S. R. MATHEWSON.

Steam-Generator.

No. 161,423. Patented March 30, 1875.

Fig. 1

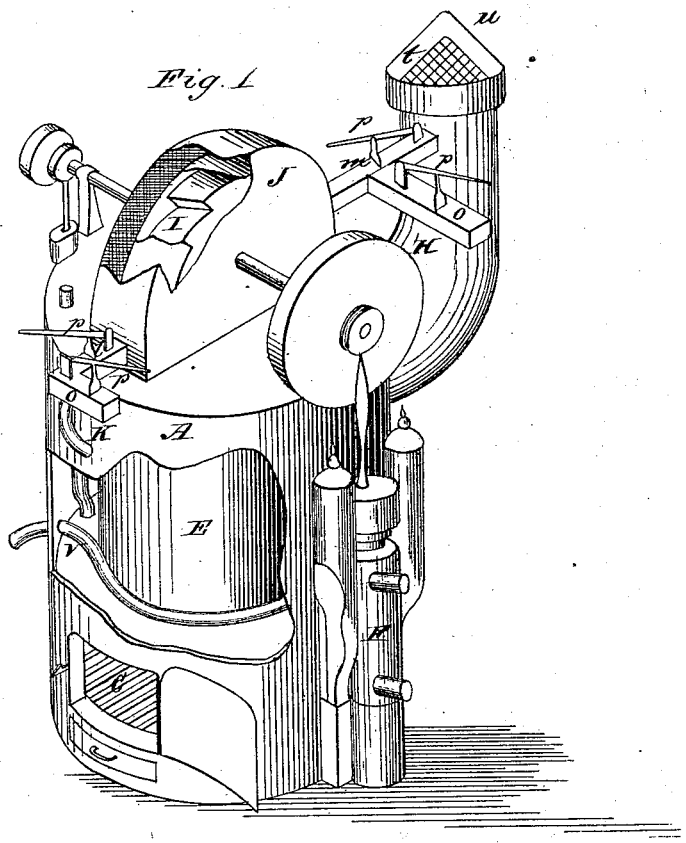
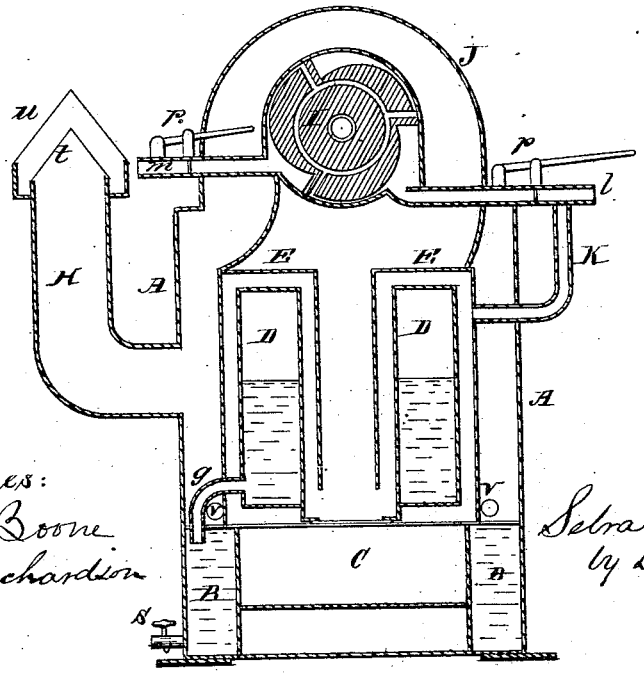


Fig. 2



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UNITED STATES PATENT OFFICE.

SEBRA R. MATHEWSON, OF GILROY, CALFORNIA.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **161,423**, dated March 30, 1875; application filed December 10, 1874.

To all whom it may concern:

Be it known that I, SEBRA R. MATHEWSON, of Gilroy, Santa Clara county, State of California, have invented an Improved Steam-Generator, Water-Heater, and Steam-Motor, combined; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvement without further invention or experiment.

