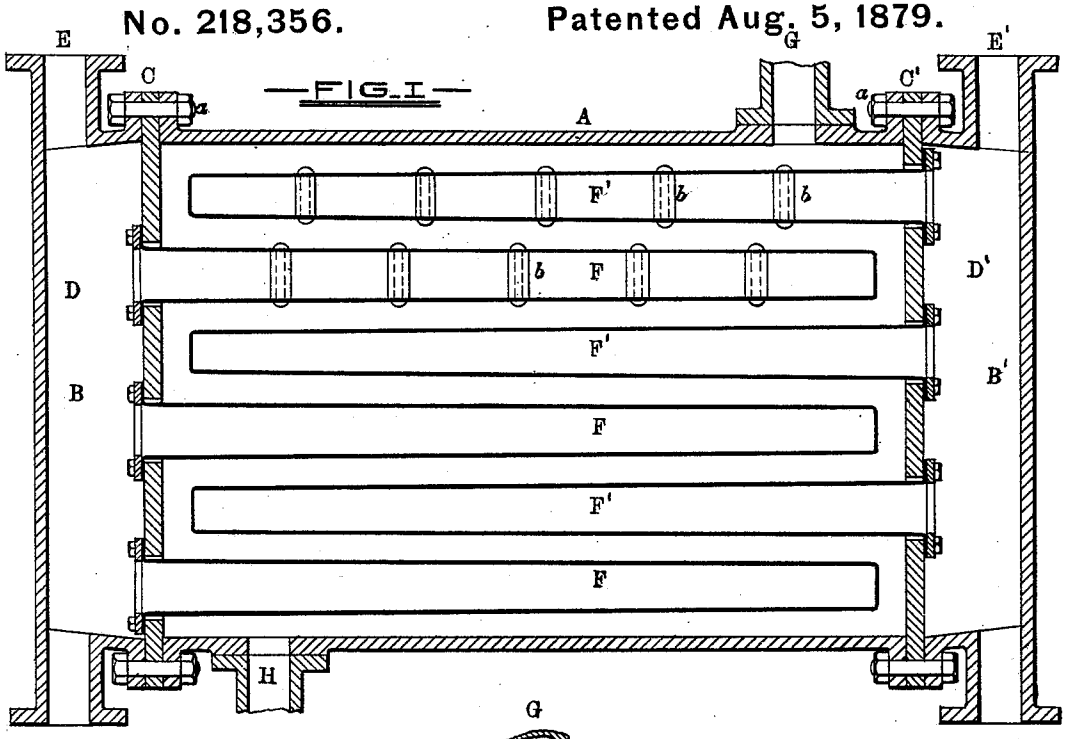
G. W. ZASTROW.

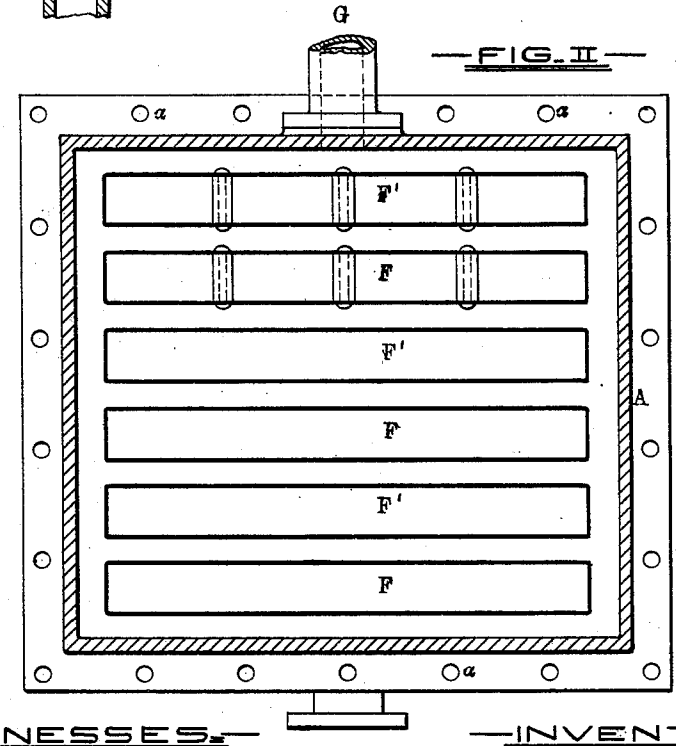
Surface-Condensers for Steam-Engines.

