B. T. BABBITT.

Steam-Condensing and Feed-Water Heating Apparatus.

No. 220,110. Patented Sept. 30, 1879.

Fig. 1.

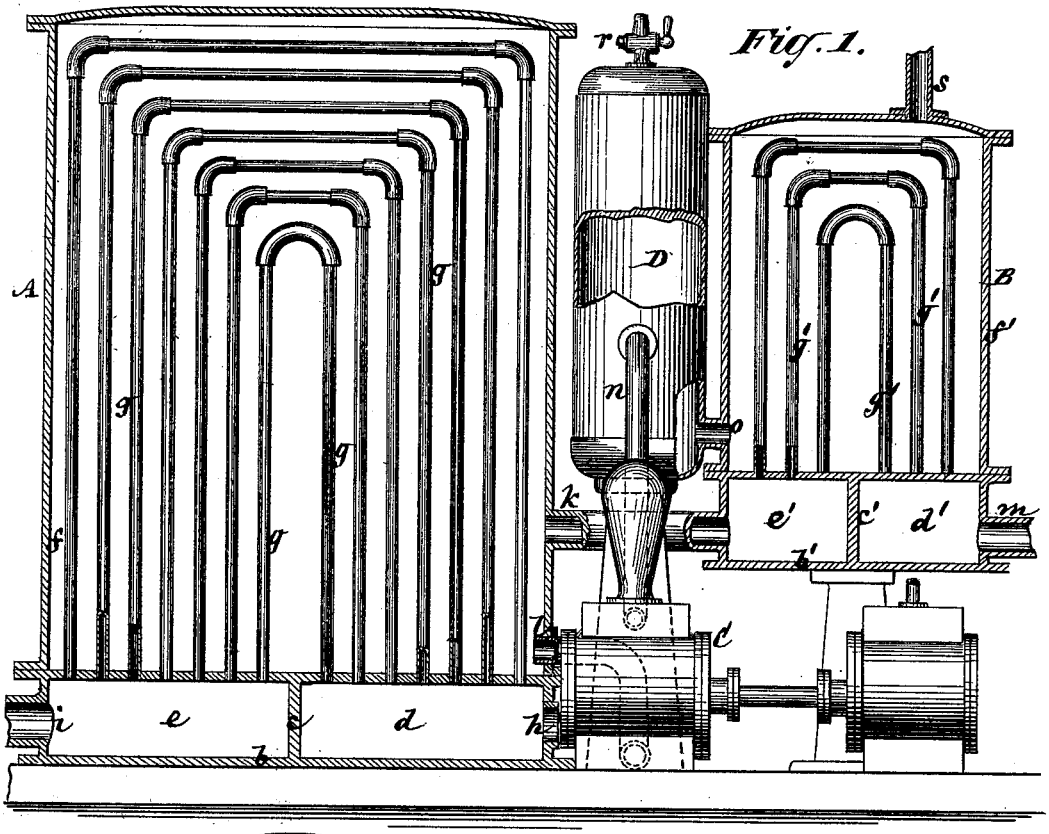
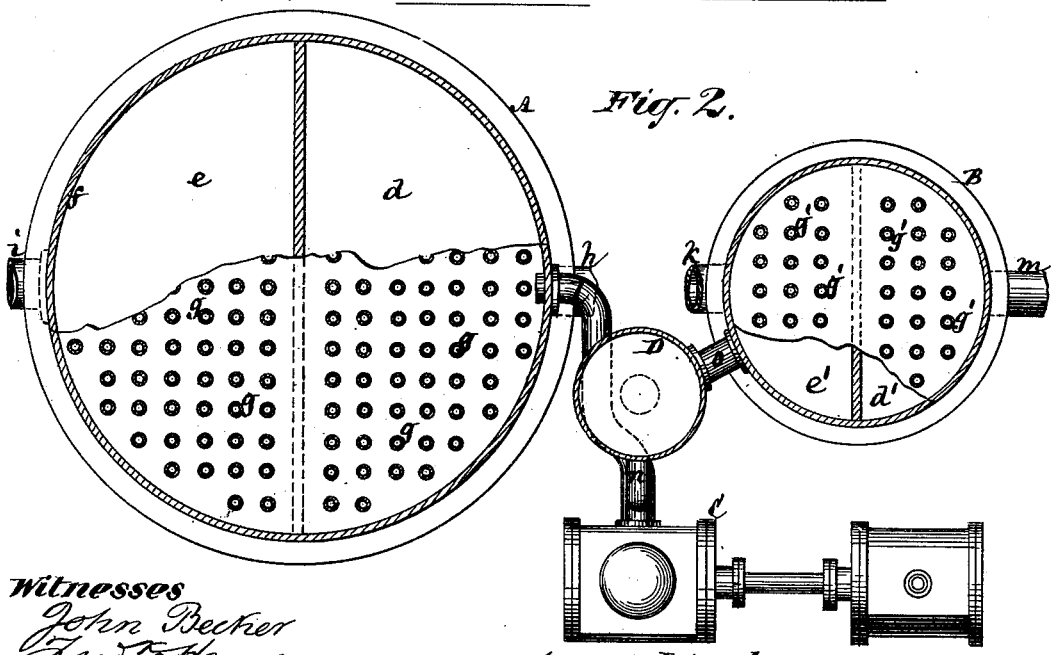


Fig. 2.