The object of my invention is to provide a general-utility apparatus for farmers and dairymen, and it consists of a steam-generator, water-heater, and motive power combined in one machine, and provided with conveniences to adapt it to the various uses to which it is to be applied.

In order to describe my invention so that others will be able to understand its construction and operation, reference is had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a perspective view of my machine. Fig. 2 is a sectional elevation.

A is the outside case or shell, which can be made of boiler-iron or other suitable material. This case I prefer to make cylindrical and upright, in order to accommodate the peculiar arrangement of my boiler and engine. In the lower part of this shell I construct an annular chamber, B, surrounding the furnace or fire-place C, and extending as high as the fire-place. The boiler D which I use is annular in shape, and has an outside shell, E, Fig. 2, Sheet 1, surrounding its outside and top, and extending down in the tubular space inside of it, almost to the bottom, so as to provide a space between the boiler and shell. The boiler, with its shell E, is smaller in diameter than the shell A, so that an annular space is left between the shell of the boiler and the outside shell, the outside lower edge of the shell E resting upon the inner edge of the annular water-chamber B; and the boiler is supported above the bottom of the shell by a short supporting-rim which provides a space below it.

The water is first introduced into the annular water-chamber B which surrounds the fire-place, through a pipe V, which is coiled around the boiler, by means of any suitable pump F, and here it receives a preparatory heating. The chamber B is connected with the boiler D by means of a pipe, *g*, so that the pump will force it up into the boiler, and, suitable gages being used, a uniform level of water can be preserved in the boiler. The heat and products of combustion from the fire-place, in order to pass out through the stack or chimney H at one side of the shell A, are compelled to pass up through the space between the boiler D and its shell E, outside of the boiler, then over its top and down its inside, until they enter the tubular space inside of the boiler; thence they pass around the motor, as below explained, before they reach the smoke-stack. Upon the top of the case A I construct a rotary engine, I, and surround it with a case, J, so as to leave a space around it. This space communicates with the space above the boiler upon one side, and with the space between the boiler and outside shell upon the opposite side, so that the heat and products of combustion, after passing around the boiler, will also pass around the engine and thence to the smoke-stack. K is the steam-pipe, which leads from the steam-space in the boiler to a pipe or passage, *l*, which conveys the steam to the engine I, and *m* is the exhaust pipe or passsage on the opposite side of the engine. The pipes *l* and *m* have each a branch pipe, *o*, leading from them, and a cock or cut-off valve, *p*, is applied both to the pipes themselves and their branch pipes, so that the steam may either be cut off before it enters the engine, and turned through the branch pipe, or the exhaust may be directed through the branch pipes and conveyed to any point desired. A draw-pipe, *s*, with cock, leads from the annular water-chamber B through the shell A, so that hot water can be drawn from the chamber when desired.

Any desired style of rotary engine can be employed in connection with my apparatus, but I prefer to use one constructed after the plan represented in the accompanying drawings, and which will form the subject of a separate patent.

By the above arrangement it will be seen that I greatly economize in fuel by entirely surrounding the boiler with the flue-space, so

that the heat from the furnace will pass entirely around it and then around the engine before escaping, thus enabling me to work the apparatus economically. The steam can be drawn off either before or after it passes through the engine, while hot water of almost any temperature can be obtained from the apparatus.

The end of the smoke-stack I cover with a double netting, the inner netting *t* being very coarse, while the outer one *u* is quite fine, so that any sparks which pass through the inner or coarse netting will lodge between the two, thus entirely avoiding danger from sparks.

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

1. The shell A, with its annular water chamber B, fire-place C, and annular boiler D, having the shell E arranged to form a flue surrounding the boiler, substantially as and for the purpose described.

2. The combination of the annular flue J with the engine-cylinder, the flue forming a jacket around the engine, substantially as and for the purpose set forth.

In witness whereof I hereunto set my hand and seal.

SEBRA R. MATHEWSON. [L. S.]

Witnesses:
JNO. L. BOONE,
C. M. RICHARDSON.