

J. D. KEELEY.
Hot Water-Boilers.

No. 151,294.

Patented May 26, 1874.

Fig. 1

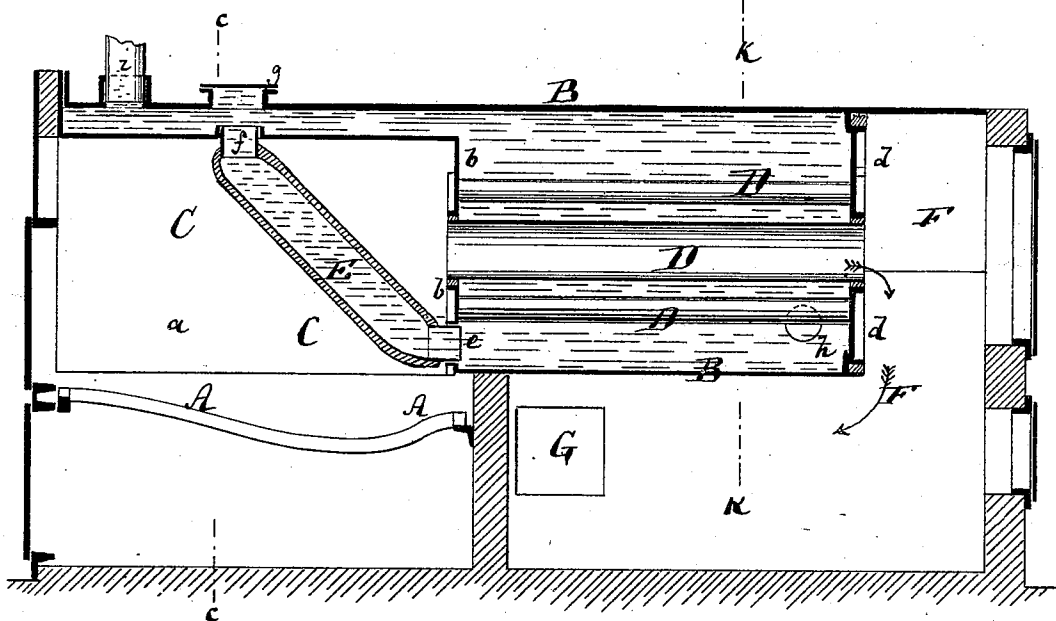


Fig. 2

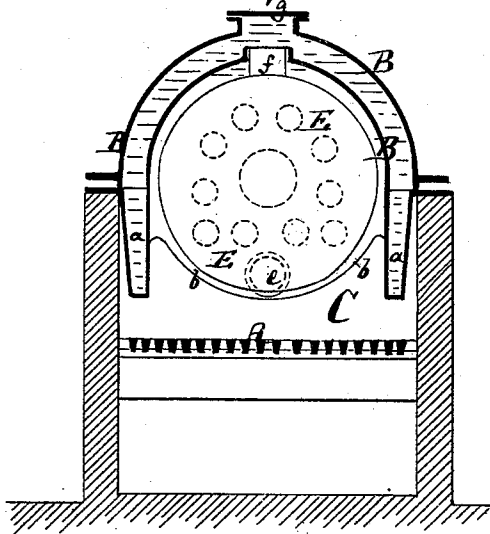
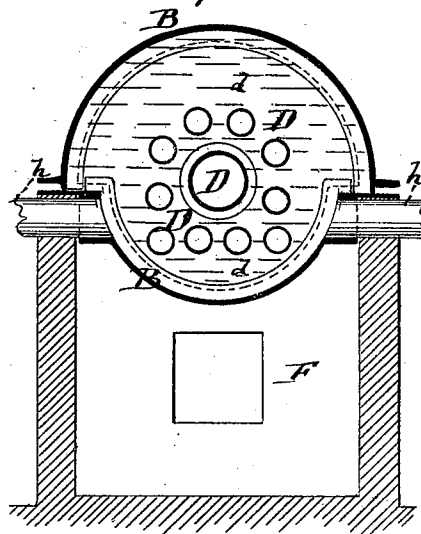


Fig. 3.



Witnesses:

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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. 151,294, dated May 26, 1874; application filed April 14, 1874.

