

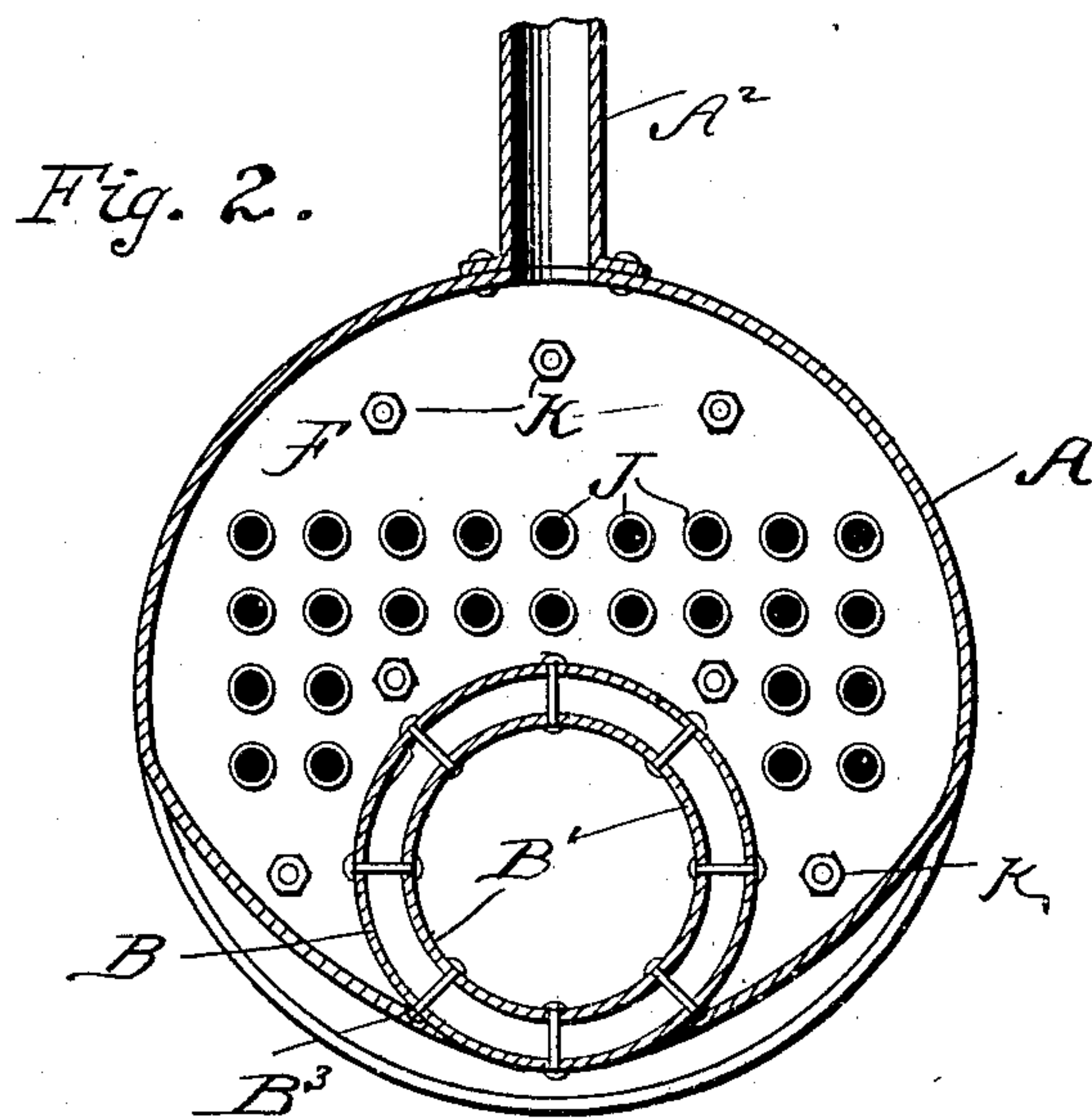
