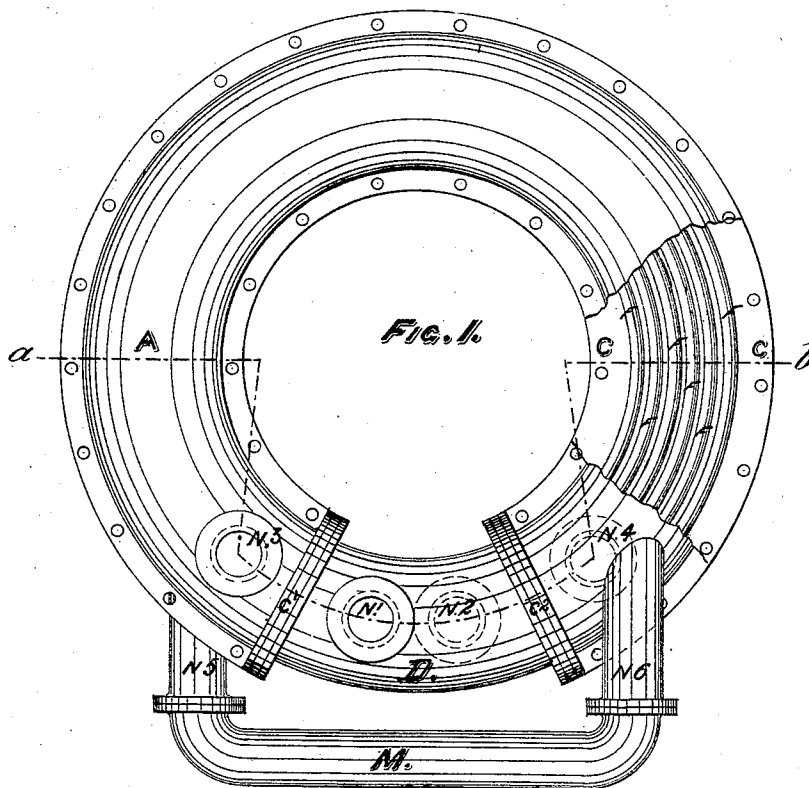


G. WALES.

Condensers for Steam-Engines.

No. 135,180.

Patented Jan. 21, 1873.



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Nathan J. L. Litch
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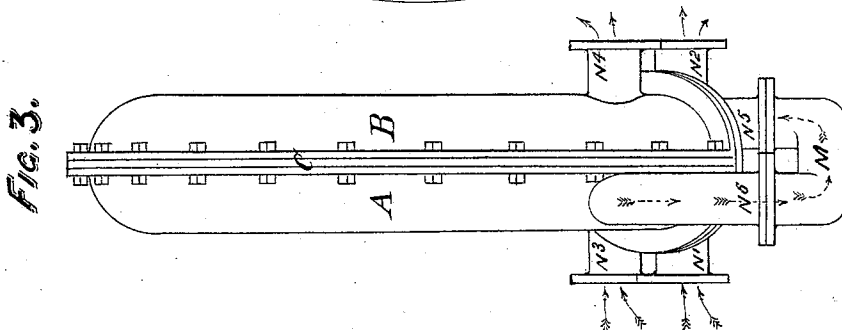
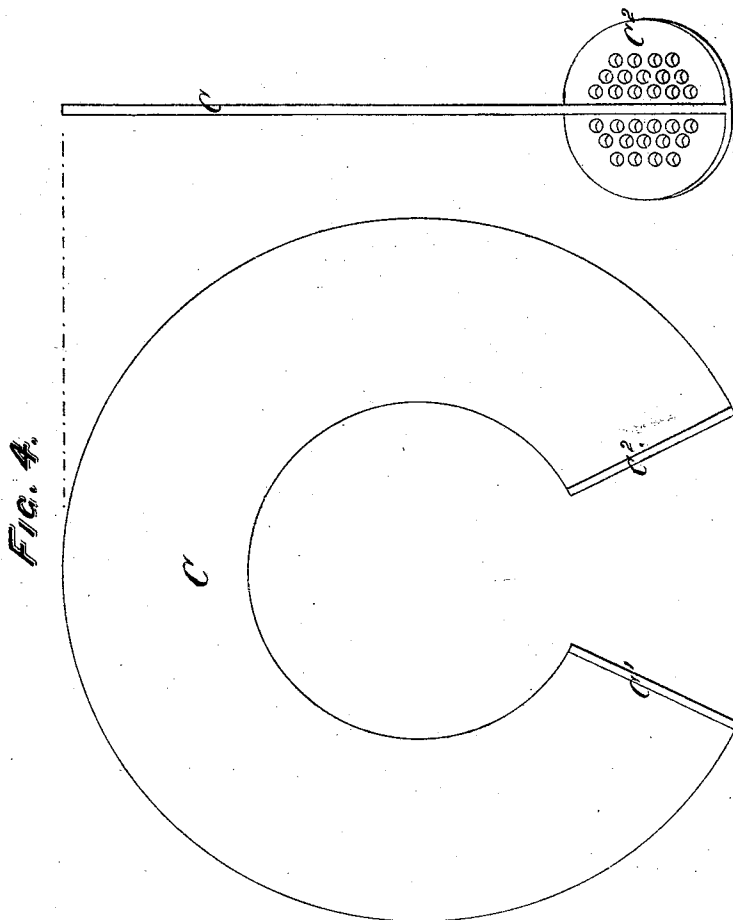
INVENTOR,
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UNITED STATES PATENT OFFICE.

