J. F. BARKER.

Condensing-Engine.

No. 165,148. Patented July 6, 1875.

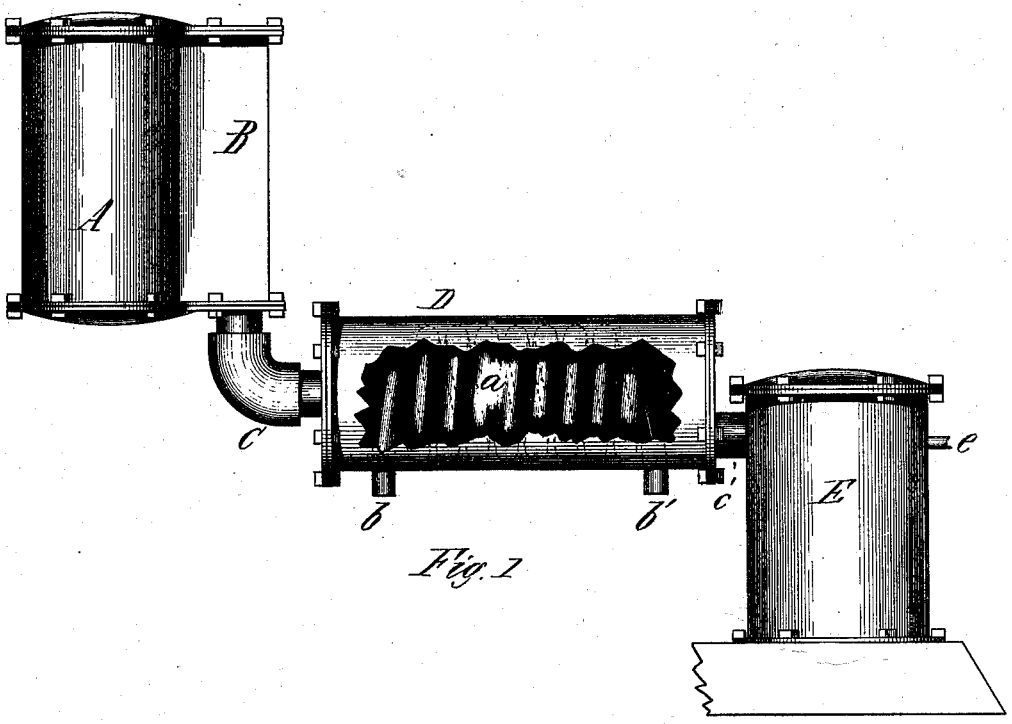

Fig. 1

Witnesses,
E. P. Kendrick.
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UNITED STATES PATENT OFFICE.

JOHN F. BARKER, OF SPRINGFIELD, MASSACHUSETTS.

IMPROVEMENT IN CONDENSING-ENGINES.

Specification forming part of Letters Patent No. **165,148**, dated July 6, 1875; application filed September 16, 1874.

To all whom it may concern:

Be it known that I, JOHN F. BARKER, of Springfield, in the State of Massachusetts, have invented a new and useful Improvement in Condensing-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, and to the letters of reference marked thereon, in which—

Figure 1 is a side view of a steam-cylinder and condenser, illustrating the arrangement of my invention therewith.

My invention relates to a heating apparatus, arranged and combined with the steam-cylinder and condenser of a condensing-engine, its object being to more thoroughly utilize the heat of the exhaust steam escaping from the steam-cylinder into the condenser, for the purpose of heating the water to a temperature of nearly the boiling-point when forced into the boiler, so that by the supply of such heated water a great saving of fuel will be effected, and to enable the condenser to form a more perfect vacuum, and thereby acting directly upon the piston in the cylinder, and upon the pump connected with the condenser; and my invention consists of a heating-cylinder arranged in combination with, and placed between, the steam-cylinder and the condenser, with a heating-vessel placed within the heating-cylinder, and connected with suitable pipes outside, so that a current of water may be passed into and through the heating-vessel placed in the heating-cylinder, and thence into the boiler. In low-pressure engines, as ordinarily arranged, the exhaust steam is not utilized for the purpose of heating the feed-water to the boiler; but the boiler-pump is usually connected with the hot well, from which it draws the water, and forces it into the boiler at a temperature of about eighty degrees.

In the drawings, A represents the steam-cylinder of a low-pressure engine, and E represents the condenser. D represents a heating-cylinder, placed at any convenient point between the steam-cylinder and the condenser, and connected with the exhaust of the former by a pipe, C, and with the latter by a pipe, *c*. Within the heating-cylinder D, I place a heating-vessel, *a*, which, preferably, is made of a coil of pipe, so that the water, in passing through, shall pass a long distance, and be subjected to the large area of heated surface, and the heating-cylinder D is provided with apertures, through which extend the pipes *b* and *b'*, connected with the coil *a* inside—the one an inlet, the other an outlet. The condenser E is arranged in the manner pertaining to ordinary condensers of low-pressure engines. When the exhaust steam passes out of the exhaust-chamber B of the cylinder, as thus arranged, it passes first into the cylinder D, within which is the coil *a*. The latter becomes heated by the heat of the exhaust steam, and the water passing through the coil also becomes heated, and from the cylinder D the steam passes on into the condenser E, where it is condensed in the ordinary manner, and the water carried off through the customary channel. A portion of the exhaust steam may be condensed within the heating-cylinder D, as it parts with a portion of its heat, which is absorbed in the water passing through the coil; and as the condensation accumulates within the cylinder D, it is carried off through the pipe *c* into the condenser E.

It is evident that the condenser E will have less of its function to perform by just the amount of condensation produced in the heating-cylinder D, on account of the heat of the steam absorbed and carried away by the water passing through the coil, and there will consequently be that amount less of work performed by the machinery necessary to operate the condenser or the pump connected therewith. By this arrangement and combination I relieve the machinery of some of its work, utilize heat which would otherwise be lost, and force the water into the boiler heated to nearly the boiling-point with a positive saving of fuel.

It is evident that any of the well-known forms of heaters may be used without departing from the general arrangement of the invention, and with precisely the same results.

I am aware that heaters have heretofore been used in connection with the exhaust-pipe of high-pressure engines; and I do not claim any arrangement of heater other than that arranged and combined with the steam-

cylinder and condenser, as hereinbefore described.

Having thus described my invention, what I claim as new is—

The steam-cylinder A, condenser E, and the heating-cylinder D, containing a heating vessel or coil, *a*, provided with an inlet and outlet, *b* and *b'*, all the said parts being combined and arranged substantially as described, whereby the heat of the exhaust steam is utilized to heat the water to be forced into the boiler, and whereby the condenser is assisted in performing its function of forming a vacuum in the cylinder, and the pump connected with the condenser is relieved of a portion of its work, substantially as specified.

JOHN F. BARKER.

Witnesses:

GIDEON WELLS,

C. E. BUCKLAND.