No. 763,359. PATENTED JUNE 28, 1904.

S. T. J. BRAY.

STEAM BOILER.

APPLICATION FILED JAN. 28, 1904.

NO MODEL. 3 SHEETS—SHEET 1.

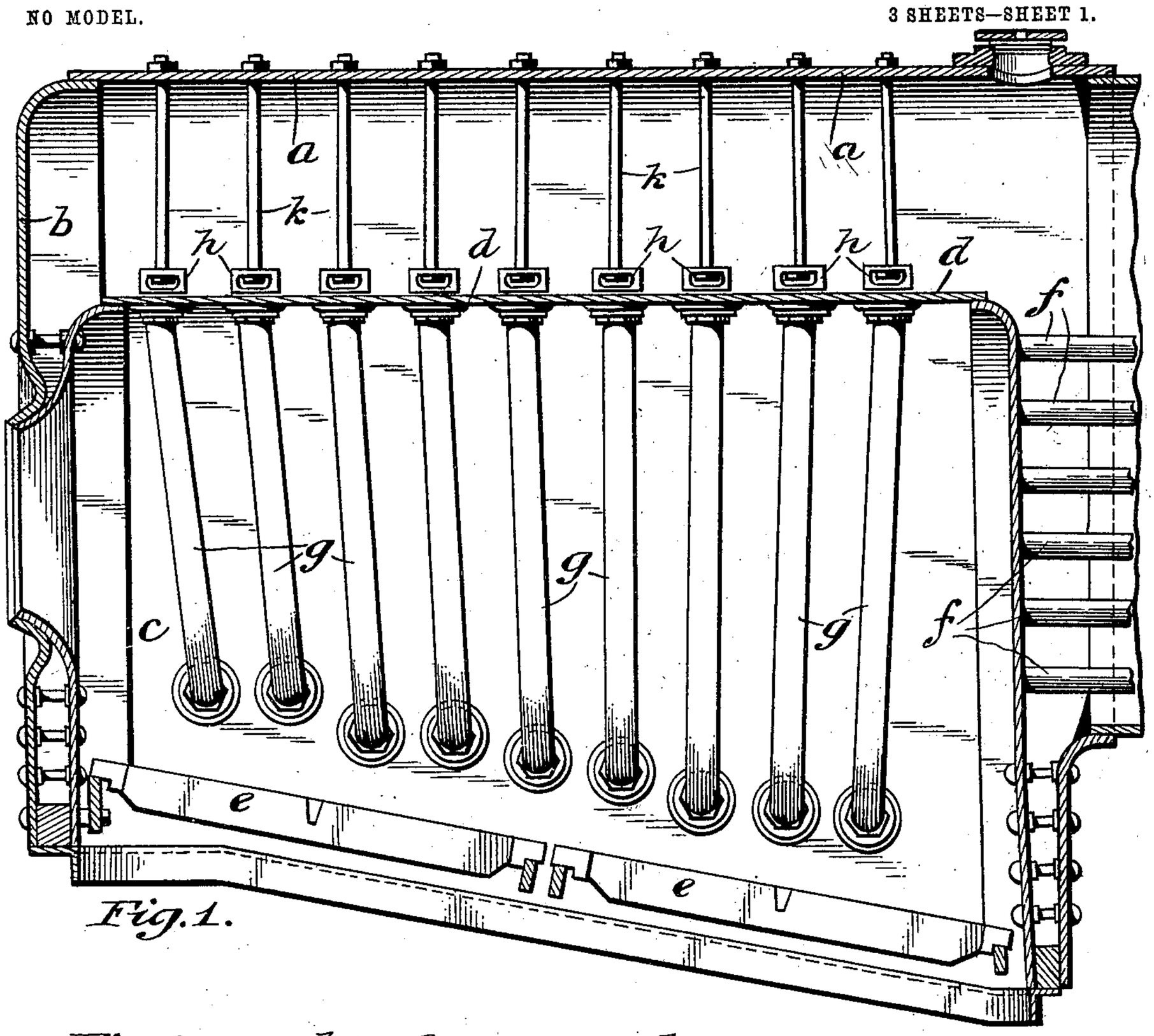
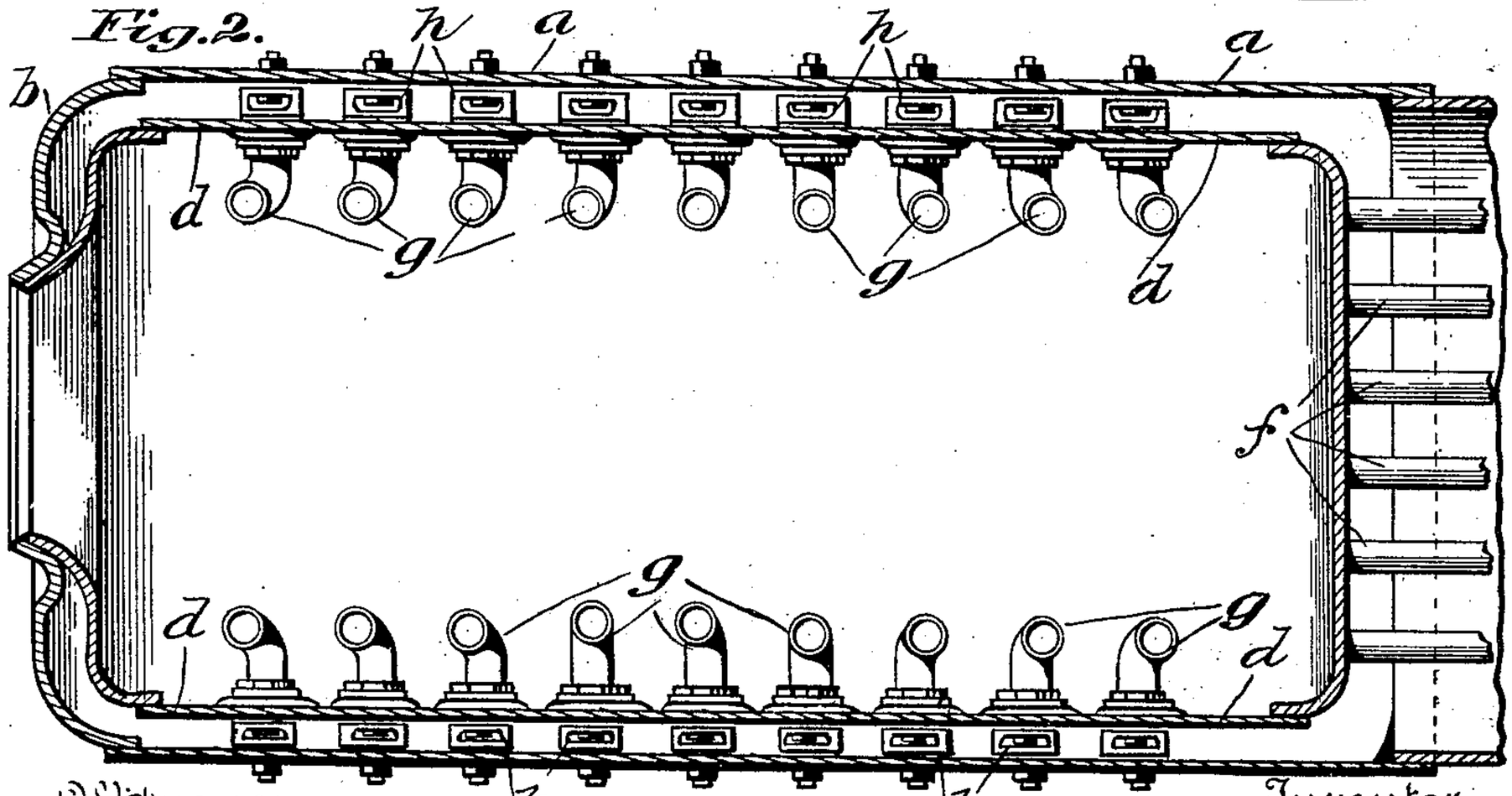


