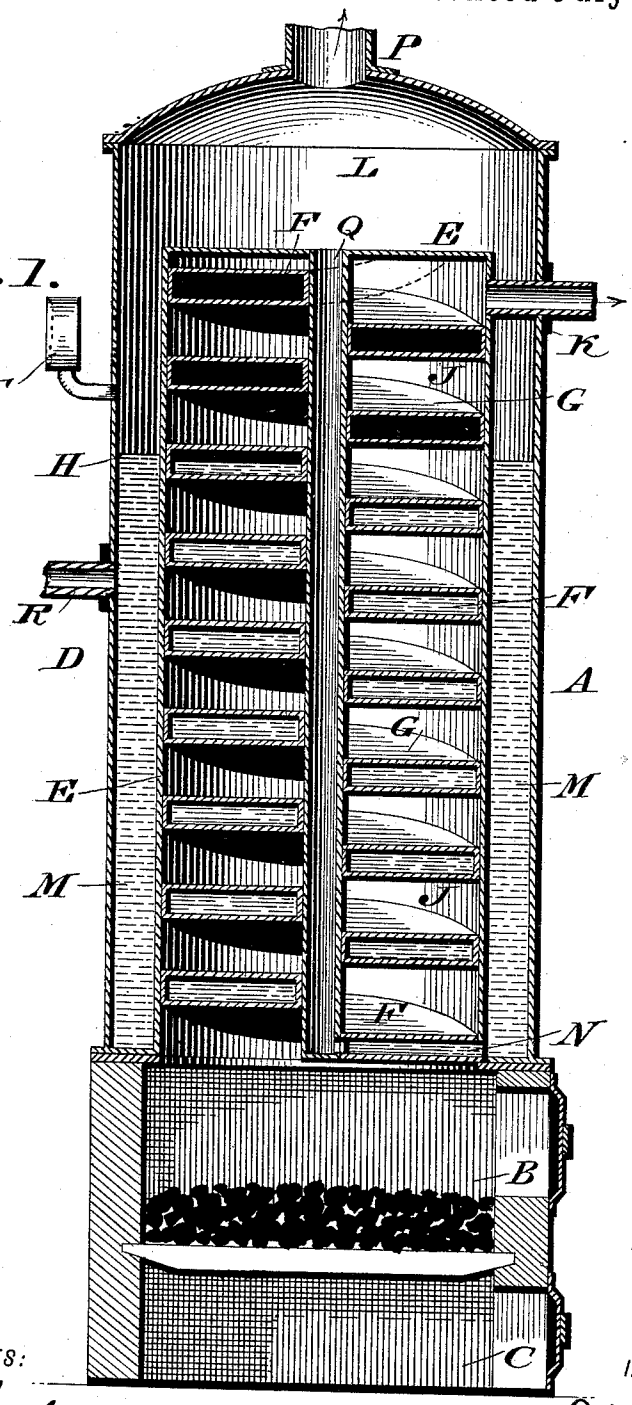
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R. J. YOUNG.

STEAM AND HOT WATER GENERATOR.

No. 432,811. Patented July 22, 1890.

Fig. 1.



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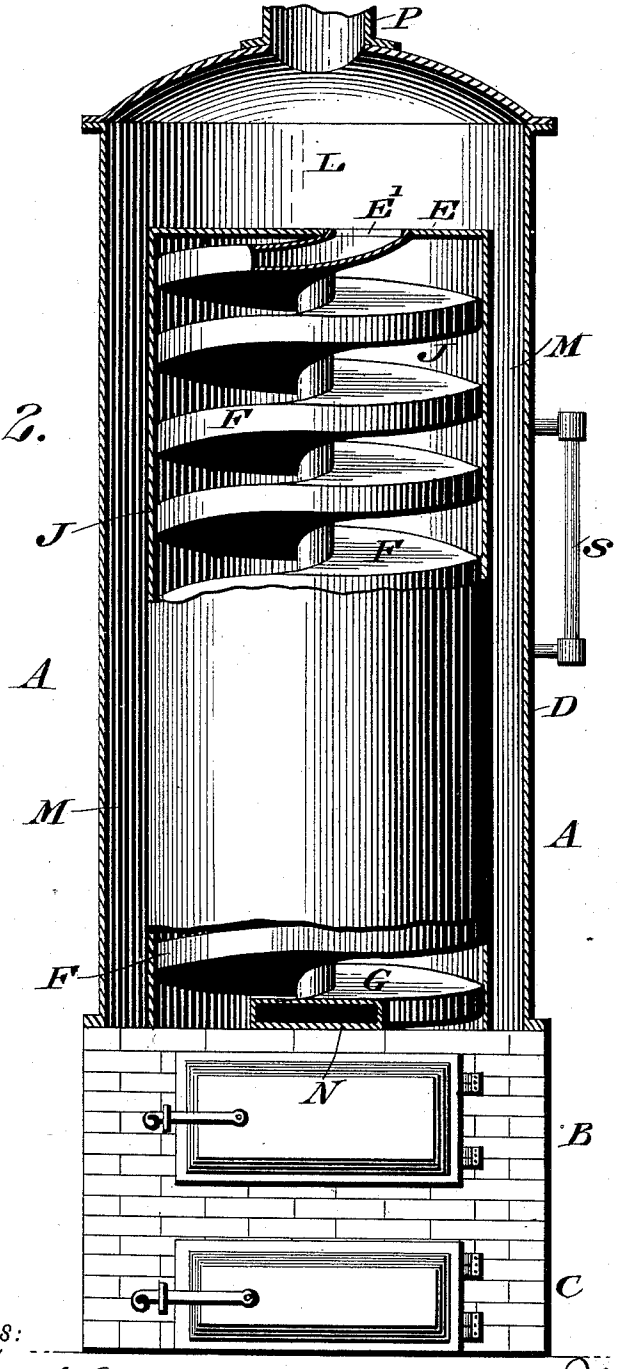
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Fig. 2.



