(No Model.)

F. A. GARDNER.

STEAM BOILER.

No. 405,209. Patented June 11, 1889.

Fig. 1.

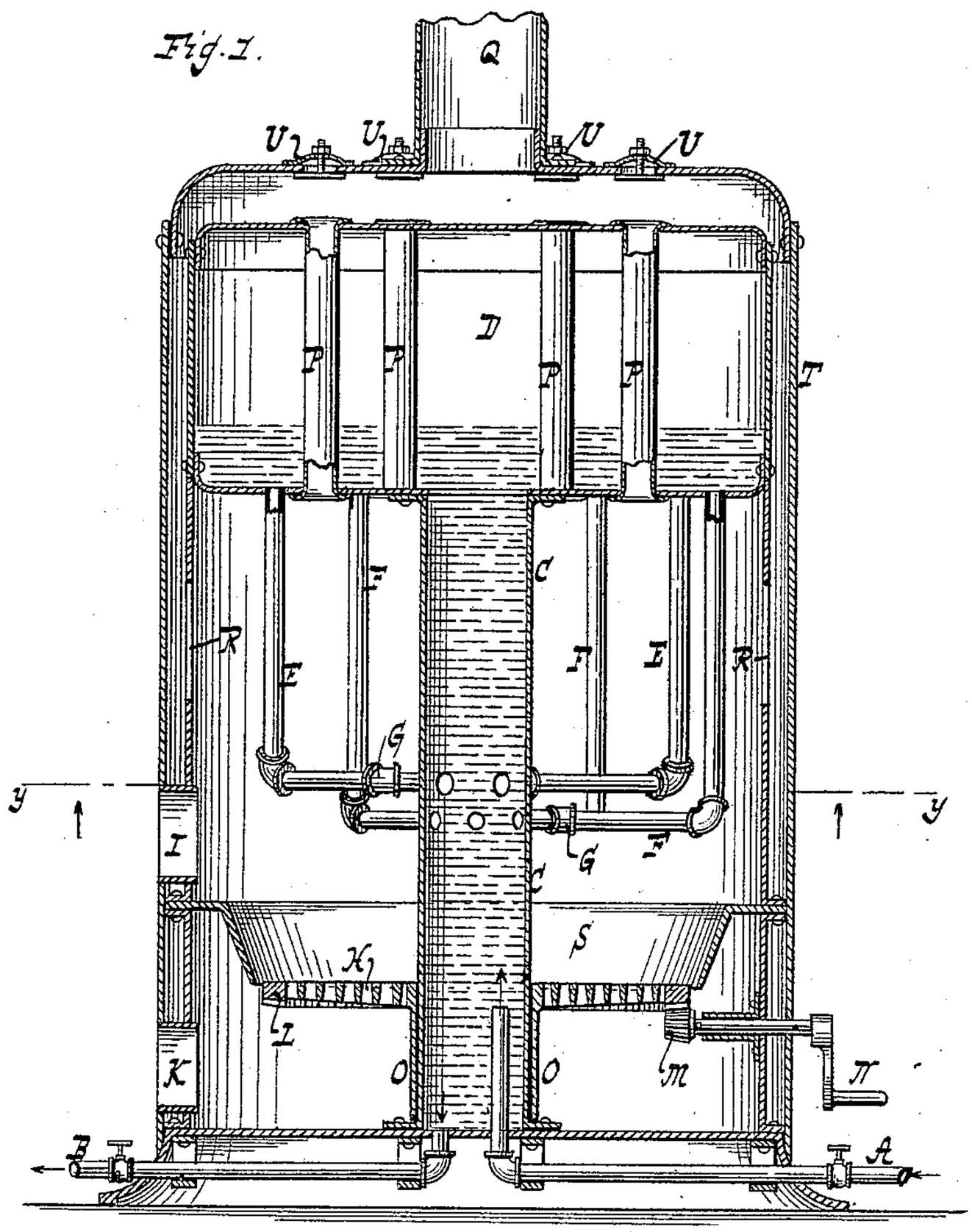
