B. Holly,

Surface Condenser.

No. 113,668. Patented Apr. 11. 1871.

Fig. 1

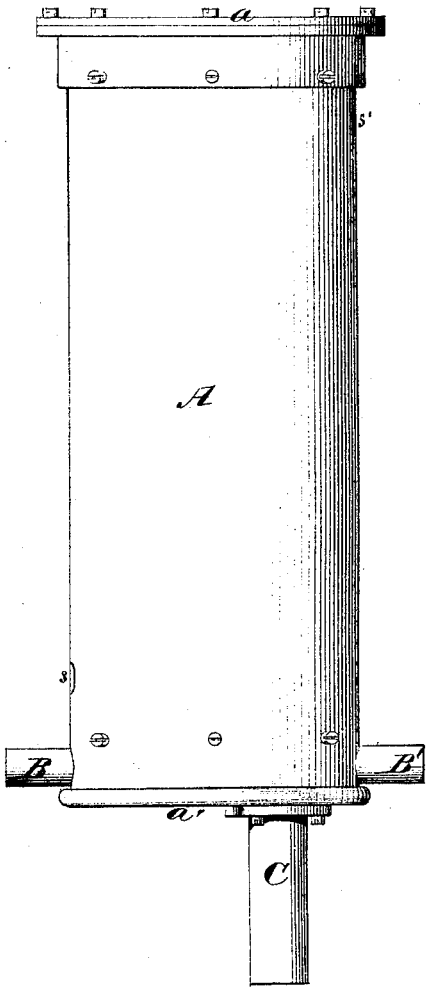


Fig. 2

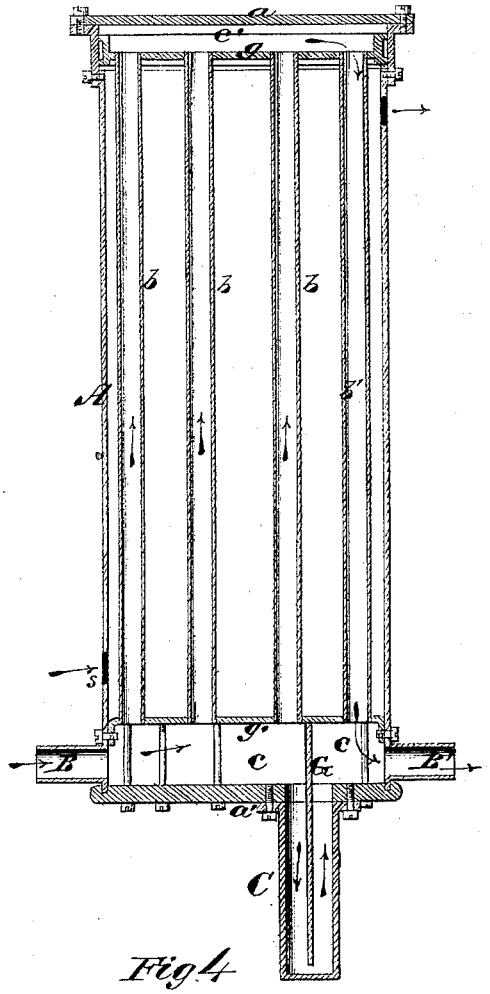
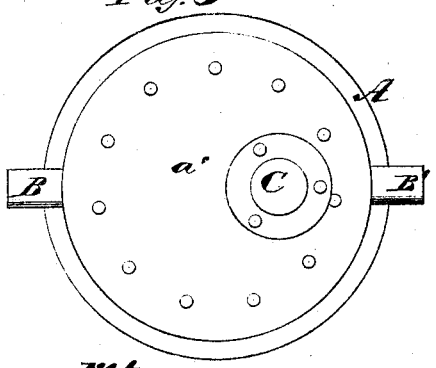
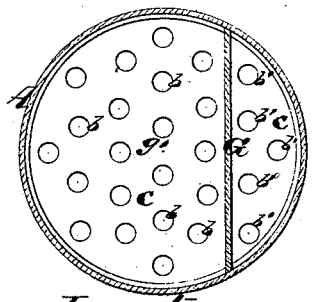


Fig. 4

Fig. 3





Witnesses
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J. N. Campbell

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UNITED STATES PATENT OFFICE.