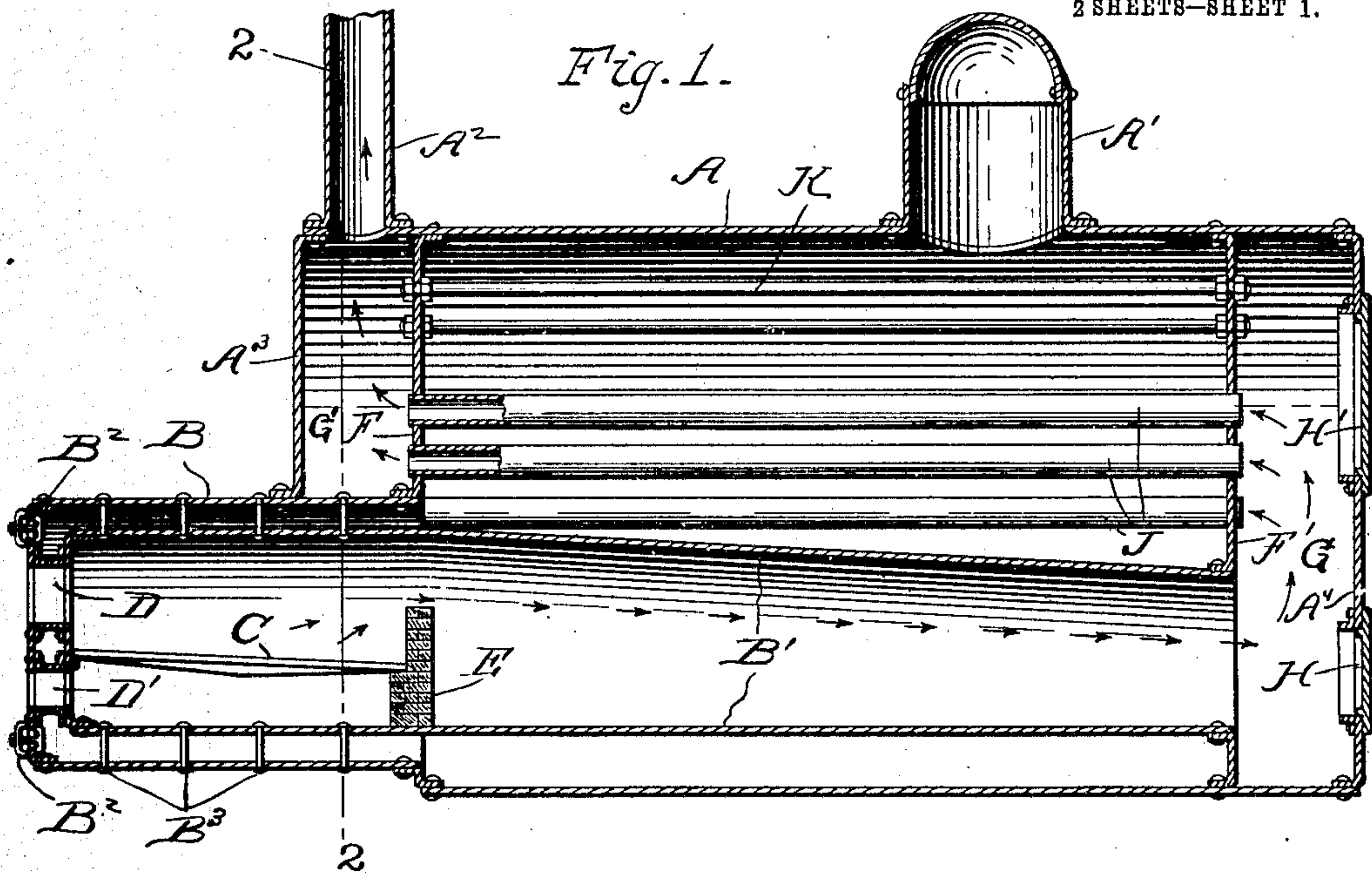
No. 860,538.

