

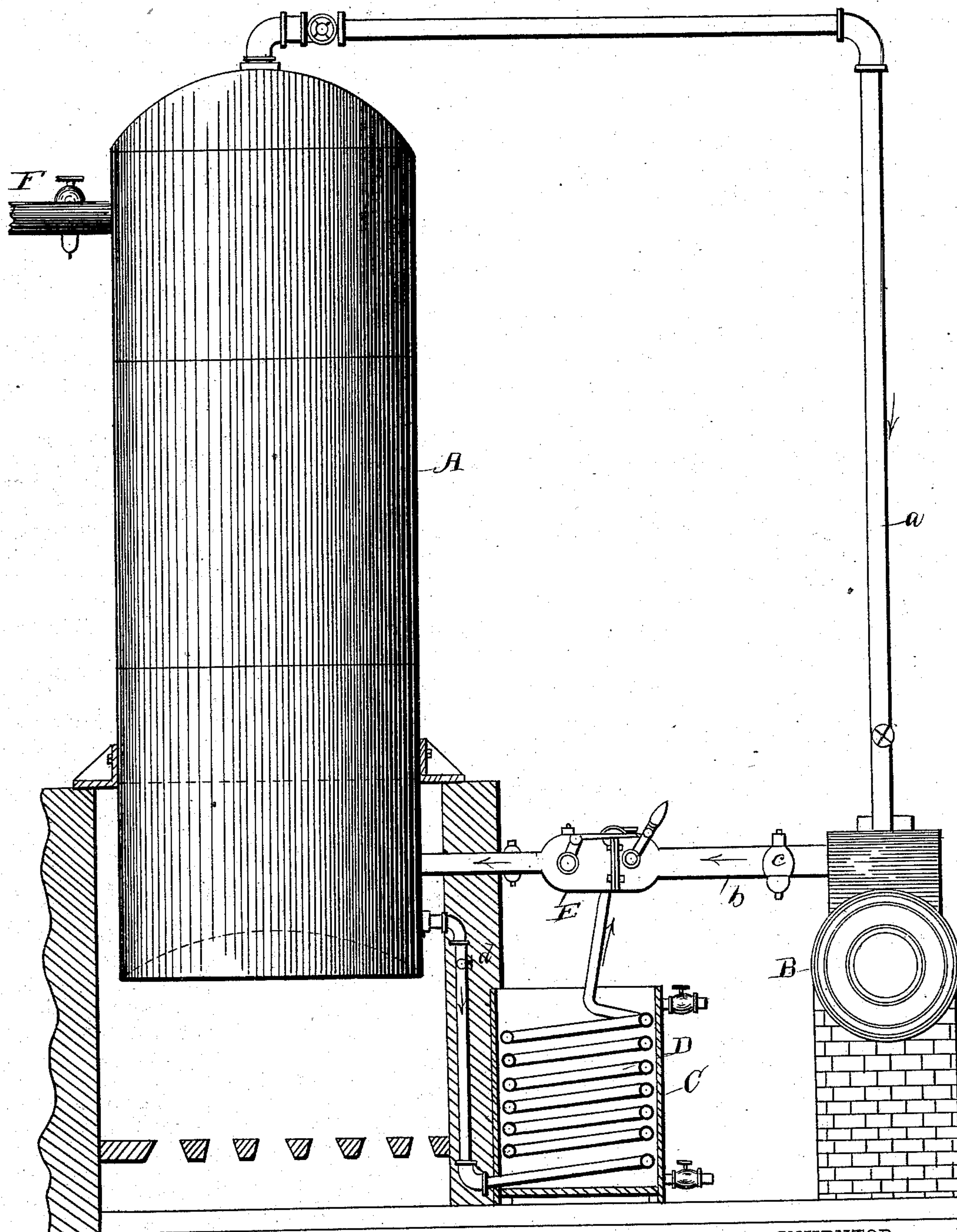
(No Model.)

