

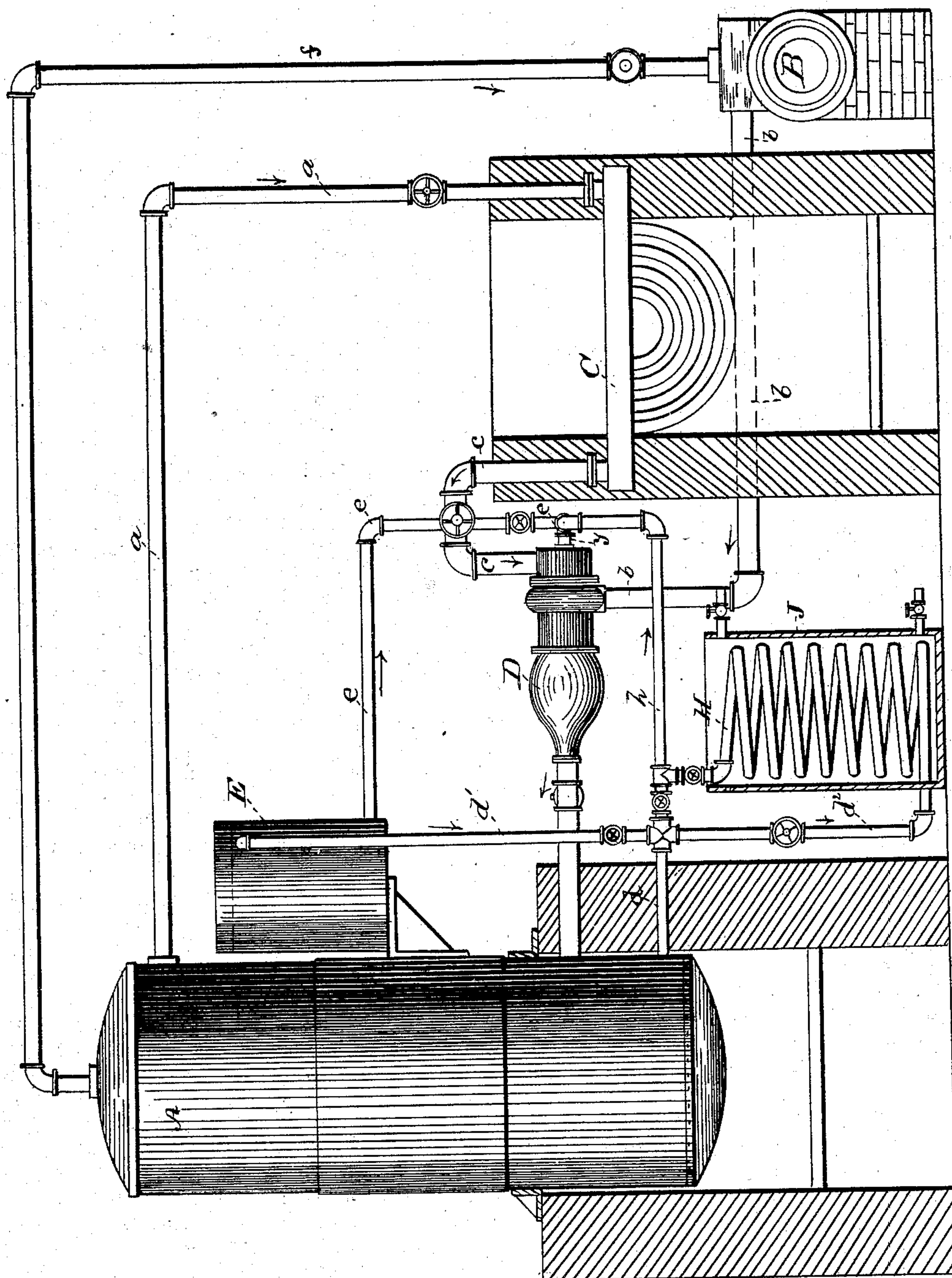
(No Model.)