PATENTED JULY 16, 1907.

P. C. FORGARD.
STEAM BOILER.

APPLICATION FILED JAN. 30, 1905.

2 SHEETS—SHEET 1.



Witnesses
Ernest Puleford.
Edgar B. McBath.

Inventor
Peter C. Forgard,
By *Oliver & Brock*
Attorneys

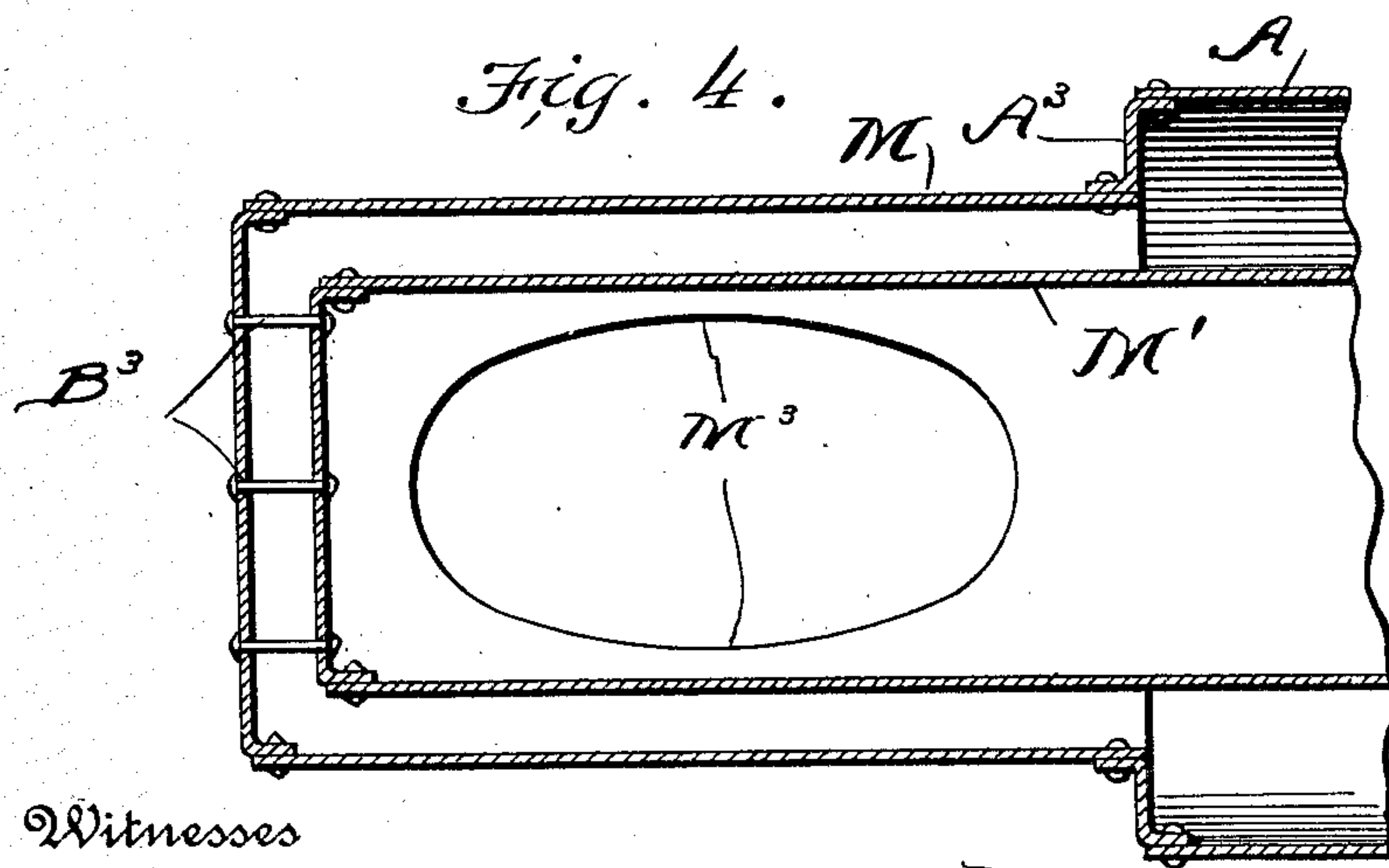
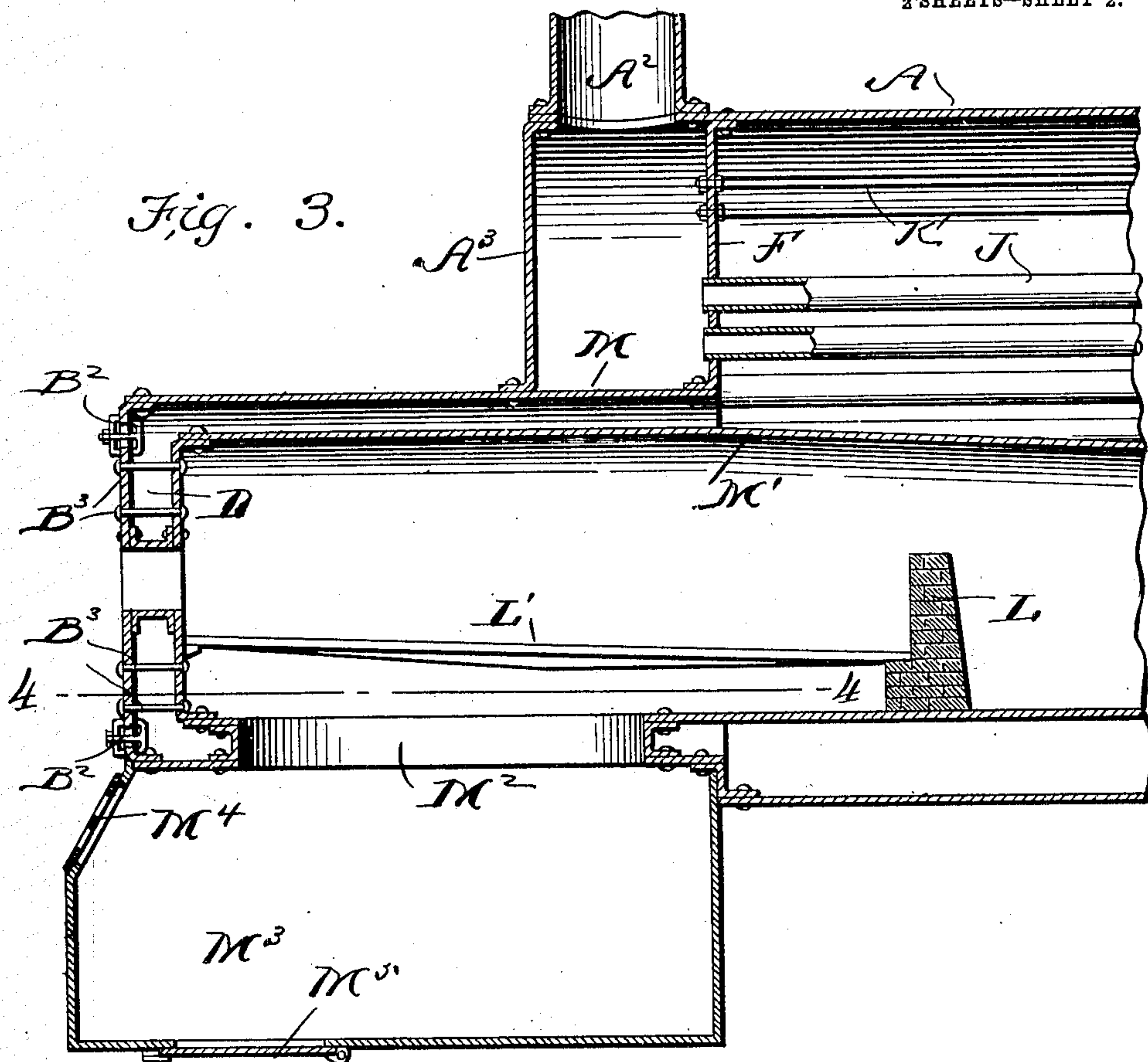
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Witnesses
Emmet P. Ford
E. B. McBeth