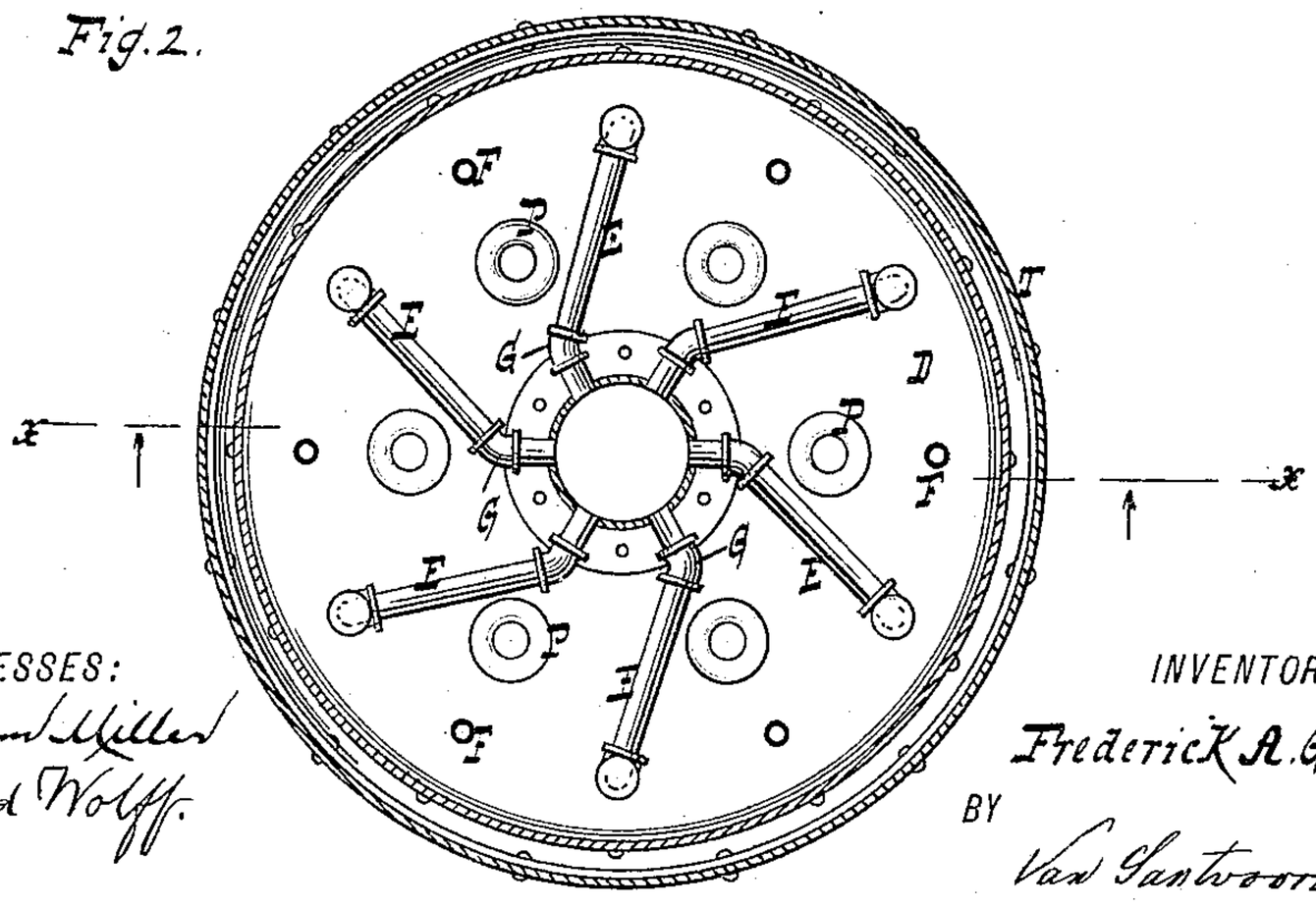


Fig. 2.



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UNITED STATES PATENT OFFICE.