Fig. 1.

Fig. 2.



Witnesses
C. Mitchell
F. P. Wentworth

Inventor
Stephen Thomas James Bray
By his Attorney
N. L. Frothingham

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3.

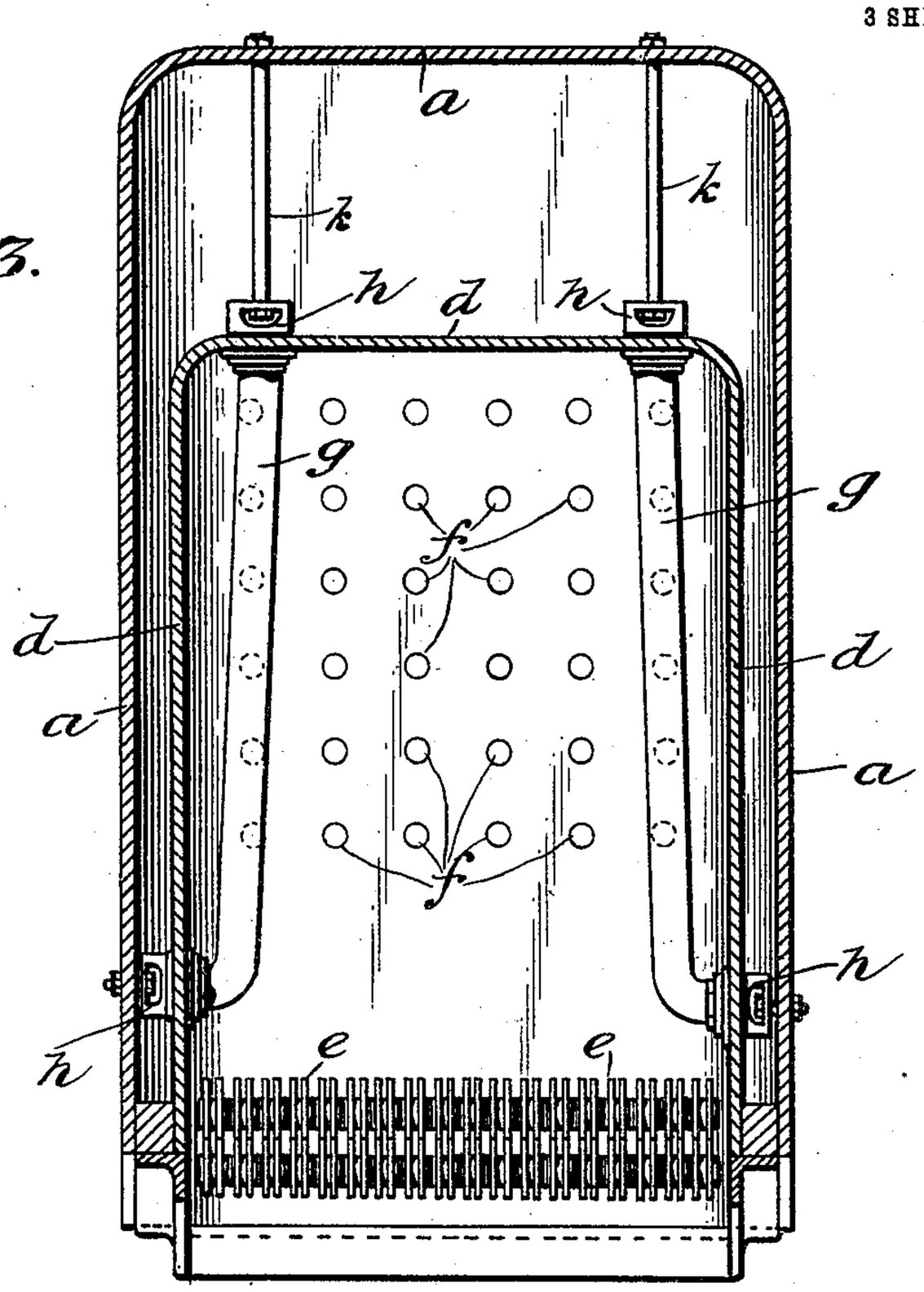
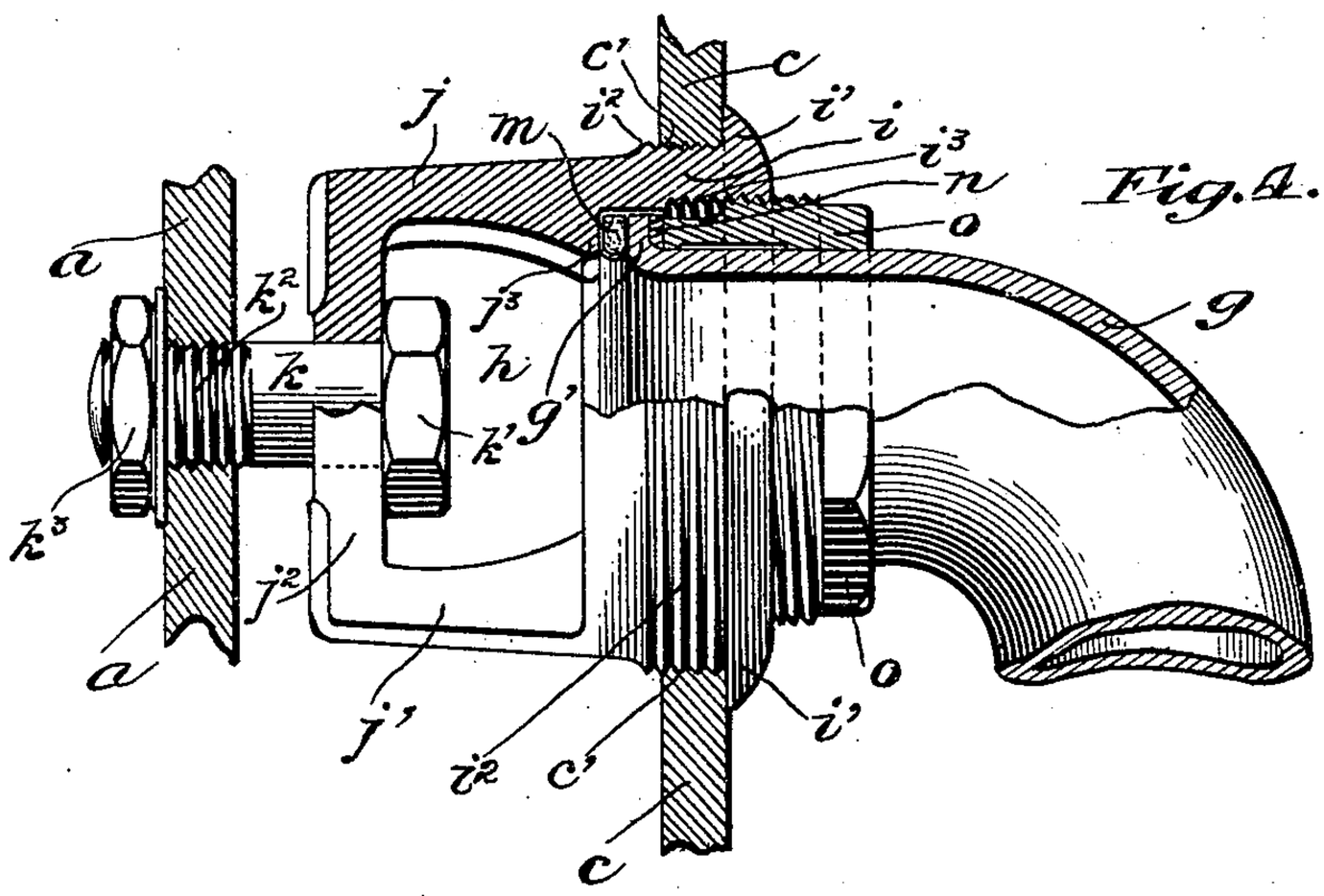