Inventor
Peter C. Forgard,
By *Wm. A. Brock*
Attorneys

UNITED STATES PATENT OFFICE.

PETER C. FORGARD, OF LAKE PRESTON, SOUTH DAKOTA.

STEAM-BOILER.

No. 860,538.

Specification of Letters Patent.

Patented July 16, 1907.

Application filed January 30, 1905. Serial No. 243,353.

To all whom it may concern:

Be it known that I, PETER C. FORGARD, a citizen of the United States, residing at Lake Preston, in the county of Kingsbury and the State of South Dakota, have invented a new and useful Improvement in Steam-Boilers, of which the following is a specification.

This invention relates to tubular steam boilers, of either stationary or portable type, and I have illustrated the same as a stationary boiler.

The object of the invention is to obtain as far as possible the full value in heat units of the fuel burned, and to make the boiler as efficient and durable as possible.

The invention consists in the novel features of construction and combination of parts hereinafter described, particularly pointed out in the claims and shown in the accompanying drawings in which:—

Figure 1 is a vertical, longitudinal section through the boiler. Fig. 2 is a section on the line 2—2 of Fig. 1. Fig. 3 is a vertical longitudinal section through a portion of the boiler and through an ash box showing a slight modification. Fig. 4 is a section on the line 4—4 of Fig. 3.

In these drawings A represents the outer shell of a tubular boiler having a steam dome A', and a smoke stack A². This smoke stack will be arranged at what will be termed the rear end of the boiler. The outer end A³ of the smoke box has an annular opening formed therein adjacent the base or lower portion of the boiler, and in this opening is fitted a water jacket comprised of two concentric cylinders B and B'. Both of these cylinders have flanges or heads at their outer ends and in the end or head portion of the cylinder B are formed hand holes B². The space between the cylinders B and B' forms a water jacket which projects rearwardly beyond the head A³ of the smoke box, and extends inwardly to a rear flue sheet F, to which the inner end of the cylinder B is riveted, or otherwise secured. The cylinders B and B' are braced by suitable stay bolts B³. The rear flue plate F is cut out to aline with the opening formed in the end plate A³, and the cylinder B' passes through this cut out portion and is continued to the front flue plate F'. Within the shell B', and in vertical alinement with the flue sheet F, is a bridge wall E which supports a fire grate C. At the outer, rear ends of the cylinders B and B' is placed a door D through which fuel can be introduced into the furnace, which is formed by the rear portion of the cylinder B'. An ash pit door D' is placed immediately below the furnace door D, and in the form shown in Figs. 1 and 2 the ash pit is also within the cylinder B'. In advance of the bridge wall E the cylinder B' loses

its true cylindrical shape being gradually reduced in height by the lowering of its upper wall, and this cylinder B' will be for convenience termed the inner shell, to distinguish it from the cylinder B. The shell B' in advance of the bridge wall E therefore forms a combustion chamber with a downwardly and forwardly sloping roof, and the shell B' communicates at its forward end, through an opening in the front flue sheet F', with a supplement, front combustion chamber G. Tubular fire tubes are supported by the flue sheets F and F' and these tubes J may be expanded or otherwise secured in place in the flue sheets F and F'. While the fire tubes J are shown horizontal it is obvious that they may be inclined in either direction if desired. These fire tubes or flues give the boiler the character of a return flue boiler and afford free communication between the combustion chamber G at the front of the boiler and a smoke chamber G' at the rear end of the boiler and which opens upwardly into a stack A². The flue sheets F and F' are braced by suitable brace rods K.

In Figs. 3 and 4 I have illustrated a modification in the construction of the ash pit. I have also shown some slight changes in the construction of the boiler, a portion of the stays B³ being omitted, those used being placed at the rear end of the inner and outer shells instead of at the sides. In the modified construction I place the bridge wall L further forward than the bridge wall E thus gaining greater length of grate bars L', and the inner and outer shells M and M' are cut out as shown at M² and the ash pit M³ is arranged below the boiler and is provided with dampers M⁴ and a trap door M⁵, in the bottom of the pit, through which the ashes may be removed. A man hole H is provided at the front of the boiler and a suitable door H' is also provided at the front to permit ready cleaning of the fire tubes or flues J.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent is:—

The combination with a boiler having a combustion chamber at one end and a smoke chamber at the opposite end, of a shell extending outwardly beyond the smoke chamber and inwardly to and communicating with the combustion chamber, a bridge wall and grate arranged in the outwardly extending end portion of the shell, and a plurality of fire tubes connecting the combustion chamber and the smoke chamber.

PETER C. FORGARD.

Witnesses:

VICTOR L. POWER,
HARRY DE CHAMBEREDER.