BIRDSILL HOLLY, OF LOCKPORT, NEW YORK.

IMPROVEMENT IN SURFACE-CONDENSERS.

Specification forming part of Letters Patent No. **113,668**, dated April 11, 1871.

To all whom it may concern:

Be it known that I, BIRDSILL HOLLY, of Lockport, in the county of Niagara and State of New York, have invented a new and Improved Surface-Condenser for Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1 is a side elevation of the condenser. Fig. 2 is a diametrical section through the condenser. Fig. 3 is a bottom view of the same. Fig. 4 is a cross-section through the same.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to surface-condensers; and consists, first, in providing for allowing one of the heads, to which the tubes through which the steam passes are connected, to slip in the casing of the condenser, thereby compensating for expansion and contraction of said tubes; second, in arranging at the bottom of the condenser, beneath the steam-tubes, a chamber and a well having a partition, which, while it causes the steam to pass up one set of tubes and down another set, will also, by means of a passage beneath it, establish an equilibrium of the water of condensation in the inlet and outlet compartments of the condenser, as will be hereinafter explained.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

In the accompanying drawing, A represents the external shell of the apparatus, which is closed at both ends by means of heads *a a'*, and which is provided with an inlet, *s*, and an outlet, *s'*, for cold water, which is caused to flow through it. Within this shell is a number of steam-tubes, *b b'*, arranged vertically, and connected by their extremities to heads *g g'*. The head *g'* is secured fast to the shell A and its head *a'*, above the latter, so as to leave a chamber, *c*, which is subdivided by a vertical partition, G. The top head *g* is not permanently connected to the shell A, but is snugly fitted to it and allowed to slip up and down as the tubes *b b'* expand and contract. This provision allows the steam-tubes to expand and contract without buckling or working loose at their points of connection to their heads *g g'*. The movable head *g* may be packed in any suitable manner around its periphery, so as to make a water and steam tight joint; and above this head *g* is a chamber, *c'*, which forms the upper communication between the pipes *b* and *b'*, and allows steam which rises through pipes *b*, without being condensed, to enter the upper ends of the pipes *b'*; or, in other words, this chamber *c* establishes an upper communication between the inlet and outlet compartments of chamber *c*, thereby establishing a circulation for the steam into or through the apparatus. Depending from the head *a'* is a well, C, into which the partition G extends nearly to its bottom. This well, with the partition, affords a communication between the inlet and outlet compartments of chamber *c* for the water of condensation, so that this water can escape from both compartments of said chamber through the single outlet-pipe B'. Steam is introduced through the pipe B into the chamber *c*, beneath pipes *b b*, and water is introduced into shell A through opening *s*, and allowed to escape at opening *s'*. The steam, as it rises through pipes *b*, is condensed more or less, and the water resulting from condensation flows down into the chamber *c* and well C, and rises on both sides of the partition G, and flows out through the pipe B'. The steam which escapes uncondensed into the chamber *c'* descends into pipes *b'*, and is condensed therein, the water flowing down into the compartment next the escape-pipe B'.

I am aware that surface-condensers have been constructed with a movable head, substantially like that hereinbefore represented. I do not, therefore, claim that contrivance by itself; but

What I do claim as new, and desire to secure by Letters Patent in a surface-condenser, is—

The chamber *c*, with its partition G and well C, all constructed substantially in the manner and for the purpose above described.

Witness my hand in matter of my application for a patent for improved surface-condenser this 15th day of February, A. D. 1871.

BIRDSILL HOLLY.

Witnesses:
R. T. CAMPBELL,
J. N. CAMPBELL.