D. RENSHAW.

UTILIZING THE EXHAUST OF ENGINES.

No. 274,973.

Patented Apr. 3, 1883.



WITNESSES

W. E. Bowen
Chas. R. Burr

INVENTOR

David Renshaw
per O. E. Duff
Attorney

UNITED STATES PATENT OFFICE.

DAVID RENSHAW, OF BRAINTREE, MASSACHUSETTS.

UTILIZING THE EXHAUST OF ENGINES.

SPECIFICATION forming part of Letters Patent No. 274,973, dated April 3, 1883.

Application filed February 24, 1883. (No model.)

To all whom it may concern:

Be it known that I, DAVID RENSHAW, of Braintree, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in the Methods of Utilizing the Exhaust of Engines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form part of this specification.

The object of this invention is the utilization of the exhaust of engines; and it consists in the process herein described of taking steam from the boiler and superheating the same, and then delivering it to an injector, where it comes in contact with the exhaust of the engine, and also with water taken from said boiler, the united effect of the mixture in an injector being the return of the whole to the boiler from which they were taken. This water may be forced by the boiler-pressure to a tank located above the line of the injector, and fed to it by gravity under ordinary atmospheric pressure; or it may be forced through a cooling apparatus and delivered to the injector at boiler-pressure, but cooled; or it may be forced directly from the boiler into the injector without such cooling, as may be desired.

The drawing shows a side elevation of an arrangement for carrying this process into effect, in which are shown different means in delivering the water to the injector, as described.

Referring more particularly to said drawing, A is the working-boiler; B, the engine; C, the superheater, which receives its supply from the boiler A through pipe *a*. D is an injector, which receives its driving or working steam from the superheater C through pipe *c*, and also the exhaust of the engine through the exhaust-pipe *b*. The water delivered from the boiler A to the injector D through pipe *y* for the purpose of effecting partial condensation may first pass from said boiler through pipes *d d'* to tank E, and from tank E through pipe *e* to injector D, under atmospheric-pressure; or it may pass from the boiler A through pipes *d d''*, through cooling-coil H, (located in tank J,) and thence through pipes *h* and *y* into the injector D, partially cooled, but under the pressure of the working-boiler A; or it may pass directly from the boiler A through pipes *d, h,*

and *y* into the injector at the pressure and temperature due to the working-boiler A. All the connecting-pipes are controlled by suitable valves and suitable furnaces, as provided for the boiler and superheater.

The superheater, tanks, and boiler, and their connections may be of any ordinary construction. The engine B is supplied with boiler-steam through pipe *f*.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The process herein described of utilizing the exhaust of engines by first taking live steam from the boiler, then superheating it, then bringing it in contact, in an injector, with the exhaust-steam from the engine and with water taken from the said boiler and cooled, thus returning it into the boiler from which it came, on the principle of the injector.

2. The process herein described of utilizing the exhaust of engines by first taking live steam from the boiler, then superheating it, then bringing it in contact, in an injector, with the exhaust-steam from the engine and with water taken from the said boiler, without cooling, thereby returning it into the boiler from which it came, on the principle of the injector.

3. In an apparatus for utilizing the exhaust of engines, the combination of the boiler, the superheater, the injector, and the cooling medium with the live-steam and water pipes from the boiler, and with the exhaust-pipe, the live and exhaust steam and water being mixed in the injector and returned into the boiler from which they were taken, as described.

4. In an apparatus for utilizing the exhaust of engines, the combination of the boiler, the live-steam superheater, the injector, the exhaust-pipe, the live-steam pipe, and the water-pipe connecting directly with the boiler, the whole uniting in the said injector, whereby the exhaust-steam is returned into the boiler from which it came by the superheated steam and the water from the boiler without cooling the boiler-water, as described.

In testimony that I claim the foregoing as my own invention I affix my signature in presence of two witnesses.

DAVID RENSHAW.

Witnesses:

B. F. MORSELL,
EUGENE D. CARUSI.