

B. HOLLY.

Improvement in Combined Heaters and Condensers.

No. 114,142.

Patented April 25, 1871.

Fig. 1

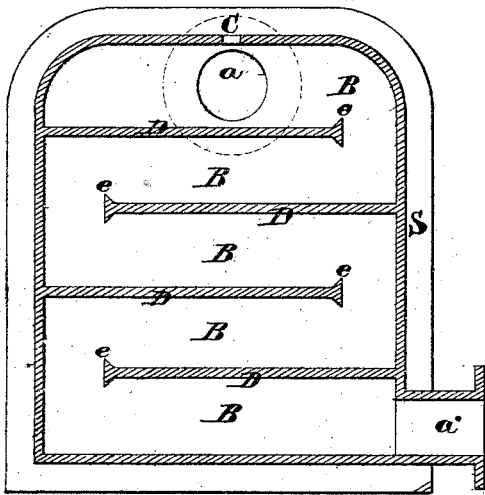


Fig 2

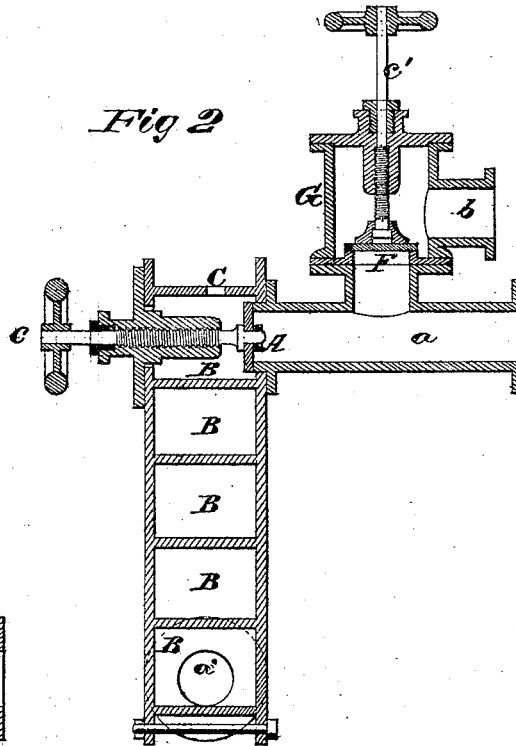
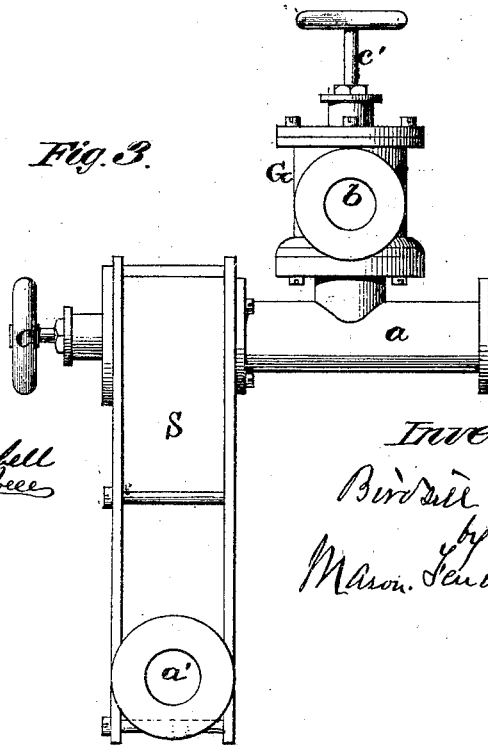


Fig. 3.



Witnesses.
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BIRDSILL HOLLY, OF LOCKPORT, NEW YORK.

IMPROVEMENT IN COMBINED HEATER AND CONDENSER.

Specification forming part of Letters Patent No. 114,142, dated April 25, 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 Combined Heater and Condenser; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a section through the heater and condenser, exposing to view the arrangement of the shelves therein. Fig. 2 is a sectional view, showing the valves and passages in the heater and condenser. Fig. 3 is an elevation of one end of the apparatus.

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

The object of this invention is to adapt a heater for the feed-water of steam-boilers for steam-engines working either at high or low pressure.

With the Holly system of water-works it is necessary to run the engine sometimes at low pressure and sometimes at high pressure. When running as a low-pressure engine the water from the condenser is pumped into the hot-well, and thence, as needed, into the boilers. When the change is made from low to high pressure the supply of hot water ceases, and under these circumstances cold water must either be pumped into the boilers, or a heater adapted to allow the necessary changes must be employed. Such a heater I have invented.

It consists of a heating-chest having valves and passages applied to it in such manner that steam from an engine working at low pressure can be conducted into the condensing and heating chest, while steam from the engine, when working at high pressure, can be conducted into the atmosphere; or, if desired, steam can be conducted, in proper quantities, into the heating-chest for heating the feed-water, 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 drawings, S represents a condensing and heating chest, which may be made of any suitable capacity and shape, and *a* represents a pipe, which communicates with the interior of the chest at its

upper end through an opening that is provided with a valve, A. The steam-pipe *a* also communicates with a chest, G, from which steam is allowed to escape through a pipe, *b*.

In the chest G is a check-valve, F, which may be held down upon its seat by a screw-stem, *c'*, carrying a hand-wheel on its upper end. This valve F is shut when it is desired to conduct all the steam from pipe *a* into the condensing and heating chest S. When the valve F is open and valve A is shut, all the steam will escape through pipe *b* into the atmosphere. The valve A is also provided with a screw-stem, *c'*, carrying a hand-wheel on it, so that this valve can be easily adjusted.

Within the heating and condensing chest S a number of shelves, D, is arranged horizontally one below the other, so as to leave spaces B between them, and so as to break spaces one with another, as shown Fig. 1. Each shelf D has a raised lip, *e*, on its edge, which will retain about one-half an inch depth of water upon it, while the surplus water will flow over and fall from one shelf to another until it reaches the bottom of the case, where it can be drawn off by way of pipe *a'*.

Just above the orifice of pipe *a* leading into the case S an opening, C, is made through the top of this case for admitting the cool condensing-water, which is first received upon the highest shelf D of the series.

Operation: When the apparatus is in use for a low-pressure condensing-engine, all the steam from the cylinders enters through valve-opening A into the chest S. Injection-water enters the chest through the passage C and falls upon the highest shelf D, then upon the next lower shelf, and so on over all the shelves until it reaches the bottom of the case, when it can be drawn off by the means of the air that may have accumulated in the chest. Under this operation the steam that is not condensed in the upper one of the spaces B will be condensed while circulating in the other spaces.

The change from a condensing to a non-condensing engine is made by closing valve A. The steam will then raise check-valve F and pass off into the atmosphere through chest G and pipe *b*.

When the apparatus is used only as a heater for the feed-water, the cold water is admitted in

any quantity desired through a suitable pipe connected with the mains into the case S, through passage C, and by opening the valve A sufficiently to supply the required amount of steam the water may be heated to any desired degree.

I am aware that condensers and feed-water heaters have been constructed substantially like that represented in my application, and make no claim to that contrivance by itself; but

What I do claim as new, and desire to secure by Letters Patent, is—

The combination of the chests S and G, their valves A and F, and steam-pipe *a*, substantially as and for the purpose described.

BIRDSILL HOLLY.

Witnesses:

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