Fig. 4.



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 6.

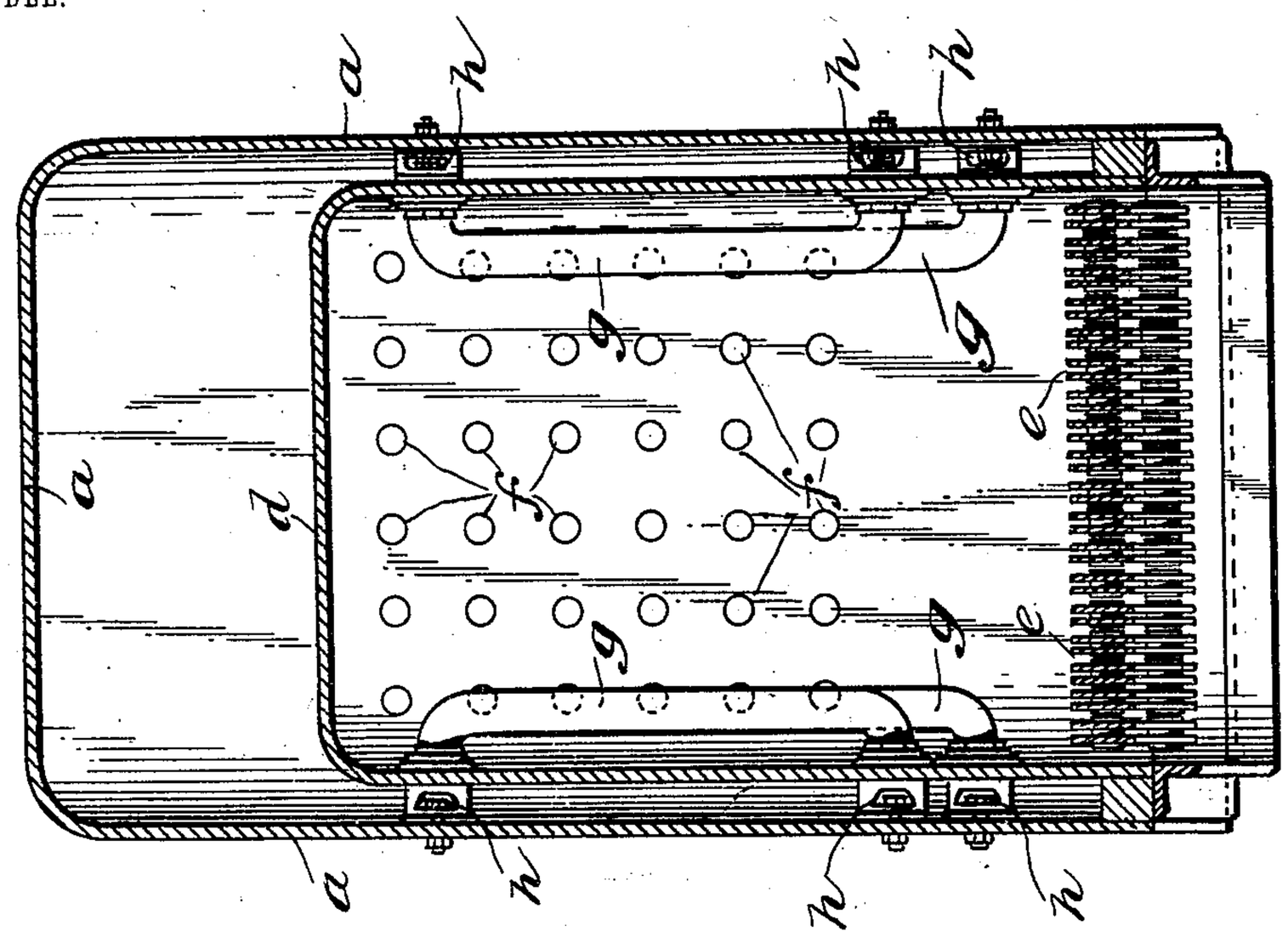

Fig. 5.

Witnesses
C. Mitchell.
F. P. Wentworth

Inventor
Stephen Thomas James Bray
By his Attorney
N. L. Frothingham

No. 763,359. Patented June 28, 1904.

UNITED STATES PATENT OFFICE.

STEPHEN THOMAS JAMES BRAY, OF MOSCOW, RUSSIA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 763,359, dated June 28, 1904.

Application filed January 28, 1904. Serial No. 190,964. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN THOMAS JAMES BRAY, a subject of the King of the United Kingdom of Great Britain and Ireland, residing at Moscow, Russia, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification, reference being had therein to the accompanying drawings, which form a part thereof.

My invention relates to steam-boilers, and more particularly to a class of fire-tube boilers provided with auxiliary circulating water-pipes situated within the fire-box.

The object of the invention is to provide a boiler of this type wherein the auxiliary circulating water-pipes may be attached in relation to the fire-box walls or the crown-sheet thereof by means of a joint which is simple and durable, and thus reduce the expense of assembling and the cost of repairs.

A further object is to provide a suitable joint of this character which will permit the individual pipes to be attached to or detached from the fire-box walls or crown-sheet without requiring any material alteration therein or the destruction of any parts of said joint.

A still further object is to provide a joint which is capable of speedy application to a boiler and yet will act as a stay to strengthen the walls and crown-sheet of the fire-box, and thus increase the durability of the entire structure without obstructing or interfering in any way with the fire-tubes of the boiler.

