

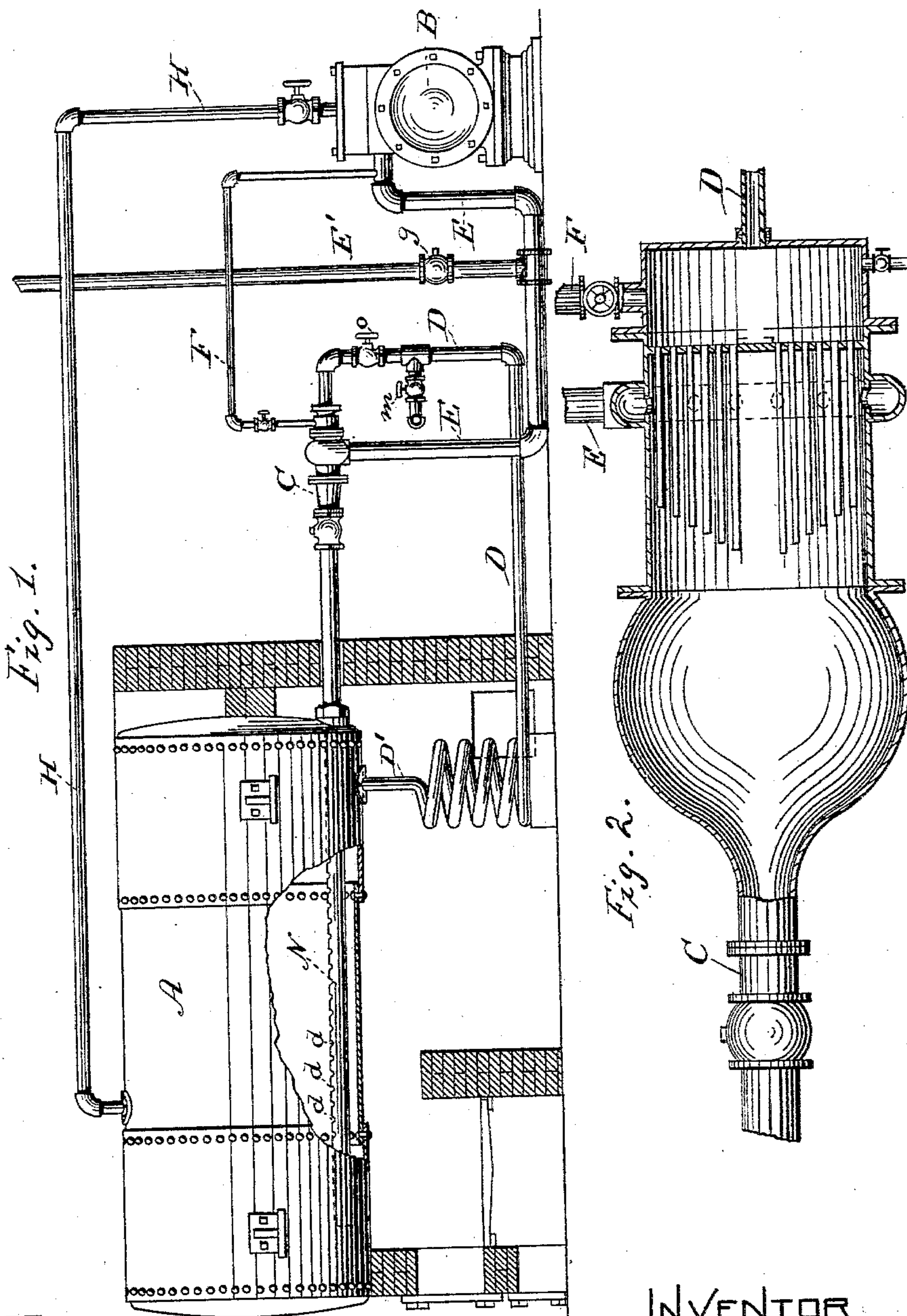
(No Model.)

D. RENSHAW.

UTILIZING THE EXHAUST OF ENGINES.

