

J. D. KEELEY.
HOT WATER BOILER.

No. 176,317.

Patented April 18, 1876.

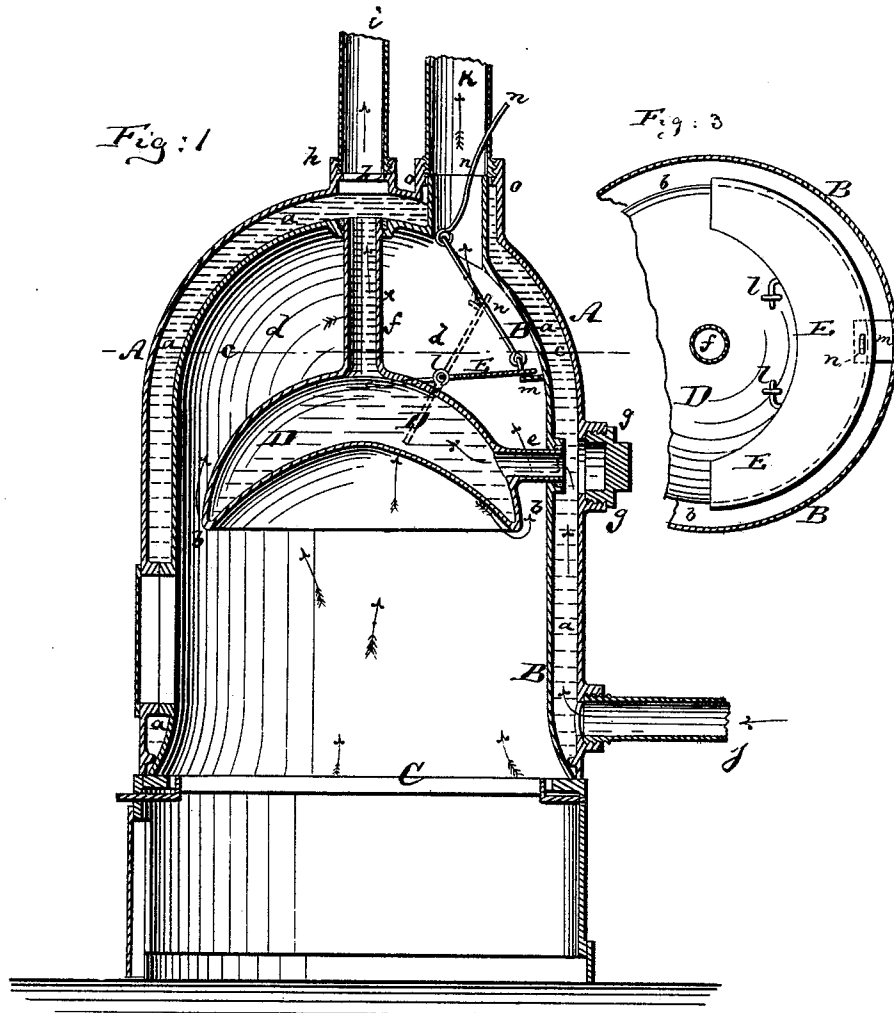
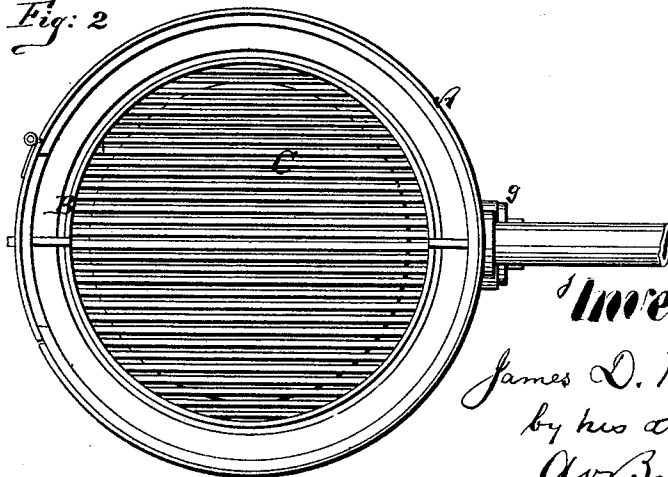


Fig. 2

Witnesses:
A. Moraga.
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Inventor:
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by his attorney
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UNITED STATES PATENT OFFICE.

JAMES D. KEELEY, OF NEW YORK, N. Y.

IMPROVEMENT IN HOT-WATER BOILERS.

Specification forming part of Letters Patent No. **176,317**, dated April 18, 1876; application filed March 11, 1876.

