D. N. ALLEN & J. M. FARRINGTON.

STEAM-BOILER.

No. 193,069. Patented July 17, 1877.

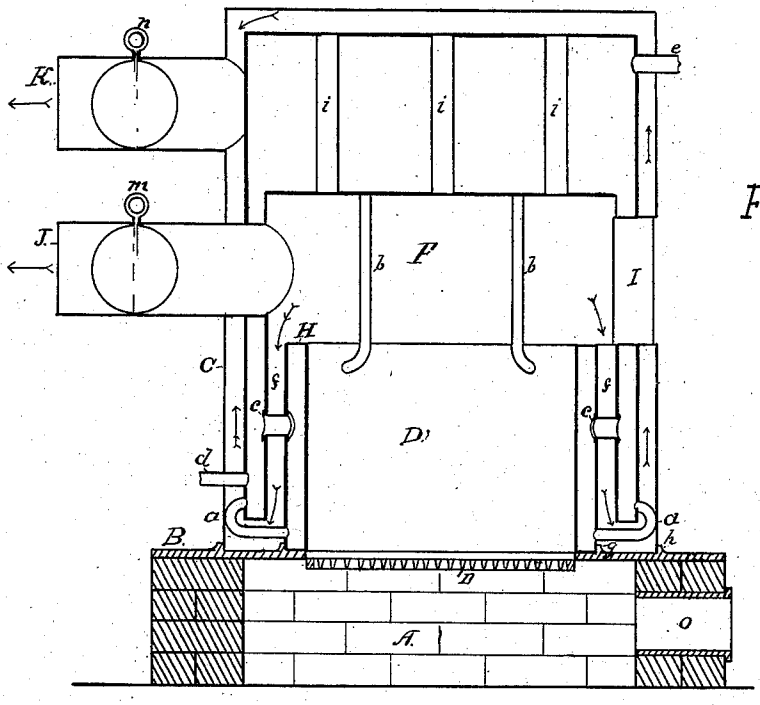


Fig. I.

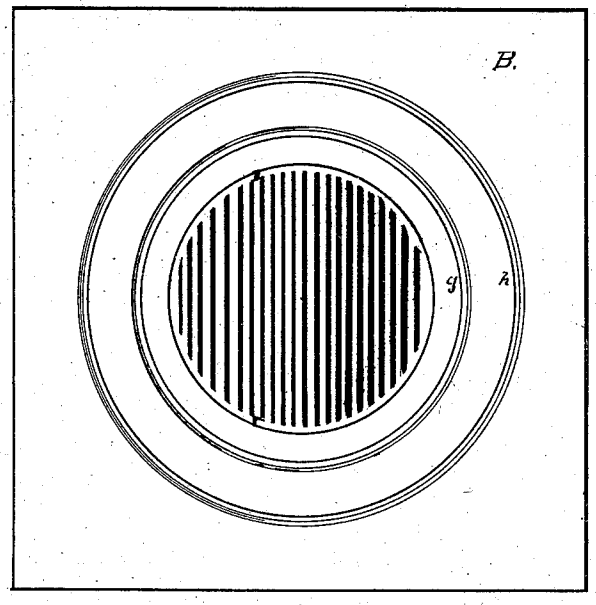


Fig. II.

Attest.

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DANA N. ALLEN AND JAMES M. FARRINGTON, OF CONCORD, NEW HAMPSHIRE, ASSIGNORS TO SAID ALLEN.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **193,069**, dated July 17, 1877; application filed May 5, 1877.

To all whom it may concern:

Be it known that we, DANA N. ALLEN and JAMES M. FARRINGTON, of Concord, in the county of Merrimack and State of New Hampshire, have invented certain new and useful Improvements in Steam-Boilers; and we do hereby declare that the following is a full, clear, and exact description thereof, 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 a part of this specification.

This invention relates to that class of devices used for the purpose of generating steam for heating buildings, and other purposes where an excessive pressure is not required, the object being to produce a boiler which shall have a perfect water-circulation through all its parts, and give out the greatest amount of heat obtainable from the consumption of a given quantity of fuel; and the invention consists in the construction and arrangement of the different parts of the boiler, as will be hereinafter fully set forth, and then specifically pointed out in the claims.

