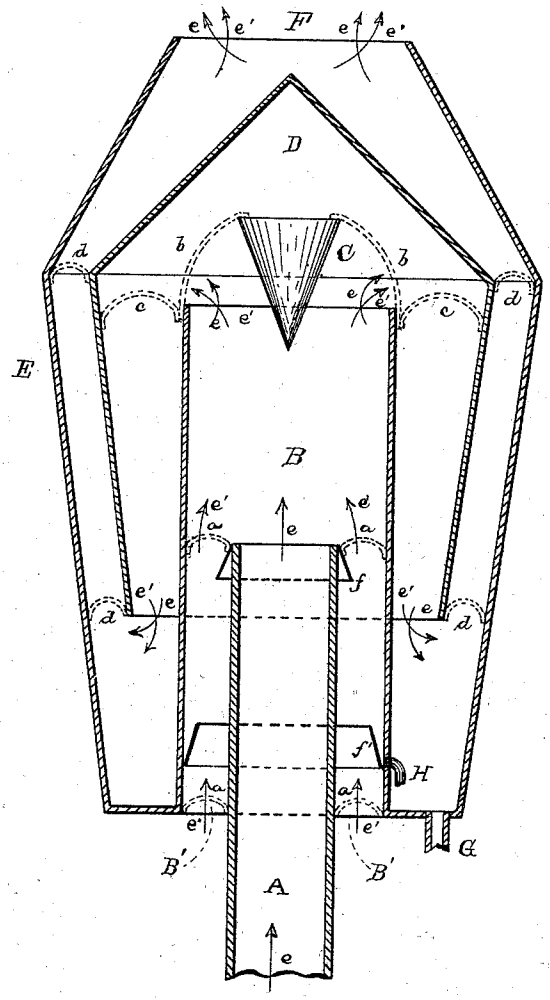
(No Model.)

H. A. CAMPBELL.

STEAM CONDENSER.

No. 277,457. Patented May 15, 1883.



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UNITED STATES PATENT OFFICE.

HENRY A. CAMPBELL, OF METUCHEN, NEW JERSEY.

STEAM-CONDENSER.

SPECIFICATION forming part of Letters Patent No. 277,457, dated May 15, 1883.

Application filed December 26, 1882. (No model.)

To all whom it may concern:

Be it known that I, HENRY ALEXANDER CAMPBELL, of Metuchen, in the county of Middlesex and State of New Jersey, have invented a certain new and useful Improvement in Steam-Condensers, of which the following is a specification.

The object of my invention is to facilitate the condensation of steam in any steam-condensing apparatus, and especially in the exhaust-heads of exhaust steam-pipes; and I accomplish this by providing a condensing-chamber with an opening for the admission of air, so placed that the steam, when entering such chamber, will draw cold air in with it, which air, mingling with the steam, cools it off, and also cools the condensing-surfaces, whereby the condensation is greatly increased. I further provide the exhaust-head with facilities for carrying off the water of condensation and preventing the escape of the same through the air-inlet from the surfaces adjoining the same.

My invention is illustrated in the annexed drawing, which is a sectional view of an exhaust-head embodying said invention.

A is the exhaust-steam pipe, and B a chamber surrounding such exhaust-pipe, and supported therefrom by braces *a a*. The chamber B is open at top and bottom and supports at its upper end, by means of braces *b b*, a cone, C, for dividing the volume of steam.

A hood, D, is supported by braces *c c* from chamber B, and the whole is surrounded by a jacket, E, supported by braces *d d* and open at the top F. This jacket is connected with the cylinder B at its lower end, forming a closed chamber.

The arrows *e* indicate the course of the steam, and the arrows *e'* that of the air.

The steam enters the chamber B from the exhaust-pipe with such force as to draw in air at the bottom of said chamber through the opening B' around the exhaust-pipe, as shown by the arrows, and such air mingles with the steam in the chamber. The mingled air and steam pass from chamber B, being divided by the cone C down through hood D into jacket E, and pass out at the top F of the jacket. The steam being cooled by the cold air mixed with it, and the metal surfaces of the various chambers and passages being also cooled by contact with such air, the condensation of steam is much more rapid and complete than in the exhaust-heads heretofore in use, thus diminishing the back-pressure on the engine, increasing the water of condensation returned to the boiler, and resulting in increased economy of steam. The water produced by condensation within the hood D and jacket E runs down into the bottom of the latter and into pipe G, by which it is conveyed to the boiler or pump. The moisture which accumulates in the chamber B drops into the bottom of said chamber and is conveyed by pipe H into the jacket E. Inclined flanges *f* and *f'* are secured upon the exhaust-pipe A and chamber B, so that all the water will be readily conveyed to said pipes.

I do not, of course, limit myself to the particular form of exhaust-head described, as the principle of my invention can be applied to any efficient apparatus of the kind, and also to any other form of apparatus where it is desired to facilitate the condensation of steam in whatever location the condenser may be used.

What I claim is—

1. The combination, with a steam-condensing chamber and the pipe for admitting steam thereto, of an air-opening in said chamber surrounding said pipe, whereby the admission of steam causes the drawing in of air, substantially as set forth.

2. In an exhaust-head, the combination, with the exhaust-pipe, of a chamber surrounding the top of the same, and provided with an air-opening at its bottom, substantially as set forth.

3. In an exhaust-head, the combination, with the exhaust-pipe and the chamber surrounding the top of the same, and having an air-inlet, of the flanges *f f'* in such air-passage, substantially as and for the purpose set forth.

This specification signed and witnessed this 19th day of December, 1882.

HENRY ALEXANDER CAMPBELL.

Witnesses:
H. W. SEELY,
EDWARD H. PYATT.