No. 218,356. Patented Aug. 5, 1879.

—FIG. I—



—FIG. II—



—WITNESSES—

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—INVENTOR—

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UNITED STATES PATENT OFFICE.

GEORGE W. ZASTROW, OF BALTIMORE, MARYLAND, ASSIGNOR TO JOHN C. FROEHLICH AND HANSON H. KEYS, OF SAME PLACE, ONE-FOURTH TO EACH.

IMPROVEMENT IN SURFACE-CONDENSERS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **218,356**, dated August 5, 1879; application filed May 1, 1879.

To all whom it may concern:

Be it known that I, GEORGE W. ZASTROW, of the city of Baltimore and State of Maryland, have invented certain Improvements in Surface-Condensers for Steam-Engines, of which the following is a specification; and I do hereby declare that in the same is contained a full, clear, and exact description of my said invention, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention relates to the manner of constructing and arranging the refrigerating appliances of the condenser with reference to the casing and other parts of the same, as will hereinafter fully appear.

In the description of the invention which follows, reference is made to the accompanying drawings, forming a part hereof, and in which—

Figure I is a longitudinal section of the improved condenser, and Fig. II is a transverse section of the same.

A is the shell of the condenser, and B B′ are the heads of the same.

C C′ are plates, secured between the shell and the heads by means of bolts *a*. The heads B B′ are recessed, in order to form the chambers D D′, into which the exhaust-steam from the engine is admitted by way of the nozzles E E′, and from which the water resulting from the condensation of the exhaust-steam is drawn by the feed-pump.

F F′ are refrigerating-pans, constructed, preferably, of sheet metal, projecting from the plates C C′, to which they are suitably fastened. The exhaust-steam, introduced to the chambers D D′, passes into the pans F F′, and on coming in contact with the surfaces of the same, which are cooled by water admitted and discharged, respectively, through the openings G and H, is condensed and carried off by means of the feed-pump, as before stated.

It will be seen that the chamber D and the pans F, supported by the plate C, do not communicate with the chamber D′ and pans F′, supported by the plate C′, but that the steam-space of the condenser is composed of two non-communicating apartments. This duplex arrangement is not essential to the carrying out of my invention, which, however, is preferably constructed in the manner shown; for one of the chambers, with its attendant refrigerating-pans, may be omitted, the other chamber being used alone, its refrigerating-pans projecting into a tight condenser-shell.

The said refrigerating pans are preferably tapered, as shown in the drawings, in order to facilitate the introduction and fastening of the thimbles *b*, used to prevent the collapsing of the pans from the atmospheric pressure to which they are subjected exteriorly.

The tapered construction of the refrigerating-pans also permits of the ready flow of the water of condensation to the chamber, whence it is carried off.

The relative positions of the pans projecting from the plates C C′, as shown, are such as to economize space and utilize to the fullest extent the cooling effects of the injection or condensing water.

Having thus described my invention, what I claim as new, and wish to secure by Letters Patent of the United States, is—

1. The shell of a condenser having suitable heads and nozzles for the admission of steam and the withdrawal of water resulting from condensation of said steam, combined with a plate or plates carrying a series of refrigerating-pans, and extending therefrom, with closed ends, into the condenser-shell, and having their other ends open and in communication with the steam and condensed-water nozzles, substantially as and for the purposes set forth.

2. A condenser-shell and its head or heads, and nozzles for the admission of steam and egress of the water of condensation, combined with a plate or plates carrying tapered refrigerating-pans, closed at one of their ends and projecting into the condenser-shell, and open at their other ends, which are in communication with the steam and condensed-water nozzles, substantially as and for the purposes set forth.

In testimony whereof I have hereunto subscribed my name this 10th day of March, A. D. 1879.

GEORGE WILLIAM ZASTROW. [L. S.]

Witnesses:

JOHN W. TAYLOR,

WM. C. NICHOLLS.