Figure 1 is a vertical section through the boiler-grate and ash-pit; and Fig. 2 is a top view of the base-plate, showing the arrangement of the grate with relation to it and the devices which retain the boiler in position.

A represents the ash-pit, which may be constructed of brick or other material, and is provided with a door, *o*, for the admission of air to the fire and the removal of ashes. Over this ash-pit is placed the bed-plate B, having a circular opening in its center, within which is placed a dumping-grate, D. Two annular projecting rings, *g* and *h*, are formed upon the upper surface of the plate, and serve to keep the boiler in place by encircling the bottom of the smoke-jacket C and inner boiler or water-jacket H.

In constructing the boiler an outer shell is formed, in the same manner as those in common use for vertical-tube boilers, having in its lower part a combustion-chamber, D′, which is completely surrounded by a water-space, through which passes the smoke-outlet J, capable of being closed by a damper, *m*, when it is desired to pass the products of combustion, through the tubes *i* and space *f*, into the space between the outer shell of the boiler and the smoke-jacket C. This smoke-jacket is also provided with an outlet for smoke, K′, which, as well as the outlet I, may pass into the same chimney. Occupying a central and annular position within the combustion-chamber is a water-jacket, H, which has the same internal diameter as the grate D, and rests upon the bed-plate B, immediately surrounding the opening for the grate, being retained in place by the ring *g* upon the bed-plate. This water-jacket rises to a level with or slightly above the bottom of the fire-door I, and is connected with the upper part of the boiler by the water-tubes *b*, and with its sides by the thimbles *c* and bent water-tubes *a*.

It will be observed that this water-jacket H forms the fire-pot D′, within which the fuel is placed, and, owing to its numerous connections with the outer boiler, is sure to always have a good circulation of water through it, thus insuring safety with great steam-generating qualities.

The pipe *d* serves as an inlet through which the boiler is supplied with water, while the steam or hot water, if the boiler be used as a water-heater, makes its exit through the pipe *e*.

In operating the boiler it is, of course, first filled with water to the height desired, always covering the crown-sheet of the combustion-chamber to a good depth, after which the damper *n* in the pipe K may be closed, and the damper *m* in the pipe J opened. This insures a direct draft into the chimney when lighting a fire—a great desideratum in drop-flue boilers, as much difficulty is often experienced in producing sufficient draft in such boilers when the fires are first lighted, to prevent the smoke from forcing its way out into the boiler-room. After the fires are well started and the boiler is warmed up, the damper *n* in the pipe K is opened and the damper *m* closed. This forces the products of combustion to pass through the space *f* between the water-jacket and the outer boiler, beneath the latter, and into the smoke-space surrounding it, before it can make its exit by the pipe K. A portion

of the products of combustion, however, are allowed to pass through the vertical tubes *i*, for the purpose of drying the steam when the boiler is used as a steam-producer.

It will be apparent that the amount of heating-surface can scarcely be surpassed in a boiler of approximate size and similar construction, while the jacketing of the whole outer surface of the boiler, with the products of combustion, prevents any loss by condensation, and insures the greatest amount of useful effect from the fuel used, as by the time the products have reached the exit-pipe K their caloric will be so completely absorbed as to have lost all power of generating steam.

Having thus described our invention, we claim as new, and desire to secure by Letters Patent of the United States, the following:

1. The water-jacket H, connected with the outer boiler by the bent water-pipes *a*, thimbles *c*, and vertical water-tubes *b*, in combination with the outer casing C and water and steam spaces above the fire-pot, traversed by the tubes *i*, as and for the purpose specified.

2. The boiler provided with an outer smoke-jacket, C, an auxiliary combustion-chamber, F, annular flue *f*, and the outlet-pipes J and K, one of which connects directly with the auxiliary combustion-chamber, and the other with the smoke-jacket, as shown and described.

In testimony that we claim the foregoing as our own we hereunto affix our signatures in presence of two witnesses.

DANA N. ALLEN.
JAMES M. FARRINGTON.

Witnesses:
CHAS. C. LUND,
I. A. MERRILL.