

No. 777,594.

PATENTED DEC. 13, 1904.

F. BURGER & H. M. WILLIAMS.

STEAM SUPERHEATER.

APPLICATION FILED APR. 3, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

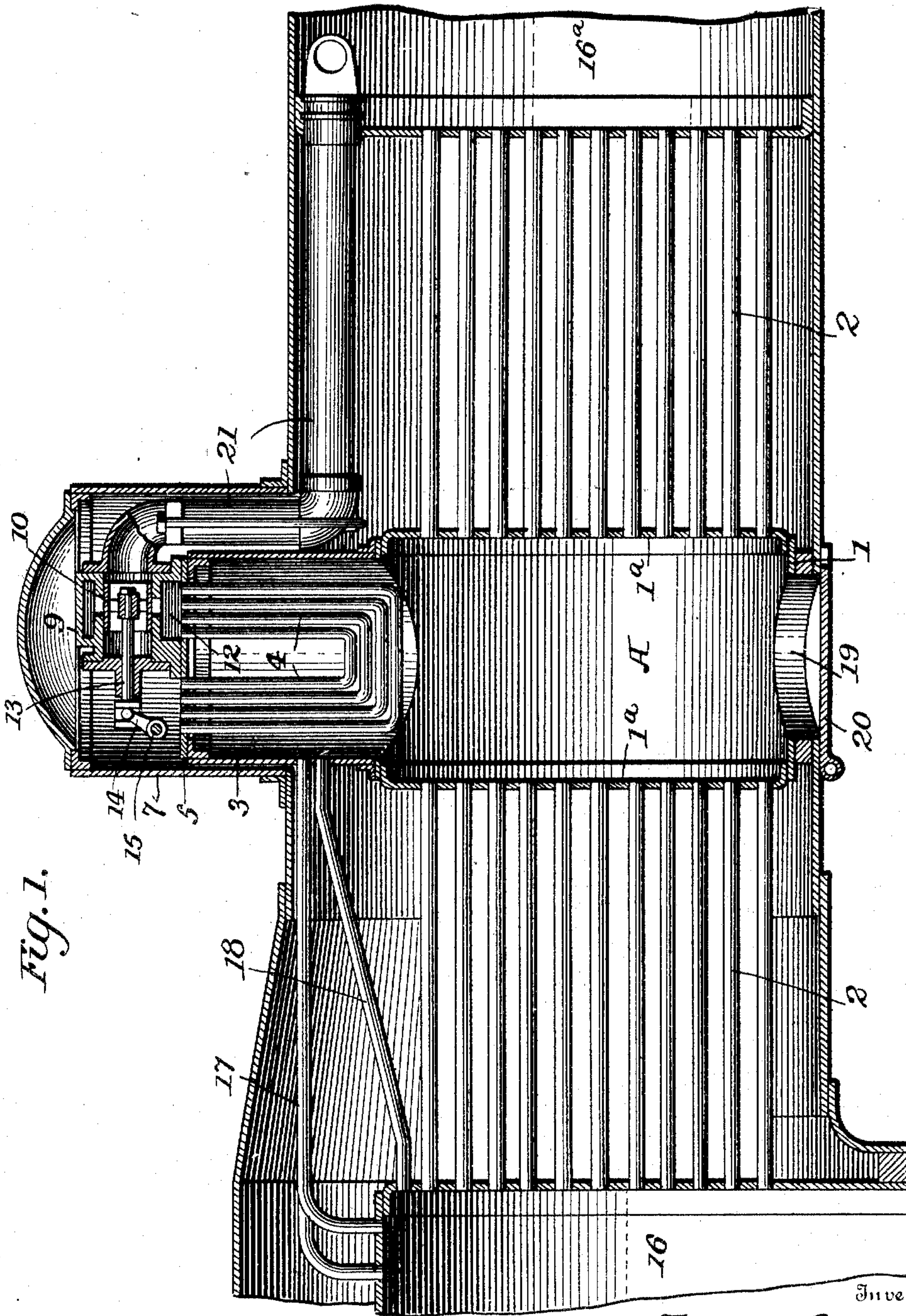


Fig. 1.

