A. C. Fletcher,

Steam-Boiler Condenser,

No. 53,967. Patented Apr. 17, 1866.

Fig. 1.

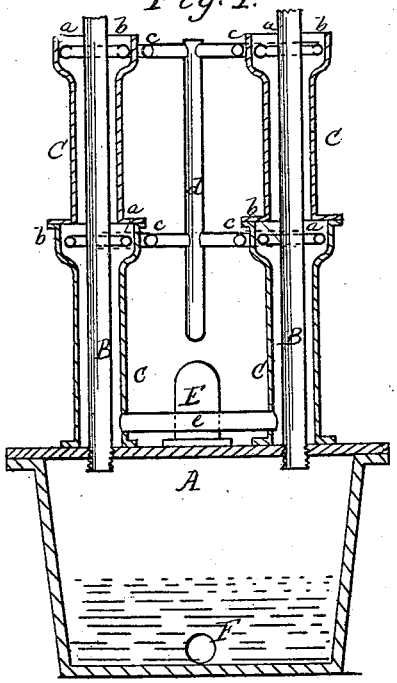


Fig. 2.

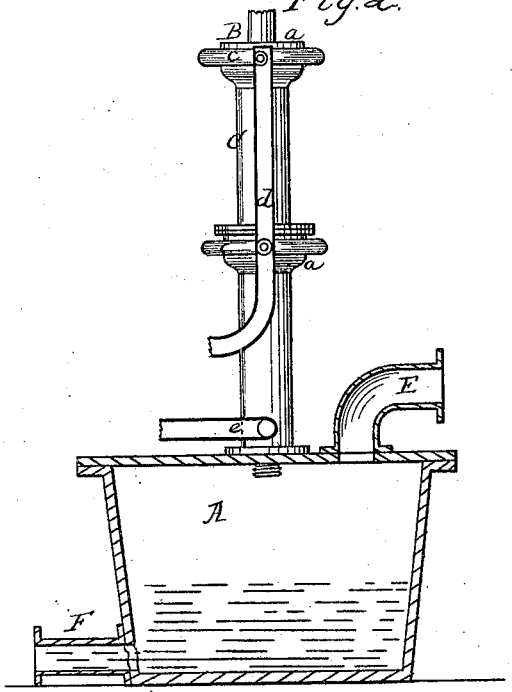
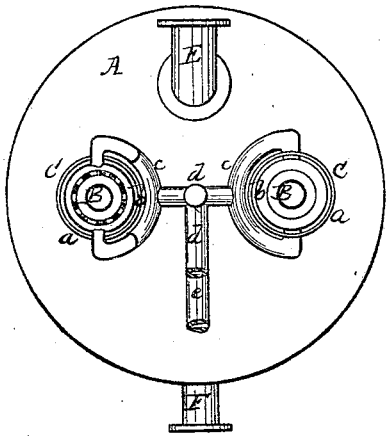


Fig. 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

ADDISON C. FLETCHER, OF NEW YORK, N. Y.

IMPROVEMENT IN SURFACE-CONDENSERS.

Specification forming part of Letters Patent No. **53,967**, dated April 17, 1866.

To all whom it may concern:

Be it known that I, ADDISON C. FLETCHER, of the city, county, and State of New York, have invented a new and Improved Surface-Condenser, to be applied in connection with high or low pressure engines, or for other purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figures 1 and 2 are central vertical sections of the condenser at right angles to each other. Fig. 3 is a plan of the same, partly in section.

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

This invention may be applied, in connection with the exhaust or eduction pipe of a high or low pressure steam-engine, for condensing the whole or the greater portion of the escaping steam, or in connection with apparatus such as are the subject-matter of my Letters Patent of May 19, 1863, June 30, 1863, and July 11, 1865, or with any apparatus in connection with which the employment of a condenser is desirable. It is composed of a series of standing pipes which have their lower ends inserted into a hot-well or receptacle, and are surrounded above the latter with jackets, within which are arranged perforated jet-pipes, through which cold water is injected, in numerous small streams, on the surfaces of the stand-pipes, down which it trickles for the purpose of cooling them and condensing the steam which enters them at the bottom, the water of such condensation running down into the hot-well or receptacle below, whence it may be taken at a high temperature for feeding the boiler or for any other purpose.

To enable those skilled in the art to make and use my invention, I will proceed to describe it with reference to the drawings.

A is the hot-well, of wrought or cast iron or other suitable material, and of any desirable form.

B B are the standing pipes, of iron, copper, or other metal, of any size, height, and number, open at the top and bottom, and having their lower ends screwed or otherwise secured on the top of the hot-well. These pipes may be upright, as represented, or inclined at any suitable angle.

C C are the jackets surrounding the standing pipes A A, secured firmly to the top of the hot-well, open at the top, but closed at the bottom. These jackets consist of simple pipes, and in order to avoid unnecessary enlargement of said pipes along their whole length they are enlarged, as shown at *a a*, at the top and at one or more places below to form chambers for the reception of the ring-shaped perforated jet-pipes *b b*, which are connected by forked pipes *c c*, communicating through the jackets with branches of a pipe, *d*, through which cold water is supplied by a force-pump or elevated reservoir. The jet-pipes *b b* are perforated on the side toward the standing pipes A A, or in such manner that the jets of water issuing from them will all be injected upon the surfaces of the standing pipes. Jackets C C are connected near their bottoms with a pipe, *e*, for the escape of the condensing-water, which, after having been injected from the jet-pipes upon the surface of the standing pipes, has trickled down the latter and been collected in the lower parts of the jackets.

E is the exhaust-pipe, by which the steam to be condensed enters the apparatus, connected with the top of the hot-well.

F is a pipe connected with the lower part of the hot-well for drawing off the hot water of condensation for the supply of the boiler or for any other purpose.

The operation is as follows: The steam, entering the hot-well by the pipe E, attempts to escape by the standing pipes B B, while the cold water is injected from the perforated jet-pipes on the exterior surfaces of the standing pipes, and thus in trickling down them cools them in such degree as to produce the condensation of the steam within them. The water of such condensation trickles down the interior surfaces of the standing pipes and runs into the hot-well, where it is collected at a very high temperature, that it may be returned to the boiler or carried off through the pipe F for any other purpose with the least possible loss of heat.

In some cases the condensing-water, collected in a warm state in the bottoms of the jackets, may be conducted to the hot-well by connecting the pipe *e* with the lower part thereof, and in such case the water in the hot-well not being so hot as when it receives only the water of condensation, a partial condensation of the incoming steam takes place in

its passage through the hot-well before it enters the standing pipes. In this case, also, the water received in the hot-well being greater than is required for feeding the boiler, an overflow-pipe may be provided at a suitable height.

Two or more standing pipes may be arranged near together within one jacket, said pipes being of round, half-round, flat, or other form; and the jet-pipes, in such case, may be arranged to encircle said pipes or intersect the spaces between them, that the water may be injected from them upon all sides of the standing pipes.

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

1. The standing pipes B B, jackets C C, and jet-pipes *a a*, in combination with each other and with a hot-well or receptacle, A, substantially as and for the purpose herein specified.

2. The chambers *a a* in the jackets C C, in combination with the jet-pipes *a a*, substantially as and for the purpose herein specified.

ADDISON C. FLETCHER.

Witnesses:

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