

No. 667,326.

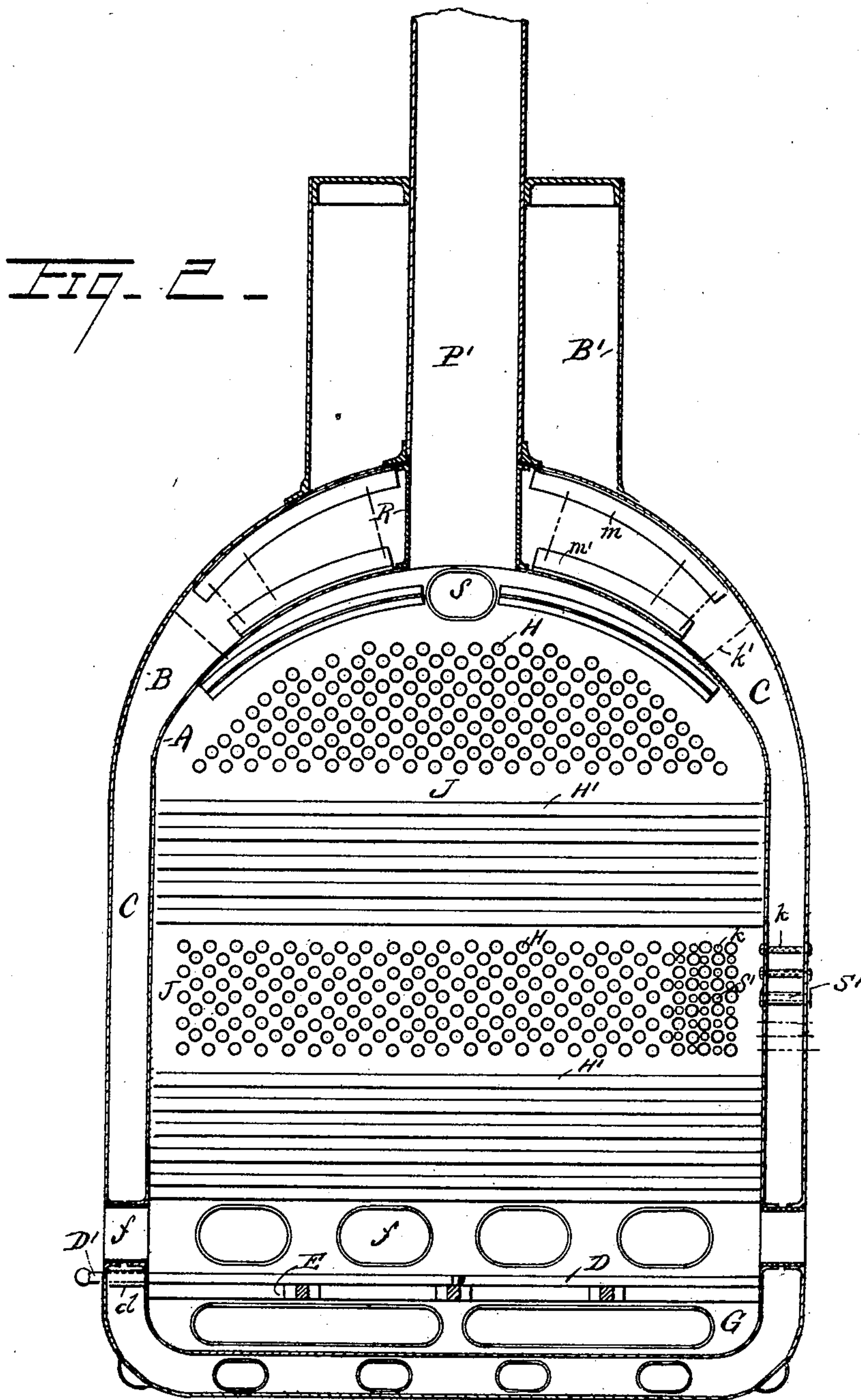
Patented Feb. 5, 1901.

J. LEIGHTHAM.
BOILER.

(Application filed Jan. 23, 1900.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses
E. M. Stewart
Allen Tucker.

Joseph Leighton - Inventor

by *W. L. Ward*

Attorney

UNITED STATES PATENT OFFICE.

JOSEPH LEIGHTHAM, OF READING, PENNSYLVANIA, ASSIGNOR OF THREE-SIXTEENTHS TO HARRY W. BATEMAN, OF SAME PLACE.

BOILER.

SPECIFICATION forming part of Letters Patent No. 667,326, dated February 5, 1901.

Application filed January 23, 1900. Serial No. 2,433. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH LEIGHTHAM, a citizen of the United States of America, and a resident of Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Boilers, of which the following is a specification.

My invention relates to steam-boilers, and particularly to that class known as "water-tube" boilers as arranged for all varieties of service.

My improvements are fully described in connection with the accompanying drawings and are specifically pointed out in the claims.

Figure 1 is a longitudinal sectional view of one form of boiler embodying my improvements. Fig. 2 is a central cross-sectional view of the same.