To all whom it may concern:

Be it known that I, JAMES D. KEELEY, of New York, in the county of New York 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 longitudinal section of my improved hot-water boiler; Fig. 2, a vertical transverse section of the same on the line *c c*, Fig. 1; and Fig. 3, a vertical transverse section of the same on the line *k k*, Fig. 1.

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

The object of this invention is to produce a boiler which is to be used for heating water for warming buildings, hot-houses, &c., in which boiler the tubular smoke-passages will, by an inclined hollow shield, be protected so that solid portions of the fuel cannot enter them, and in which, moreover, special facilities for repairing the boiler or inspecting its interior will be provided. The invention consists, first, in a new manner of attaching the hollow inclined shield in front of the tubular smoke-passages, by means of tubular projections of said shield entering the water-chamber of the boiler, so that such projections will constitute the fastening of the shield, and also a means for providing circulation in the interior thereof. My invention consists, secondly, in making in the shell of the boiler a man-hole above the upper pipe connection of the shield, for the purpose of permitting the inspection of such connection and the repair thereof, if necessary.

In the accompanying drawing, the letter *A* represents the grate of the boiler, and *B* the shell of the water-chamber of the boiler. This shell is saddle-shaped in its front portion above the grate to form cheek-pieces *a a* at the sides of the fire-space, said cheek-pieces being hollow, as in Fig. 2, to be filled with water, and to expose the contents to the most intense effect of the fire. The back part of the boiler is cylindrical, or nearly so, as indicated in Fig. 3, being separated from the fire-space *C* by means of a vertical plate, *b*. Tubular smoke-passages *D D*, which are open at both ends, extend horizontally from the aforementioned plate *b* to and through the rear head or end *d* of the boiler. *E* is a hollow inclined

shield, of circular or elliptic form, placed within the fire-space *C*, in front of the plate *b*, and within the chamber formed under the saddle part of the boiler. The shield *E* connects, by a tube, *e*, at its lower end, with the lower part of the plate *b*, and, by a pipe, *f*, at its upper end, with the upper portion of the boiler above the grate, as clearly shown in Figs. 1 and 2. These parts, *e* and *f*, serve to hold the shield in position and in place, and serve also, by being open at their ends, to connect the shield with the water-space of the boiler, and permit proper circulation of water through said shield, this being necessary, as, owing to the position of the shield, circulation in the same will be more active than in any other part of the boiler. For the reception of the pipes *e* and *f*, the corresponding parts of the boiler-shell are made with proper sockets, in which the said parts are introduced, the latter being properly packed by metal shavings or in other suitable manner to form water-tight joints, and at the same time to permit the pipe-connections *e f* to have some play in the sockets, so that they may accommodate themselves to the varying degrees of expansion and contraction of the shield.

I am aware that inclined shields have heretofore been arranged in hot-water boilers in front of the tubular smoke-passages, and within the fire-chamber; but such shells were invariably attached and secured in place by means of bolts or rivets, and were, therefore, universally liable to become disconnected when such bolts or rivets became burned or otherwise injured; while also said bolt-connections made it very difficult to replace the shield, when burned or injured, without taking the whole boiler apart; whereas, my improved tube-connection and support, *e* and *f*, overcomes all these difficulties, permits the ready replacing of the shield by another, and is, moreover, not exposed to the danger of being injured by the fire, because, through the fastenings *e* and *f*, water is caused to circulate and to protect them from the injurious influence of the heat. For the purpose of obtaining still greater facility for the inspection of the fastening *f*, I construct a man-hole, *g*, in the upper shell of the boiler above *f*, as shown, and secure said

man-hole by a proper cover or lid, so that when said lid is removed the connection *f* can be inspected and repaired, if necessary.

The operation of the boiler need not be specially described, because it will be similar to that of other boilers. The smoke from the fire-chamber C will pass behind the shield E into the tubes D, thence into the space F, which is directly behind the boiler, and thence pass forward again until it escapes through the chimney G. Water is admitted to the boiler through side tubes *h*, and the hot water taken from the same at the top, as at *i*.

I claim as my invention—

1. The hollow inclined shield E, arranged within the fire-space of a hot-water boiler, and secured in place by means of the pipe-connections *e* and *f*, substantially as described.

2. In combination, with a shield, E, having the pipe-connections *e* and *f*, the man-hole *g* in the boiler above the pipe-connection *f*, substantially as specified.

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Witnesses:

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