No. 300,504.

Patented June 17, 1884.



WITNESSES

Edward C. Ellis
A. Lee Duffy.

INVENTOR

David Renshaw
per O. E. Duffy
att'y.

UNITED STATES PATENT OFFICE.

DAVID RENSHAW, OF BRAINTREE, MASSACHUSETTS.

UTILIZING THE EXHAUST OF ENGINES.

SPECIFICATION forming part of Letters Patent No. 300,504, dated June 17, 1884.

Application filed August 7, 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; 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 drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention relates to a method of and apparatus for utilizing the heat from the exhaust of steam-engines, its object being to return the exhaust directly into the boiler or generator from which it was taken without the intervention of any cooling or condensing medium or apparatus.

The invention consists in the method, hereinafter more fully described, of carrying the exhaust-steam from an engine to an injector or other apparatus, where it meets with a current of water from the boiler or generator at a temperature and pressure the same as in the boiler, whereby, through suitable means, the commingled steam and water are forced back into the boiler or generator from which it was taken, and below the water-line thereof, all as will hereinafter more fully appear.

The invention also consists in the novel combinations and arrangements of parts of apparatus by which the above-named method or process is carried into effect, which will be hereinafter fully described, and specifically pointed out in the claims.

Referring to the drawings forming part of this application, Figure 1 represents a side elevation of a boiler or steam-generator and an engine-cylinder with the apparatus for carrying my improved method into effect. Fig. 2 shows a longitudinal section of an injector.

In the said drawings, A designates the boiler or generator, which may be of any ordinary or suitable construction, and in which steam is maintained under pressure.

B indicates the cylinder of an ordinary engine, which is connected with the boiler or generator by means of the supply-pipe H.

C is the injector.

The pipe D, for supplying water from the boiler to injector, is extended by means of coil D', in order to obtain velocity, which may be regulated by means of the overflow-valve *m*.

E' is an exhaust-pipe leading to the atmosphere, by which the exhaust may be directed to the open air instead of the boiler or generator, if desired, being controlled by means of the valve or cock *g* in said pipe.

F is a delivery-pipe for delivering the exhaust-steam of the engine to the small tubes of injector when I am using the injector for which Letters Patent of the United States were granted to me April 3, 1883, No. 274,968.

N is a pipe located near the bottom of the boiler or generator and below the water-line, and is connected with the injector. This pipe N is provided with a series of perforations, *d d*, along its top, and by its use a more even delivery of the exhaust-steam and water to the boiler is obtained.

S is an ordinary check-valve.

The operation is as follows: The exhaust-steam from the engine escapes from the cylinder through exhaust-pipe E or E and F to the injector, where it meets the current of water from the boiler or generator at the same pressure and temperature as contained in the boiler, and the commingled steam and water are thus forced into the pipe N, and through its perforations back into the boiler.

It will be evident that the passage for the water from the boiler to the injector may in practice be shortened, and that other modifications in details of construction may be made without departing from or sacrificing the principle of my invention, which will be fully understood from the above description and the accompanying drawings.

Having thus fully described my invention, what I claim is—

1. The method herein described of utilizing the heat from the exhaust of steam-engines by causing said exhaust to be carried to an injector, where it meets a current of water from the boiler or generator at the temperature and pressure of the contents of the boiler, and the commingled steam and water are then forced back into the water-space of the boiler or generator, substantially as shown and described.
2. In an apparatus for utilizing the heat

from the exhaust-steam of engines, the combination of the pipe E, injector C, and pipe D, all arranged to admit mingled exhaust-steam and water below the water-line of the boiler, substantially as described.

3. In an apparatus for utilizing the heat from the exhaust-steam of engines, the combination of the pipe E, injector C, pipe D, and delivery-pipe N, provided with the perforations *d d*, all substantially as shown and described.

4. The combination, in an apparatus sub-

stantially such as described, of the pipes E and D, injector C, and overflow-valve *m*, and valve *o*, all as and for the purpose shown and specified.

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.