GEORGE WALES, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN CONDENSERS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 135,180, dated January 21, 1873.

To all whom it may concern:

Be it known that I, GEORGE WALES, of Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Surface-Condensers, of which the following is a specification:

The first part of this invention consists in bending the tubes through which the steam passes in the form of a circle, the ends of the tubes being supported by plates termed the tube-heads. The second part of the invention consists in casting the tube-heads with a rib to form a partition or division plate for dividing the tubes into two sets, and form two compartments when placed in position. The third part of the invention consists in making the casing for the tubes, &c., in two sections or halves, and bolting them together for forming, in connection with the aforesaid division-plate, two circular compartments.

In the drawing, Figure 1 is a side elevation of the condenser with a portion of the casing broken away to show the tubes. Fig. 2 is a sectional view through the line *a b*. Fig. 3 is a side elevation of the same. Fig. 4 represents a portion of the partition with a tube-head.

The letters A and B represent, respectively, the lower and upper section of the casing, which are connected together by bolts. C is the partition-plate, which is provided with the tube-heads C¹ C² for supporting the series of concentrically-arranged tubes F, which are suitably connected with the tube-heads. The steam enters the compartment or chamber D¹ through the nozzle N¹ and passes through the tubes F in the tube-head C¹ in the lower compartment, and then around through the passage or chamber D² into the tubes in the upper compartment, and thence into the compartment D³ and through the nozzle N², where

the water of condensation is carried off. The water for condensing the steam enters at the nozzle N³ of the lower compartment, passes along the outside surface of the tubes F which contain the steam, or through which it is passing, and then through the nozzle N⁴ into and through the connecting-pipe M and into the nozzle N⁵ of the upper compartment, and passes off through the exit pipe or nozzle N⁴. Instead of the steam passing through the tubes and the water along the outside surface, the water may pass through the tubes and the steam along the outside of the pipes, and the same result be obtained. Owing to the curvilinear form of the tubes F any expansion of the same will not affect the tube-heads, as they expand in the direction of the curve. It is evident that the number of tubes may be duplicated to any extent desired.

It will be seen that this condenser can be employed with facility as a feed-water heater for steam-boilers.

I claim as my invention—

1. A condenser consisting of a series of circular tubes arranged within a casing and supported therein by the tube-heads, substantially as described, for the purpose specified.

2. The division-plate C combined with the tube-heads C¹ C², in the manner described, and so arranged in respect to the circular pipes as to form two compartments, substantially as described.

3. The combination of a series of circular pipes with the division-plate C, tube-heads C¹ C², divided casing A B, and induction and eduction nozzles, substantially as described, for the purpose specified.

GEORGE WALES.

Witnesses:

ARTHUR J. L. LORETZ,
CHARLES S. MASON.