The preferred form of boiler shown as embodying my improvements comprises an inner shell A and an outer shell B, one arranged within the other, so as to provide a water space or chamber C between the two, which space entirely surrounds the inner or furnace shell. As shown, the grate is formed mainly by a series of water-tubes D, extending between the side walls of the inner shell, with occasional draw-bars D' passing through sleeves d between the shells and resting upon suitable supporting-bars E, being particularly adapted for the use of wood as fuel, which may be introduced through any convenient number of doors f, though the construction may be readily modified for the use of coal or gaseous fuel, as preferred. The water space or chamber between the shells may be extended beneath the ash-pit G. Above the fuel-chamber F are arranged alternate series of longitudinal and transverse water-tubes H H and H' H', the space around and above which forms a commodious combustion-chamber J. The top or crown sheets of both the inner and outer shells are curved, and the two shells are suitably stayed at all points, stay-bolts k, preferably hollow, being screwed into the parallel sides and end walls and riveted to each, as usual, while T or flange irons m m' are riveted to other required portions of the inner and outer shells, as shown, and are connected by suitable braces or stays. These latter, where practicable, I

preferably make in such form as to permit of adjusting the strain upon each, so as to insure each of them bearing a proper proportion of the distorting pressure upon the sheets, this being accomplished, as shown, by employing right and left threaded sleeve-nuts N, which engage the screw-threaded bolts of two-part stays n n', connected to opposite T or flange irons m m'.

The main object of my invention is to provide means for securing uniform or proper generation and distribution of heat at every part of the heating-surface. In furnaces heretofore built, so far as I am aware, the products of combustion are compelled to seek an exit or stack without being subject to such control as will insure full and equal use of all parts of the combustion-chamber and heating-surface. To provide for such control, I employ two or more stacks P P' P², so located as to communicate directly with different parts of the combustion-chamber J and each preferably provided with a regulating-damper Q and lever Q', by means of which the operator may so control the amount and direction of the draft through the fuel and of the products of combustion as to readily maintain a uniform fire and a practically uniform degree of heat throughout the combustion-chamber. The damper Q, as shown, is suspended by a central hanger q from the inner end of the lever Q', the outer end of which is readily controlled by the operator. The stacks are carried through the water-space above the crown-sheet by means of a flanged cylindrical sheet R, riveted to the inner and outer shells, respectively, as shown, for which a solid spacing-ring may be substituted in smaller boilers. The stack proper may be enlarged in diameter to provide for a fire-brick lining where desired.

The central stack P', as shown, passes up through a steam-dome B', which thus forms an annular superheating-chamber around the stack.

In order to protect the inner end of the damper-operating lever Q' from the destructive action of the upward blast in the stack, I preferably employ a cast-iron guard or shield Q², riveted to the interior wall of the stack and arranged to permit free movement

of the lever, while at the same time serving to deflect the rising gases, and thus prevent the rapid corrosive action to the lever which would otherwise take place.

5 Suitably-located cleaning-holes, as S and S', are provided, as required, with movable covers or plugs, and all requisite parts not indicated may be readily supplied, as usual, but have
10 no bearing upon my invention, which, however, is equally applicable to other forms of boilers than that specifically shown and described. The object and effect of my improvements are to secure in a simple construction the greatest possible benefit from the fuel con-
15 sumed and from the heating-surface and combustion-space provided, thus insuring the greatest practicable economy in first cost of the apparatus, in the floor required, and in the cost of operation.

20 What I claim is—

1. In combination with a boiler having an inner and an outer shell arranged to provide a space or chamber between them, and also having fuel and combustion chambers, said
25 shells having a plurality of pairs of coinciding openings in the tops or crown-sheets thereof; a plurality of dampered stacks, one for each pair of coinciding openings in the shells, projecting from the outer shell, and a spacing
30 ring or cylinder for each of said stacks, each of said rings or cylinders being arranged in the space between the inner and outer shells and at the walls of the coinciding openings thereof and forming a continuation of the con-

tiguous stack, by which the latter has com- 35
munication with the combustion-chamber of the boiler, substantially as described and for the purposes set forth.

2. In combination with a boiler, having an inner and an outer shell arranged to provide 40
a space or chamber between them, said shells having a plurality of pairs of coinciding openings in the tops or crown-sheets thereof and said boiler having fuel and combustion cham- 45
bers; a plurality of separate stacks communicating independently of each other with different portions of said combustion-chamber, a spacing ring or cylinder for each of
said stacks, each of said rings or cylinders being arranged in the space between the in- 50
ner and outer shell and at the walls of the coinciding openings thereof and forming a continuation of its stack, by which the latter has communication with the combustion-
chamber of the boiler, a steam-dome forming 55
a superheating-chamber around one of the stacks, dampers for the stacks, a pivoted operating-lever for each damper, and a shield
for each damper, rigidly fixed to the inner 60
wall of the stack and protecting the inner portion of said operating-lever, substantially as described and for the purposes set forth.

Signed by me at Reading, Pennsylvania, this
15th day of January, 1900.

JOSEPH LEIGHTHAM.

Witnesses:

HENRY L. WICKEL,
WOOD M. SCHWARTZ, Jr.