FREDERICK A. GARDNER, OF CATSKILL, NEW YORK, ASSIGNOR TO F. A. GARDNER & CO., OF SAME PLACE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 405,209, dated June 11, 1889.

Application filed November 1, 1888. Serial No. 289,742. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK A. GARDNER, a citizen of the United States, residing at Catskill, in the county of Greene and State of New York, have invented new and useful Improvements in Steam-Boilers, of which the following is a specification.

This invention relates to an improvement in steam-boilers, as set forth in the following specification and claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a section of a steam-boiler along the line *x x*, Fig. 2. Fig. 2 is a section along the line *y y*, Fig. 1, and looking upward in the direction of the arrow opposite to that line.

Similar letters indicate corresponding parts.

In the drawings, the letter D indicates a drum, which is provided with the stand-pipe C. A indicates a feed-pipe, and B is a blow-off pipe. The feed-pipe supplies water to a stand-pipe C and to the drum D. The circulating-pipes E F communicate with the stand-pipe and with the drum. The pipes E are secured to the stand-pipe at a higher level than the pipes F. The parts or branches of the pipes E F which extend from the stand-pipe are bent or provided with elbow-joints G, so as to increase the length of such parts or branches, and thus increase the surface of such pipes which is exposed to the heat or fire. A grate H is adapted for the support of fuel which can be fed onto the grate through the fire-door I. The ash-pit can be cleaned through the door K.

The grate H is shown as closing the bottom of a fuel-magazine S. A toothed ring L is secured to the grate, and a cog-wheel M and crank N can be made to rotate or oscillate the ring L and grate H when it is desired to distribute the fuel evenly over the grate or to remove the ashes from the fire. The grate is rotatable or oscillatory, being supported on a sleeve O surrounding the stand-pipe C. The products of combustion pass to the chimney Q by way of the flues P, which extend through the drum D. Openings R may also be provided through which the products of combustion may pass about the drum and within the outer shell T to the chimney Q.

From the construction shown it will be noticed that the water in the horizontal branches of the circulating-pipes E F is exposed more directly to the heat than the water in the stand-pipe C, and consequently the water in the pipes E F will pass from such pipes into the drum D, and will be replaced by water passing from the stand-pipe C into the circulating-pipes E F, so that a circulation of the water is effected which materially facilitates the production of steam. The shell T is shown provided with hand-holes having covers U. These hand-holes correspond to the flues P. Said holes enable the flues to be readily cleaned, since by removing the covers U and passing cleaning-rods through said holes and flues any soot or impurity in the flues can be removed therefrom. This cleaning can be done even while the boiler is in use.

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

1. In a steam-boiler, the combination, with a stand-pipe C, having a feed-pipe entering its lower end, of the drum D, arranged above and having the stand-pipe entering its bottom, the circulating-pipes of elbow shape, leading from the stand-pipe to said drum, and the flues P traversing said drum, substantially as described.

2. In a steam-boiler, the drum D, the stand-pipe entering its bottom, the elbow-shaped circulating-pipes E F, leading from the stand-pipe to the drum, and the flues P traversing the latter, substantially as described.

3. A steam-boiler composed of the shell T, the drum D, arranged above the stand-pipe C, the upper end of which communicates with the drum, the circulating-pipes leading from the stand-pipe into the drum, the fire-place H, the fire-flues P, extending through the drum D, and smoke-stack Q, leading from shell T, substantially as described.

4. The combination, with the shell T, the drum D, and the stand-pipe C, of the grate H, provided with a sleeve which fits the stand-pipe, the fuel-magazine S, and means, substantially as described, for imparting to the grate a revolving motion.

5. A steam-boiler composed of the drum D, arranged above the stand-pipe C, the upper

end of which enters the drum D, the circulating-pipes leading from the stand-pipe into the drum, the fire-place H, the fire-flues P, extending through the drum D, the shell T, having hand-holes for the flues, and smoke-stack Q, leading from the shell T, substantially as described.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

FREDERICK A. GARDNER. [L. S.]

Witnesses:

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