The invention consists in the novel features of construction hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

Referring to the drawings, Figure 1 is a sectional elevation (side) of a fire-box, showing the joint as applied to auxiliary water-circulating pipes discharging through the crown-sheet. Fig. 2 is a sectional plan view showing said joint so applied to such pipes discharging through the side walls of the fire-box. Fig. 3 is a view on the line 3 3, Fig. 1. Fig. 4 is an enlarged view of one end of one of the pipes, showing the joint applied thereto, said joint being partly in section and partly in elevation; and Figs. 5 and 6 are views of different types of boilers embodying the invention.

Like letters refer to like parts throughout the several views.

In the drawings I have shown the invention as applied to several types of locomotive-boilers employing auxiliary circulating water-pipes, in all of which views *a* indicates the outer shell of the boiler; *b*, the front wall of the fire-box; *c*, the side walls, and *d* the crown-sheet thereof. *e* indicates the fire-grate; *f*, the fire-tubes, and *g* the auxiliary circulating water-pipes. The general arrangement and construction of these parts are well known in this art, the subject-matter of the present invention relating more particularly to the means of attaching or securing the pipes *f* in relation to the fire-box walls and the crown-sheet. It has been the practice heretofore to secure these pipes in position by means of bolts passing through an enlarged flange on each pipe and said walls or sheet, a construction which required considerable nicety in the relative dimensions of the pipe-flanges and side walls. There was also considerable difficulty in securing permanent tight fits at the points of joinder. In the present application this joinder of parts is accomplished by means of a joint *h*, the details of which and its manner of application will appear hereinafter. The joint *h* comprises a hollow plug *i*, having a flange i' adapted to butt against the inside of the wall or crown-sheet of the fire-box, and is secured in relation thereto by means of screw-threads i^2, meshing with threads c', tapped in the periphery of an opening formed in said wall or sheet. The plug *i* is provided with interior screw-threads i^3.

Carried by the plug *i* and extending into the water-space is what I term a "nest" *j*, consisting of a plurality of arms j', united in a cap-plate j^2 opposite the opening in said plug and presenting adjacent to the side wall or crown-sheet a seat, as j^3. The space between said arms and said cap-plate serves as a suitable discharge-opening, establishing communication between each pipe and the

a rigid connection between said plug and the boiler-shell comprising a nest formed of a plurality of arms carried by said plug and a cap-plate, a bolt passing through said cap-plate, screw-threaded connections between said bolt and the boiler-shell and a check-nut on the free end of said bolt.

5. In a steam-boiler, the combination with an auxiliary circulating water-pipe having a flanged end of an exteriorly and interiorly screw-threaded plug adapted to be fitted in and to an opening in the fire-box wall or crown-sheet, a nest comprising a plurality of arms presenting a seat adjacent to said plug, a packing-ring seated on said seat and a jam-nut surrounding said pipe coöperating with said interior screw-threads on said plug and acting on the flanged end of said pipe.

6. In a steam-boiler, the combination with an auxiliary circulating water-pipe having a flanged end of an exteriorly and interiorly screw-threaded plug adapted to be fitted in and to an opening in the fire-box wall or crown-sheet, a nest comprising a plurality of arms presenting a seat adjacent to said plug, a packing-ring seated on said seat and a jam-nut surrounding said pipe coöperating with said interior screw-threads on said plug and acting on the flanged end of said pipe, and a rigid connection between said nest and the boiler-shell.

7. In a steam-boiler, the combination with an auxiliary circulating water-pipe having a flanged end of an exteriorly and interiorly screw-threaded plug having an outwardly-projected flange adapted to be fitted in and to an opening in the fire-box wall or crown-sheet, a rigid connection between said plug and the boiler-shell comprising a nest formed of a plurality of arms carried by said plug and a cap-plate, a bolt passing through said cap-plate, screw-threaded connections between said bolt and the boiler-shell and a check-nut on the free end of said bolt, said arms presenting a seat adjacent to said plug, a packing-ring seated on said seat and a jam-nut surrounding said pipe coöperating with said interior screw-threads on said plug and acting on the flanged end of said pipe.

In witness whereof I have hereunto affixed my signature, this 20th day of November, 1903, in the presence of two witnesses.

STEPHEN THOMAS JAMES BRAY.

Witnesses:

HENRY GILBERT,

NICOLAS BORISSOFF.