

W. Phelan,
Steam Condenser,
No. 102,965. Patented May 10, 1870.

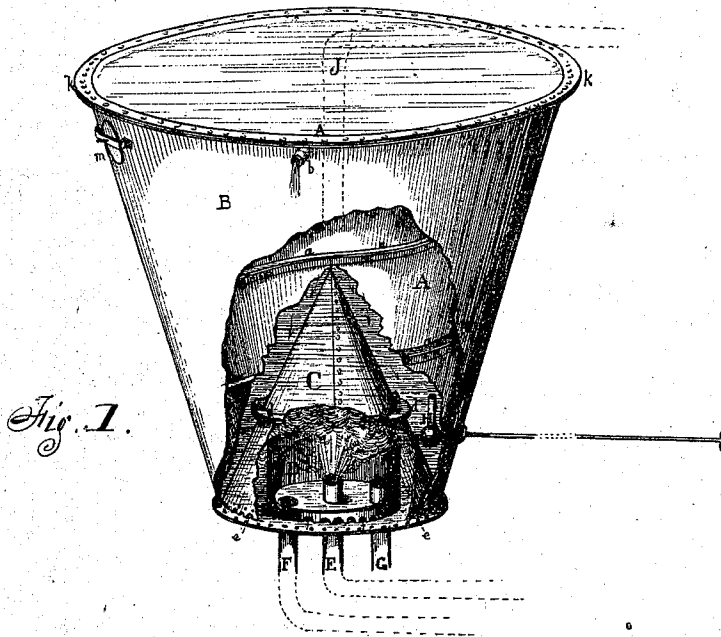


Fig. 1.

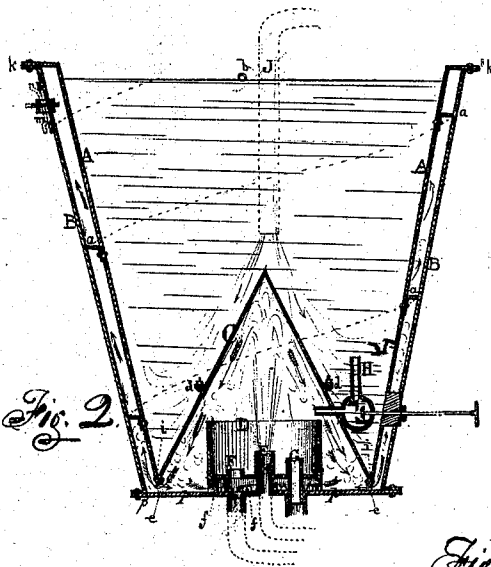


Fig. 2.

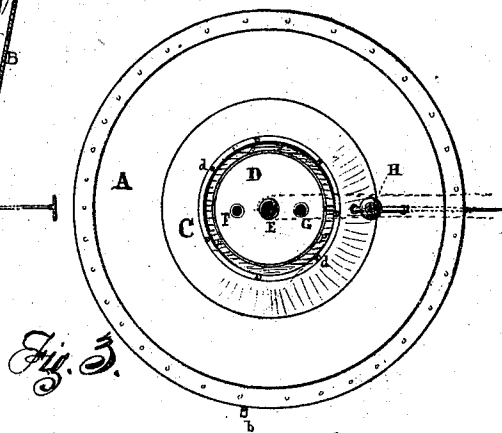


Fig. 3.

Witnesses —
Henry M. Wells
P. Cantelo.



William Phelan
Inventor

United States Patent Office.

WILLIAM PHELAN, OF PEORIA, ILLINOIS.

Letters Patent No. 102,965, dated May 10, 1870.

CONDENSER AND FEED-WATER HEATER.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, WILLIAM PHELAN, of the city of Peoria, in the county of Peoria and in the State of Illinois, have invented a Combined "Condenser" for Steam-Engines and "Heater" for Boilers; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawings making a part of this specification, in which like letters of reference refer to like parts, and in which—

Figure 1 represents a perspective view.

Figure 2, a sectional elevation.

Figure 3, a plan with the upper half of "cone" removed.

