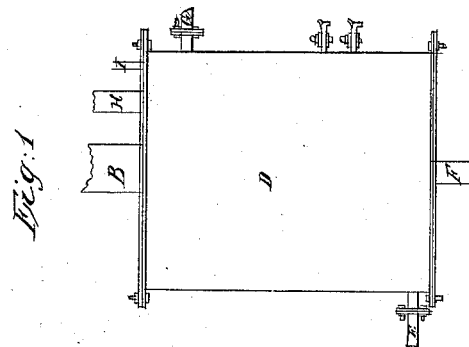
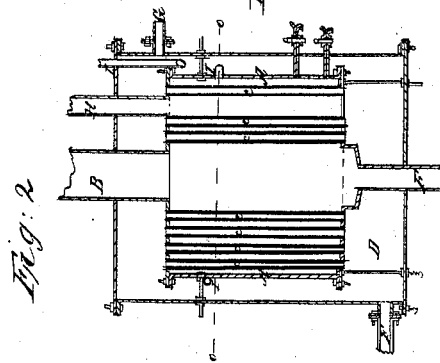
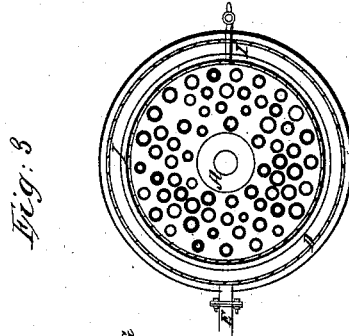


H. K. Stephens,
Steam-Boiler Condenser.

N^o 3,366.

Patented Dec. 4, 1843.



UNITED STATES PATENT OFFICE.

HENRY K. STEPHENS, OF CINCINNATI, OHIO.

CONDENSER OF STEAM-ENGINES.

Specification of Letters Patent No. 3,366, dated December 4, 1843.

To all whom it may concern:

Be it known that I, HENRY K. STEPHENS, of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in Condensers of Steam-Engines, which improvement is described as follows, reference being had to the annexed drawings of the same, making part of this specification.

Figure 1 is an elevation of the condenser and heater. Fig. 2 is a section of ditto vertically through the center. Fig. 3 is a section at the line (o o) of Fig. 1.

This improvement in the condensers of steam engines is intended for the following purposes, first, to condense the steam after it has performed its duty in the cylinder and to return the water of condensation to the boiler; second, to prevent the accumulation of mud and other deposits (from the water) in the boiler; third, to admit of the use of a number of tubes in the boiler where they cannot be used (without this improvement) in consequence of the impurity of the water.

The above objects I accomplish by causing the steam to pass from the escape pipe, into a cylindrical cubical, or any other formed vessel A, (made of copper or any other metal) the ends of which are perforated with small perforations, leaving a space in the center of the upper end to admit the escape pipe B, through all of the perforations metallic tubes C, of the length of this vessel) extend through the corresponding perforations in the opposite end, and after their insertion the perforations are closed, around them to prevent leaking, leaving all the tubes entirely open at both ends to permit water to pass through them. This condenser is immersed in cold water, contained in a cistern D, which is supplied at or near the bottom, through a pipe E by a pump. The steam passes into the vessel containing the tubes, and is there condensed, by coming in contact with the external surface of the tubes C, and the internal surface of the vessel, A, which contains them; the water of condensation being conveyed from the condenser by a pipe F, (in connection with its bottom) which passes through the cistern, to a pump, by which it is forced into the boiler. The water in the cistern, as it becomes heated by the condensation of the steam in the condenser, rises, by its specific levity, to the surface, and passes off through a pipe G.

The cylinder, tubes, and cistern may be made of any size, shape and material to

suit the views of the constructor, and either of which may be placed horizontally, vertically, or in any position found most convenient.

In condensers made prior to this, for condensing steam by a cold metallic surface, the steam passes into the tubes, and is there condensed by coming in contact with their internal surface, the whole of their external surface being surrounded by, and in contact with cold water supplied by a pump, whereas by my improvement the steam passes into the vessel containing the tubes, and is there condensed by coming in contact with the external surface of the tubes, and the internal surface of the vessel containing them. The tubes, and vessel containing them, (being the condenser) are kept cold by the water in the cistern in which they are immersed.

The advantages of this improvement are as follows: First, that the condenser can be readily cleaned, (as only that part of its surface which comes in contact with the condensing water requires cleaning) which may be done by running a brush, or swab through the tubes, and over the external surface of the vessel containing them, thereby removing the sediment which will accumulate accordingly as the water used for condensing is more or less turbid; therefore this is of great advantage where only such is to be had for condensing; secondly, that the steam comes sooner in contact with a greater quantity of condensing surface, thereby effecting condensation more suddenly.

A pipe H leading from the safety valve may be conducted into the aforesaid condenser for admitting the steam blown off from the boiler.

An air pipe I is added to the condenser for drawing off any air that may be in it, said pipe being wound spirally around the outside thereof to allow the condensed vapor in the pipe to flow back into the condenser.

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

The tubular condenser in which the steam is admitted to circulate around the tubes, while the water circulates through them, in combination with the cistern of water surrounding the whole as herein described.

HENRY K. STEPHENS.

Witnesses:

WM. P. ELLIOT,

ALBERT EUGENE JOHNSON.