Witnesses

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IMPROVEMENT IN STEAM-CONDENSING AND FEED-WATER-HEATING APPARATUS.

Specification forming part of Letters Patent No. **220,110**, dated September 30, 1879; application filed May 1, 1879.

To all whom it may concern:

Be it known that I, BENJAMIN T. BABBITT, of the city, county, and State of New York, have invented certain new and useful Improvements in Steam-Condensing and Feed-Water-Heating Apparatus for Steam-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to apparatus in which a surface-condenser has associated with it a feed-water heater, in communication with said condenser, and has combined with the same a feed-pump operating to draw off the air and water from said condenser, and an air and water receiver, into which the air from the condenser is discharged, and from whence the water is forced by said pump to and through the feed-water heater.

In this relation the invention consists in a certain combination, with a surface-condenser, and with a feed-water heater through which the exhaust-steam from an engine is passed to said condenser, of an air and water receiver having an intermediate relation with said condenser and said feeder-water heater, an air cock or valve connected with the upper portion of said receiver, a pump having pipes or connections arranged to draw off the air and water from the condenser and to discharge them into said receiver, a pipe or connection between the lower portion of said receiver and the feed-water heater, and a pipe from the latter for discharge of the heated water to the boiler of the engine.

In the accompanying drawings, Figure 1 represents a mainly-sectional elevation of an apparatus constructed in accordance with my invention, and Fig. 2 an irregular horizontal section of the same.

A is a surface-condenser, composed of a hollow base, *b*, having a partition, *c*, dividing it into two compartments, *d e*, a superposed cylinder or chamber, *f*, and arched or elbowed pipes *g g*, arranged within said cylinder or chamber, and inserted into the top plate of the hollow base *b*, and each communicating at one end with one and at the other end with the other of the two compartments *d e* of the base. B is a feed-water heater communicating with the condenser A, as hereinafter described, and preferably of similar construction to said condenser, having a hollow base, *b'*, divided by a partition, *c'*, into compartments *d' e'*, and arched or elbowed pipes *g' g'*, arranged within a superposed cylinder or chamber, *f'*, and connecting at their ends with the compartments *d' e'*, respectively, of the base. About such construction, however, of the surface-condenser and feed-water heater nothing here is specially claimed as new, and said condenser and said feed-water heater may have their constructions materially changed.

The cooling-water entering the compartment *d* of the condenser by an inlet, *h*, passes thence through all the pipes *g g* into the compartment *e*, passing out through an outlet, *i*, while steam entering the chamber *f* by a pipe, *k*, circulates in the said chamber around and between the cool surfaces of the pipes *g* and is rapidly condensed, its water of condensation falling to the bottom of said chamber, and passing out through a pipe, *l*.

The compartment *d'* of the feed-water heater *b* has connected with it the exhaust-steam pipe *m* of a steam-engine, and the compartment *e'* is connected by the pipe *k* with the chamber *f* of the condenser.

C is a feed-pump of sufficient capacity to take air as well as water from the condenser, and connected with the latter by the pipe *l*, which forms the suction-pipe of the pump.

D is an air and water receiver, into which the pump C discharges, by a pipe, *n*, the air and water drawn from the condenser. This air and water receiver, which occupies an interposed relation to the condenser and feed-water heater, connects by a pipe, *o*, near or at any suitable distance from its base, with the lower portion of the chamber *f'* of the feed-water heater, and is of sufficient capacity to form an air-chamber at its top, which is or may be provided with an air-escape cock or valve, *r*.

The water of condensation passing out from the chamber *f* of the condenser A, as also the air in said condenser, by the pipe *l*, as hereinbefore described, are both taken by the feed-pump C and forced into the receiver D, from whence the water passes by the pipe or connection *o* to the chamber *f'* of the heater, and

from thence by a pipe, *s*, to the boiler, while the air pumped from the condenser lodges in the upper portion of said receiver, and in case of an excessive pressure is allowed to escape by the valve *r*. The water discharged from the receiver D into the feed-water heater B passes around and between the heated surfaces of the pipes *g'*, and is heated to a high temperature by the heat imparted to said pipes by the exhaust-steam passing through said pipes to the condenser.

I claim—

The combination, with a surface-condenser, A, and with a feed-water heater, B, through which the exhaust-steam from an engine is passed to said condenser, of an air and water receiver, D, having an intermediate relation with said condenser and said feed-water heater, an air cock or valve, *r*, on or connected with the upper portion of said receiver, a pump, E, having pipes or connections for drawing off the air and water from the condenser and for discharging them into said receiver, a pipe or connection between the lower portion of said receiver and the feed-water heater, and a pipe from the latter for discharge of the heated water to the boiler of the engine, essentially as shown and described.

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Witnesses:

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