D. RENSHAW.

UTILIZING THE EXHAUST OF ENGINES.

No. 274,969.

Patented Apr. 3, 1883.



WITNESSES

W. E. Bowen.

Chas. R. Burr

INVENTOR

David Renshaw
per O. C. Duff

ATTORNEY

UNITED STATES PATENT OFFICE.

DAVID RENSHAW, OF BRAINTREE, MASSACHUSETTS.

UTILIZING THE EXHAUST OF ENGINES.

SPECIFICATION forming part of Letters Patent No. 274,969, dated April 3, 1883.

Application filed February 14, 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 Utilizing the Exhaust of Engines by Cooling Water under Pressure; 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.

15 This invention has relation to the utilization of the exhaust of engines, and has for its object to return the steam of the exhaust directly into the boiler or vessel from which it was taken.

20 This invention consists in the process of taking a portion of the water from the steam-generator that supplies steam to the engine, or other source of supply, and passing said water through a cooling medium in a vessel outside of the boiler, the water so taken from the generator being under the boiler-pressure from which it was taken, and then conveying this water to an injector, where it meets the exhaust-steam of the engine, the exhaust-steam taking the place of the live steam heretofore used, the water being sufficiently cooled to cause a partial condensation of the exhaust, forming a partial vacuum, and thus the partially-cooled water and the exhaust-steam are returned to the boiler on the principle of the injector.

Referring to the drawing, which shows one means for carrying my invention into effect, A is a vertical boiler or vessel in which steam is maintained under pressure, and which may be an original generator, or may be attached to a steam-supply pipe from any source. B is the engine, and C the cooler. D is the cooling-coil, and E the injector. *a* is the steam-pipe leading to the engine, which is provided with the usual valves; and *b*, the exhaust-pipe leading into the injector E. *c* is a check-valve in the exhaust-pipe for preventing back-pressure, and the accumulation of water in the cyl-

inder of the engine when at rest. I also provide a check-valve between the injector and the boiler for preventing back-pressure, and a valve, *d*, on the pipe leading to the cooling-coil for shutting off the water from the boiler when necessary.

Near the top of the boiler I locate a pipe, F, provided with a controlling-valve for supplying the boiler with steam from any distributing source as a system. In this case, after the vessel is well filled and the engine in operation, the steam-supply may be cut off and a small fire started under the vessel or boiler, which will make good the loss of heat caused by the cooling medium, and in this way a great gain of fuel is effected. The same steam may be used over and over again indefinitely, it being constantly revived. Any loss by leakage may be readily supplied by any well-known means.

I prefer in the use of these vessels, reservoirs, or boilers to make them sufficiently strong to withstand the well-known working-pressure of boilers, and to always supply a furnace for any emergency.

It will be obvious that my invention may be carried into effect by varying means within wide range without departing from the principles thereof. Therefore,

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

1. The process herein described of utilizing the exhaust of engines, consisting of first cooling the temperature of a portion of the boiler-water, and then bringing it in contact with the exhaust-steam of the engine direct in an injector, and upon the principle thereof returning it to the boiler.

2. The process herein described of utilizing the exhaust of engines by reducing the temperature of a portion of the water of the supply-boiler while under the boiler-pressure, and then conveying it to an injector, where it is brought in contact with the exhaust-steam of the engine, by which the mixture is returned to the boiler from which it came, upon the injector principle, as set forth.

3. The combination, in an apparatus for utilizing the exhaust of engines, consisting of the

boiler or vessel under pressure, the cooling-
tank, and the coil, with the injector located on
the exhaust-pipe and adapted to receive the
cooled water under pressure, and the exhaust-
5 steam direct from the engine, by which the
combined mixture is returned to the boiler,
upon the principle of the injector.

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

DAVID RENSHAW.

Witnesses:

B. F. MORSELL,
EUGENE D. CARUSI.