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STEAM AND HOT-WATER GENERATOR.

SPECIFICATION forming part of Letters Patent No. 432,811, dated July 22, 1890.

Application filed March 29, 1890. Serial No. 345,824. (No model.)

To all whom it may concern:

Be it known that I, ROBERT J. YOUNG, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Steam and Hot-Water Generators, which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to improvements in steam and hot-water generators; and it consists of a cylinder having a spiral passage-way therein, with an intervening spiral flue for the products of combustion, and a water-receptacle surrounding said cylinder, substantially as described.

It further consists of the combination of parts herein described.

Figure 1 represents a central vertical section of a steam or hot-water generator embodying my invention. Fig. 2 represents a partial side and partly vertical section thereof.

Similar letters of reference indicate corresponding parts in the two figures.

Referring to the drawings, A designates a boiler or generator for steam or hot water, and B the furnace, and C the ash-pit thereof.

Within the outer casing D is an inner cylinder or drum E, having a surrounding space between it and the said casing D, forming a water leg or jacket, to be hereinafter referred to. One end of the cylinder is open to the furnace, so as to receive the products of combustion, and within the said cylinder and extending from and to the end thereof is a spiral passage F, having an upper wall G and a lower wall H. Between the walls or coils of the passages F is a spiral extending space J, forming a flue for the products of combustion, which find an outlet near the other end of the cylinder through the pipe, the upper end of the cylinder E, or that farthest from the furnace C, being closed, except at the opening E′ in the end of the passage F, so that the said products of combustion cannot pass to the dome L within the outer casing and at one end of the said inner cylinder. The passage or channel F communicates with the surrounding space or water-leg M by a pipe N, which also connects said leg with a central tube Q, so that the circulation of water is maintained, and the water in the space readily passes into the channel F. The tube Q, being open at both ends, also affords communication between the ends of the cylinder and forms a support for the inner ends of the walls of the spiral passage F. An outlet-pipe P for the generated steam or hot water communicates with the dome end of the casing D. It will be readily seen that by having the spiral passages the products of combustion are caused to pass through a much lengthened passage-way before escaping from the generator, and during their entire travel are in close contact with the walls of the water-receptacle, and therefore readily heat the same. The distance apart of the walls G and H is comparatively small, so as to present a shallow body to the heating-surface, and the heat of the products of combustion passing through the channel J is, owing to the circuitousness of said passage, entirely or nearly so absorbed by the walls of the water-receptacle, and thus by the inclosed water.

The outer casing D is provided with a supply-pipe R for the admission of water, and a water-gage S and a steam-gage T, as shown.

It will be noticed that economy of fuel, as well as rapidity of heating, is effected by the generator herein described.

The device may be used for heating air, which will then take the place of water in the passage or channel F.

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

1. A generator for steam or hot water, having an outer casing, an inner shell having a spiral passage for water, an intervening spiral flue for the products of combustion, and a water-chamber surrounding said cylinder and provided with an inlet-pipe, said parts being combined substantially as described.

2. A generator for steam or hot water, having a furnace, an outer casing, and an inner cylinder or drum, an inlet-pipe leading into the water-chamber between said outer casing and the cylinder, the said cylinder being open at one end to the products of combustion and having extending from end to end thereof an

inner spiral channel having upper and lower walls, said walls also forming a spiral flue for the said products of combustion, said parts being combined substantially as described.

3. A generator for steam or hot water, consisting of a furnace, an outer casing, an inner cylinder open at one end to the products of combustion and having within the same the spiral walls G and H, forming a spiral channel for the water and an intervening spiral flue for the products of combustion, the said cylinder having the passage K, leading outside the casing, for the products of combustion, and the end of the cylinder farthest from the furnace being closed, said parts being combined substantially as described.

4. A generator for steam or hot water, consisting of a furnace B, an outer casing D, an inner cylinder E, having the spiral walls G H therein, forming the spiral water-channel F and the spiral intervening flue J, a passage K from the combustion-flue to the outer casing D, and a water-space M, surrounding said cylinder and communicating with the water-passage F, said parts being combined substantially as described.

5. A generator for steam or hot water, having a furnace, an outer casing, an inner cylinder with a spiral water-channel, a central tube, and an intervening combustion-flue therein, said water-channel and central tube communicating with the interior of the outer casing, substantially as described.

6. A generator for steam or hot water, having a furnace, an outer casing, an inner cylinder with a central tube, a spiral water-channel surrounding said tube, and an intervening combustion-flue therein, said water-channel and tube communicating with the interior of the outer casing at both ends of the cylinder, said parts being combined substantially as described.

7. A generator for steam or hot water, having an outer casing, an inner cylinder with a spiral water-channel, an intervening combustion-flue, an inlet-pipe leading into the water-chamber between said outer casing and the cylinder, and a central tube communicating with the said water-chamber, said parts being combined substantially as described.

ROBERT J. YOUNG.

Witnesses:

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