Witnesses

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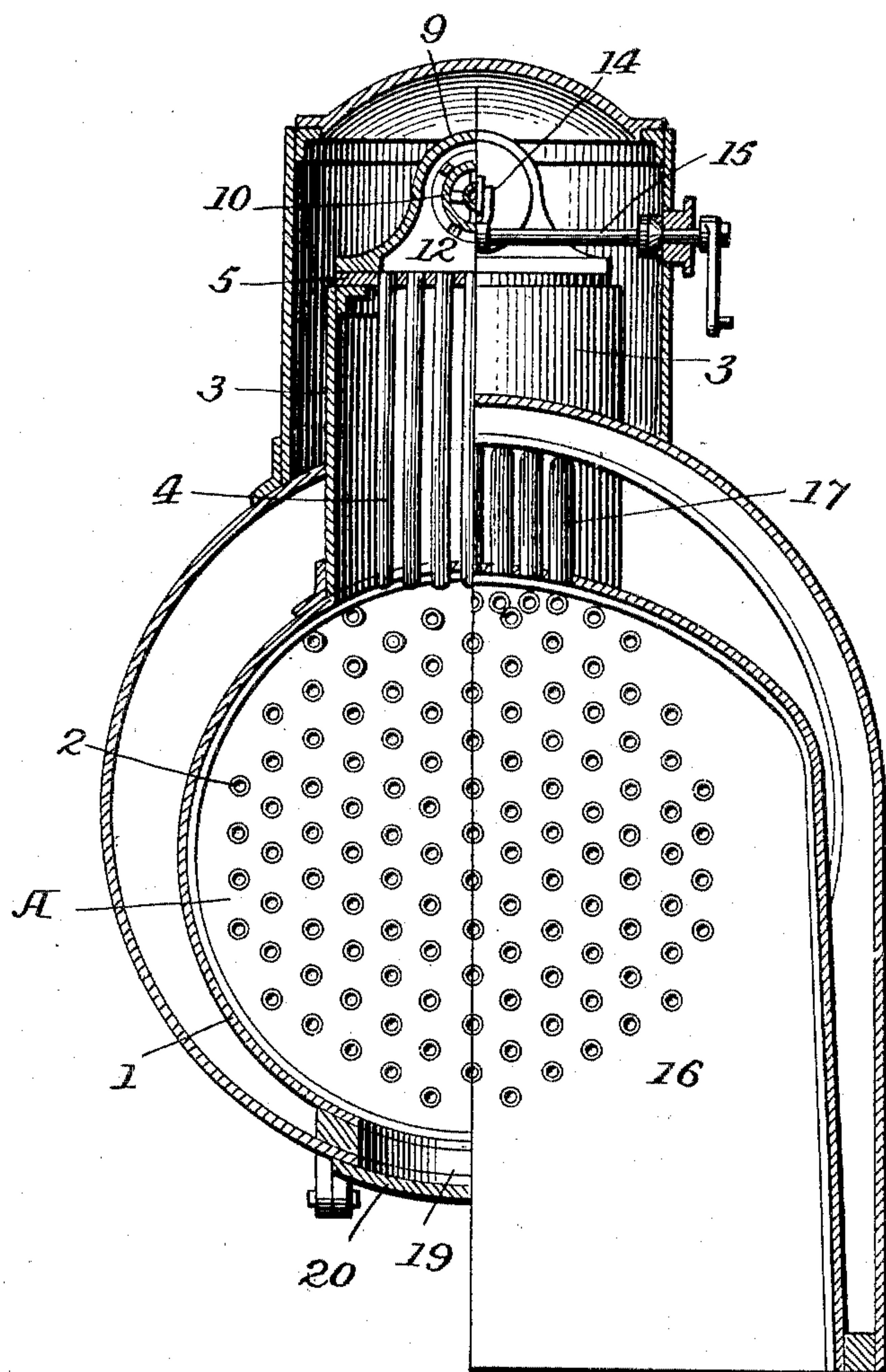
STEAM SUPERHEATER.

APPLICATION FILED APR. 3, 1902.

NO MODEL.

2 SHEETS—SHEET 2.

Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

FRANZ BURGER AND HENRY M. WILLIAMS, OF FORT WAYNE, INDIANA;
SAID BURGER ASSIGNOR OF ONE-HALF OF HIS RIGHT TO SAID WILLIAMS.

STEAM-SUPERHEATER.

SPECIFICATION forming part of Letters Patent No. 777,594, dated December 13, 1904.

Application filed April 3, 1902. Serial No. 101,229. (No model.)

To all whom it may concern:

Be it known that we, FRANZ BURGER and HENRY M. WILLIAMS, citizens of the United States, residing at Fort Wayne, Allen county, State of Indiana, have invented certain new and useful Improvements in Steam-Superheaters for Locomotive-Boilers, of which the following is a specification.