To all whom it may concern:

Be it known that I, JAMES D. KEELEY, of New York city, in the county and State of New York, have invented a new and Improved Hot-Water Boiler; of which the following is a specification:

Figure 1 is a vertical central section of my improved hot-water boiler. Fig. 2 is a bottom view of the same. Fig. 3 is a horizontal section of the same on the line *c c*, Fig. 1.

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

This invention relates to a new hot-water boiler for use in green-houses, dwellings, graperies, and the like; and consists in the details of invention hereinafter more fully described.

The letter A represents the outer shell, and B the inner shell, of the boiler. These shells are made of sheet metal or other proper material, with their tops rounded, and their lower parts connected to form an annular water-chamber, *a*, between them. C is the grate. D is a hollow dome or tank placed within the inner shell B, above the fire place of the boiler. This dome or tank is made of sheet metal, with a concave bottom and convex top, and is of smaller diameter than the inner shell B, so that an intermediate annular smoke-passage, *b*, is formed, as shown. The upper surface of the dome or tank D is a considerable distance below the top of the shell B, thus forming an upper smoke-chamber, *d*. The dome or tank D connects, by a horizontal tube, *e*, at its lower part, with the shell B and water-space *a*, and, by a vertical tube, *f*, at its top, with the upper part of the shell B and water-space *a*. These tubes *e* and *f* serve to hold the dome or tank in position and in place, and serve, also, by being open at their ends, to connect the dome or tank with the water-space *a* of the boiler, and permit proper circulation of water through said dome or tank—this being necessary, as, owing to the position of said dome or tank, circulation in the same will be more active than in any other part of the boiler.

For the reception of the tubes *e* and *f* the corresponding parts of the shell B are made with proper sockets, into which said tubes are introduced, as shown, a packing of metal shavings or other proper material being used to

form water-tight joints, and at the same time permit the tube-connections *e* and *f* to have some longitudinal play in the sockets, and accommodate themselves to the varying degrees of expansion and contraction of the dome or tank or shell. Right in line with the tubes *e* and *f* the outer shell A is perforated, it having a hand-hole, *g*, in line with the tube *e*, and another hole, *h*, in line with the tube *f*. The opening *h* may be used for the junction of the water-escape pipe *i*.

Whenever the tank or dome D is burnt out, or otherwise needs repair or replacement, it is only necessary to open the holes *g* and *h*, pick out the packing around the tubes *e f*, and take down the dome.

The feed-water enters the lower part of the space *a* through a pipe, *j*, while the hot water escapes by the pipe *i*. The smoke escapes from the chamber *d* by a pipe, *k*, into the chimney. The products of combustion, ascending from the grate, strike the hollow of the dome or tank D, and are deflected downward on their way to the annular passage *b*, whence they enter the smoke-chamber *d*. From there they escape into the smoke-pipe *k*. I attach importance to the concave form of the bottom of the suspended dome or tank, as the same causes a material detention of the smoke, and increases thereby the heating capacity of the boiler.

For the purpose of preventing a direct ascent of products of combustion at one side of the boiler toward and into the smoke-flue *k*, I have applied a hinged shelf, E, in the chamber *d*, beneath the flue *k*, but partly above the dome D. This shelf is of about semi-annular form, as shown in Fig. 3, and deflects the products of combustion that strike its lower surface, preventing their direct ascent into the flue *k*. The shelf is hinged at *l l* to lugs formed on the shell B, and is connected with a rod, *m*, which extends into and through the smoke-flue K, so that by pulling said rod the shelf E can be tilted, as indicated by dotted lines in Fig. 1, to discharge any soot or ashes that may have settled upon it. In its horizontal, or nearly horizontal, position the shelf E is preferably supported by a lug, *n*. The shelf E may be made in jointed sections, if desired; also, the rod *m*.

For the purpose of utilizing as much as possible the heat contained in the escaping smoke, I provide the outer shell A with a tubular projection, *o*, which forms an annular water-chamber around the lower part of the smoke-flue. To the water in this tubular projection the smoke will give off a large proportion of its heat. The tubular projection *o* around the smoke-flue may be made of suitable length.

I claim as my invention—

1. The semi-annular pivoted shelf E placed

in the smoke-chamber *d* of the boiler, between the smoke-passage *b* and the smoke-flue *k*, substantially as and for the purpose herein shown and described.

2. The combination of the pivoted shelf E with the rod *m*, which extends into and through the smoke-flue *k*, substantially as herein shown and described.

JAMES D. KEELEY.

Witnesses:

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