(No Model.)

D. RENSHAW.

UTILIZING THE EXHAUST OF ENGINES.

No. 274,972. Patented Apr. 3, 1883.

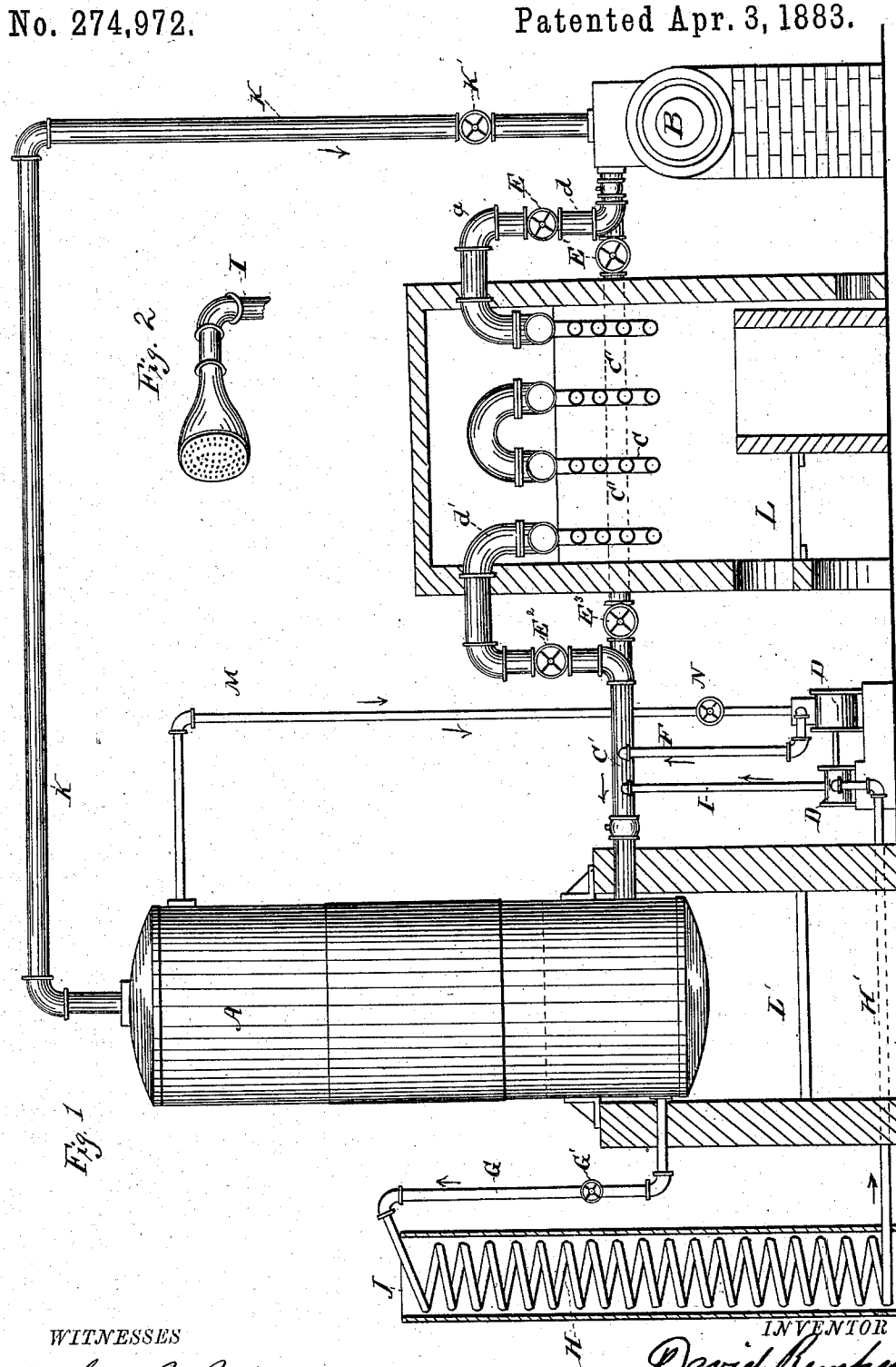


Fig. 2

Fig. 1

WITNESSES

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DAVID RENSHAW, OF BRAINTREE, MASSACHUSETTS.

UTILIZING THE EXHAUST OF ENGINES.

SPECIFICATION forming part of Letters Patent No. 274,972, dated April 3, 1883.

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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 Processes 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 drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to means of utilizing the exhaust of engines and returning it to the boiler; and it consists in the process of taking water from a boiler under pressure and cooling the same, then forcing it into the exhaust-pipe of an engine at a pressure greater than that of the boiler from which it was taken, where it comes in contact with the exhaust, and the whole is returned to the boiler from which it was taken, and is again utilized; and it consists, further, in the means by which that result is accomplished, all of which will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 represents a side elevation of an apparatus embodying my improvements, the tank containing the coil-pipe being in section. Fig. 2 is a rose-head used on the discharge end of pipe I, which will be more fully hereinafter specified.

A represents the boiler. B is the engine. C is the superheater; D, the pump. E E' E^2 E^3 are valves to control the passage of the exhaust. F is an exhaust-pipe from pump D to pipe C'. G is a pipe to supply boiler-water at boiler-pressure to the coils H in tank J. Said tank is filled with cold water. The water, in passing through coils H, is cooled. The cooled water is then passed through pipe H' to the pump, where it is forced through pipe I into the exhaust-pipe C'. The pipe I in Fig. 1 is adapted to admit a solid stream of water into the exhaust-pipe C'. The rose-head shown in Fig. 2 is adapted to be used on the discharge end of pipe I, whereby either a solid stream or spray may be injected into the exhaust-pipe C'. In either case a partial vacuum is formed by the cooled water coming in contact with the exhaust-steam.

K is the steam-pipe running from the boiler to the engine. K' is a throttle-valve in said pipe. L is a fire-box to superheat the exhaust-steam in the superheater C. *d* is the exhaust-pipe from the engine to superheater C, and d' is a pipe for carrying superheated exhaust steam from heater C into the main exhaust-pipe C'. M is a steam-pipe leading from the boiler to the pump, and N is a throttle-valve in said pipe.

The exhaust-steam, in returning to the boiler, may be superheated or not without materially departing from the spirit of my invention.

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

1. The herein-described process for utilizing exhaust, consisting in taking water from a boiler, then in cooling the same, then forcing it into the exhaust-pipe of an engine at a greater pressure than that of the boiler, where it is brought into contact with the exhaust of the engine, (superheated or not,) forming a partial vacuum and an induced current and pressure, whereby said exhaust and water are returned to the boiler from which they came, substantially as set forth.

2. The combination of the boiler, superheater C, tank, and coil, the pump and intermediate connections, and exhaust-pipe C', substantially as described, and for the purpose set forth.

3. An apparatus for returning the exhaust of engines to the source of supply, consisting of the boiler, cooling device, and the superheater connected to the exhaust-pipe, in combination with the steam and water returning mechanism, as set forth.

4. In an apparatus for returning the exhaust of engines to the boiler from which it was taken, the combination of the boiler A, pipe G, coils H, tank J, pipe H', pump D, pipes I F M, superheater C, pipe d', exhaust-pipes C' *d*, furnace L, engine B, and steam-pipe K, substantially as described, and for the purposes set forth.

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.