This invention relates to steam-superheaters for steam-boilers, its object being to provide means whereby the products of combustion generated in the furnace may be utilized to superheat the steam.

The invention will be fully described hereinafter, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional side elevation of a portion of a boiler embodying our present invention. Fig. 2 is a vertical transverse sectional view taken on three planes, the right-hand half being partly through the fire-box and partly through the steam-dome and the left-hand half being through the steam-dome, superheating-chamber, and secondary combustion-chamber.

As illustrated, our invention is applied to a fire-tube locomotive-boiler; but the use of the invention is not limited to such boilers, nor is its embodiment limited to the details of construction and arrangement illustrated and about to be described; and the invention consists, broadly, in providing a superheater within the boiler and subjecting it to the heating action of the products of combustion at a point between the fire-box and the smoke-box.

The fire-box is indicated by 16 and the smoke-box by 16^a. Between these boxes, and preferably about midway between them, a secondary combustion-chamber A is provided. This chamber is formed of a short cylinder 1, of less diameter than the interior of the boiler, so that the water can circulate freely around it, and the cylinder is provided at each end with a head 1^a, such heads forming supports for one end of fire-tubes 2, the other end of such tubes being supported in the tube-sheets of the fire-box and smoke-box, as usual.

At the upper side of the chamber A is a superheating-dome 3, communicating with the

chamber and extending up into the steam-dome 7 of the boiler. The dome 3 is provided with a steam-tight cover 5, which forms a support for a series of U-shaped superheating-tubes 4, the ends of such tubes being expanded in the cover in the usual manner. At one end these tubes 4 communicate with the steam-space of the dome, and at the other end they communicate with a chamber 12 in the casing 9 of the throttle-valve 10. This casing is supported upon the cover 5, and the pipe 21 leads from the casing to the place where the steam is to be employed.

The valve 10, which controls communication between the chamber 12 and pipe 21, is provided with a rod 13, to which is connected the lever-arm 14, fastened to a rocking shaft 15, which passes through a suitable stuffing-box to the outside of the dome 7 and is provided with suitable operating devices by means of which the movement of the valve 10 is controlled.

The hot gases from the furnace 16 will pass through the tubes 2 into the chamber A, where they will expand and fill such chamber and the dome 3, thereby heating the dome and the tubes 4. As the dome 3 extends into the steam-space of the boiler, it will superheat the steam, and as the steam must pass through the tubes 4 to the pipe 21 it will be still further superheated in its passage through the tubes 4.

Sometimes it may be desirable to convey hot gases from the furnace direct to the dome 3 in order to increase the heat in the dome, and we therefore provide a series of pipes 17 leading from the crown-sheet of the boiler directly to the superheating-dome 3 and another series of pipes 18 leading from the upper portion of the tube-sheet in the furnace to the dome 3. These pipes 17 and 18 pass through the water and steam spaces of the boiler, and as the hottest gases are at the top of the furnace such gases on their passage through the pipes 17 and 18 will impart some of their heat to the water and steam, but will still be hotter when delivered into the dome 3 than the gases which pass into the chamber A and thence to the dome.

The chamber A is provided at its lower side

with an opening 19, which allows access to the interior for cleaning or repairs and also affords an outlet for cinders and dust which may accumulate in said chamber. The opening is closed by a movable door 20.

Having described our invention, we claim—

1. The combination with a fire-tube boiler, and its furnace and smoke-box, of a chamber within the boiler between the furnace and the smoke-box with which the fire-tubes communicate, a superheating-dome communicating with and extending from said chamber into the steam-space of the boiler, pipes leading from the upper part of the furnace to the dome, and superheating-pipes communicating with the steam-space and supported within the dome, substantially as set forth.

2. The combination with a fire-tube boiler, its furnace and smoke-box, of a chamber within the boiler between the furnace and the smoke-box with which the fire-tubes communicate, a superheating-dome communicating with and extending from said chamber into the steam-space of the boiler, and pipes lead-

ing from the upper portion of the furnace to the superheating-dome substantially as set forth.

3. The combination with a fire-tube boiler, its furnace and smoke-box, of a chamber within the boiler between the furnace and the smoke-box with which the fire-tubes communicate, a superheating-dome communicating with and extending from said chamber into the steam-space of the boiler, steam circulating and superheating pipes supported within the dome and communicating at one end with the steam-space of the boiler, and pipes leading from the upper portion of the furnace to the superheating-dome, substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

FRANZ BURGER.

HENRY M. WILLIAMS.

Witnesses:

GEO. K. TORRENCE,

C. B. WATERS.