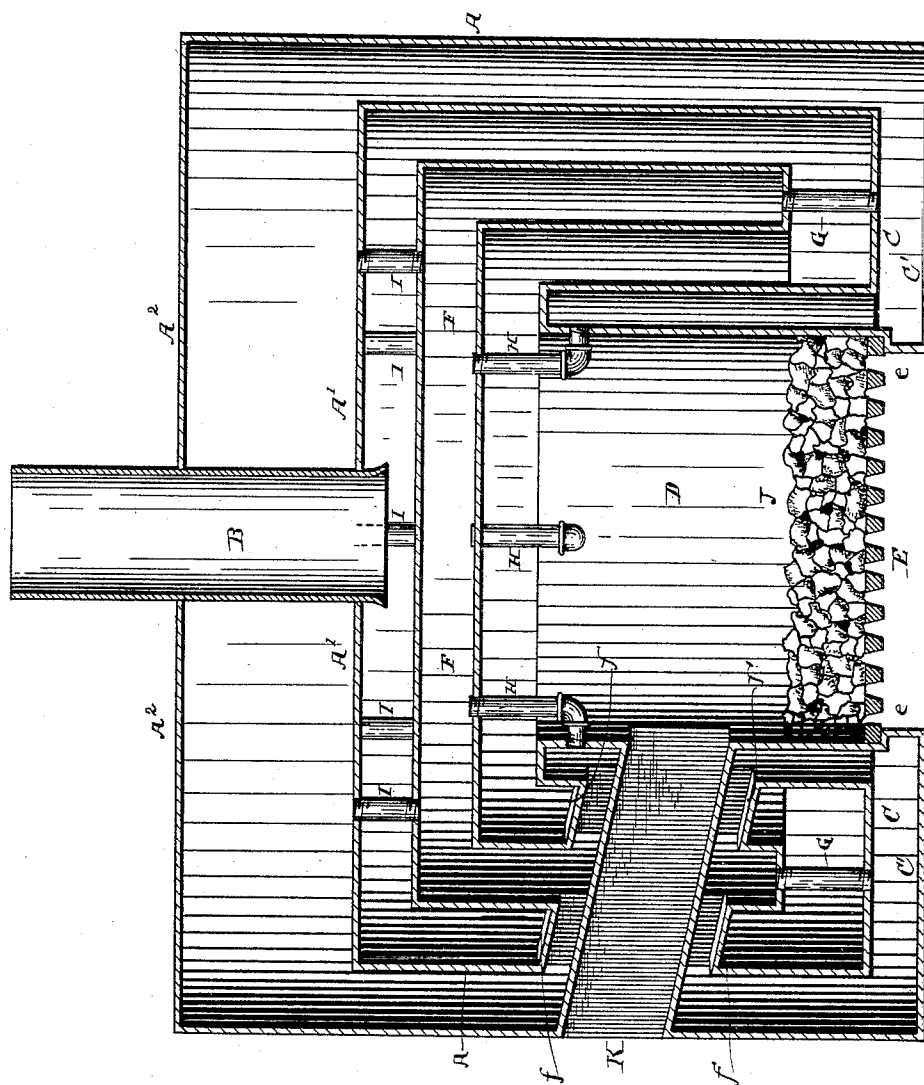


(No Model.)

L. PARDEE.
HEATING BOILER.

No. 460,158.

Patented Sept. 29, 1891.



Witnesses.

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UNITED STATES PATENT OFFICE.

LUTHER PARDEE, OF CUYAHOGA FALLS, OHIO.

HEATING-BOILER.

SPECIFICATION forming part of Letters Patent No. 460,158, dated September 29, 1891.

Application filed January 15, 1891. Serial No. 377,794 (No model.)

To all whom it may concern:

Be it known that I, LUTHER PARDEE, a citizen of the United States, residing at Cuyahoga Falls, in the county of Summit and State of Ohio, have invented a certain new and useful Improvement in Heating-Boilers, of which the following is a specification.

My invention bears special relation to improvements in boilers for heating purposes, but may be applied to any class of steam-making boilers.

The objects of my invention are primarily to produce a new, simple, and effective boiler, and as incident thereto to present increased heating-surface to the product of combustion, by means of a series of concentric hollow shells with intervening alternating spaces, so as to secure a maximum of heat from such products and to obtain additional heating-surface and circulation of the water between such concentric shells by connecting-tubes passing across the intervening spaces.

To the aforesaid objects my invention consists in the peculiar and novel construction, combination, and arrangement of parts hereinafter described, and then specifically pointed out in the claims, reference being had to the accompanying drawing, forming a part of this specification.

In the accompanying drawing the single figure shown is a central vertical section of my improved heating-boiler through the firing-spout.

Referring to this drawing, A is a cylindrical hollow case, made of sufficiently strong sheet metal to resist the strain to which it is to be subjected, consisting of two concentric shells, the inner shorter than the outer, provided with inner and outer upper heads A' A², which close the upper ends of the inner and outer shells, respectively, and through the centers of which are orifices which register vertically, and in which is placed an uptake-flue B, the ends of which extend below and above the heads A' A², respectively, and its points of union with which are secured by steam-tight joints of any preferred style. From the lower edges of the inner and outer shells of the case A extend annular heads C C', the former less in external diameter and greater in internal diameter than the

latter. The inner edges of these annular heads unite with lower ends of an inner hollow cylindrical case D, the upper ends of the two being closed by an annular head. This case D is concentric with the case A and constitutes the fire-pot and combustion-chamber, its lower inner edge being provided with a ledge, as e, or other suitable support for the grate E.

Interposed between the cases A D, both vertically and laterally, and disposed annularly thereto, is an inverted-cup-shaped hollow case F, constructed of the same material as the other cases, extending nearly to the annular head C, leaving a smoke-flue between. This case is supported in position by tubes G H I, which unite it with the annular hollow base, the inner case D, and the upper chamber of the case A, respectively. By this arrangement complete circulation is secured throughout the different cases, and the water passing through the tubes is submitted to the heat from the products of combustion as they pass from the fire to the uptake-flue, as hereinafter described. Through these cases A F D at one side is a feeding-spout K, through which the fuel J is fed to the grate E, which in operation will be closed with a door, (not deemed necessary to show,) about which is a water-jacket constructed by means of partitions f.

In operation the products of combustion arising from the fire pass up over the edge of the chamber D, then down between it and the chamber F, under the lower edge of the latter and up between it and the case A to the uptake-flue B, by which the water in the different cases is subjected in a thin body to the heat.

It is obvious that additional cases may be added in the same general form of construction, but ordinarily the number shown will be found sufficient.

I claim—

1. In a boiler, the combination, with a hollow inverted-cup-shaped cylindrical case having an uptake-flue passing through its top, a central hollow cylindrical case to constitute a fire-box and a combustion-chamber, and united at the bottom with the interior of the outer case by an annular hollow ring, a hol-

low inverted-cup-shaped case interposed between the outer and inner cases, with its bottom above their point of union, leaving a smoke-flue between and united therewith by
5 tubes passing across the intervening spaces, substantially as shown and described.

2. The combination, with the cases A F D and feeding-spout K, of a water-jacket surrounding said spout and uniting the interior

of said cases, substantially as shown and described.

In testimony that I claim the above I hereunto set my hand.

LUTHER PARDEE.

In presence of—

C. E. HUMPHREY,

C. P. HUMPHREY.