This invention relates more particularly to furnishing, for the condensation of exhaust steam, a cooling-tank which tapers to the bottom, where the steam is received, this shape allowing of the ready escape of the warmed water upward, and a consequent new supply of cold water to fill its place.

Also, to the combination of the tank and the condenser in one piece.

A represents a water-tank of sheet-iron, copper, or brass, in shape an inverted frustum of a cone, the bottom of which is water-tight, and formed by the riveting of its lower edge, *i*, with the lower edge of a smaller (right) cone, C.

This tank is set in a similar inverted frustum of a cone, B, leaving a small space between each, and riveted together by flanges at the top *k k*.

The bottom of this latter frustum, B, is flat, and is riveted or bolted to the same through a flange.

Between the two frusta A and B, a spiral "incline," *a*, extending from wall to wall, and riveted to either wall, acts as a conveyer of the received steam several times around the tank until it reaches (if not by this time condensed) the collapse-valve *m* at the top of the outer frustum B. This spiral may be carried around three or more times.

O represents the cone before mentioned, made in two pieces, united by horizontal flanges, *d*, and bolts; this division being for the purpose of removing the "lime-catcher" D, beneath the cone, for the purpose of cleaning the lime-catcher.

The base of the cone C is riveted to the base of the tank A.

Perforations or notches *e e* are cut below the union *i* of the tank and the cone, to admit thereunder the upward passage of the steam and the return of the condensed steam (water) into the pipe F, to be returned to boiler force-pumps.

D is the lime-receiver or box, which is removable from the exhaust-chamber in the cone C by removing the apex of said cone, to discharge sedimentary

concretions received from the extra feed-water which may be occasionally required from the tank.

This box D has three openings; the one, E, is the entrance for exhaust steam which rises to the apex of the cone C, and thence downward through the notches *e e* into the spiral chamber between the frusta A and B, where it rises continually against the impending sides of the tank A, falling back in streams along the spirals *a a*, and back through the said notches *e e* and *f f*, into the opening F or passage to the force-pumps.

F is the pipe under the lime-receiver leading the distilled water to force-pumps just described.

G is an overflow-pipe to discharge accidental excess of water from the condenser.

H is a feed-water pipe from the tank A into the lime-receiver in case of insufficiency of distilled water with a valve worked from the boiler-room.

J shows the place of the supply of cold water for the tank.

The crown or upper part of the exhaust-chamber C is made to fit into lower part by means of springs, and not riveted to the lower part, as in a working apparatus, for the convenience of examining the inclosed chamber and lime-receiver beneath.

The advantages of this apparatus are:

The combination in one device of a water "heater" and a "steam-condenser."

The conical shape of the tank, which allows the more rapid rise to the surface of the tank of the warmed water from the condensing surface, and of a quick return of cold water in place of the warm.

Also, of an impinging current of cold air against the impending sides of the outer case B, by reason of the "flaring" of the sides of the latter.

Also, the concentration of steam to one point by the shape of the conical chamber, immediately under the cold-water pipe, over the apex of the cone C or exhaust-chamber.

Also, the additional advantage of a box for receiving lime-concretions.

What I claim is—

1. In a condenser for steam-engines, the combination of two inverted frusta of a cone, one within the other, leaving a hollow space between their respective surfaces, and with a spiral incline uniting said surfaces winding around the chamber thus formed, the two frusta being riveted or otherwise fastened together at the top, the outer frustum having a steam and water-tight bottom.

2. The conical exhaust-chamber C, when attached to the base of the tank A, and constructed in two pieces united by horizontal flanges and bolts *d*, and having the notches *e e* cut in its base, or equiva-

lent device for passage of steam and water thereunder.

3. The "lime-receiver" D, with the openings E F G, and the notches *ff* thereunder for the passage of water.

4. The pipe H, with valve, and connection with the exhaust-chamber C and the lime-receiver, all substantially as and for the purposes herein set forth.

5. The collapse-valve *m*, in combination with the

above, substantially as described and for the purposes set forth.

In testimony that I claim the foregoing, I have hereunto set my hand this 17th day of November, 1869.

WILLIAM PHELAN.

Witnesses:

HENRY W. WELLS,
F. CANTELO.