W. BAXTER.
STEAM GENERATOR.

No. 104,820. Patented June 28, 1870.

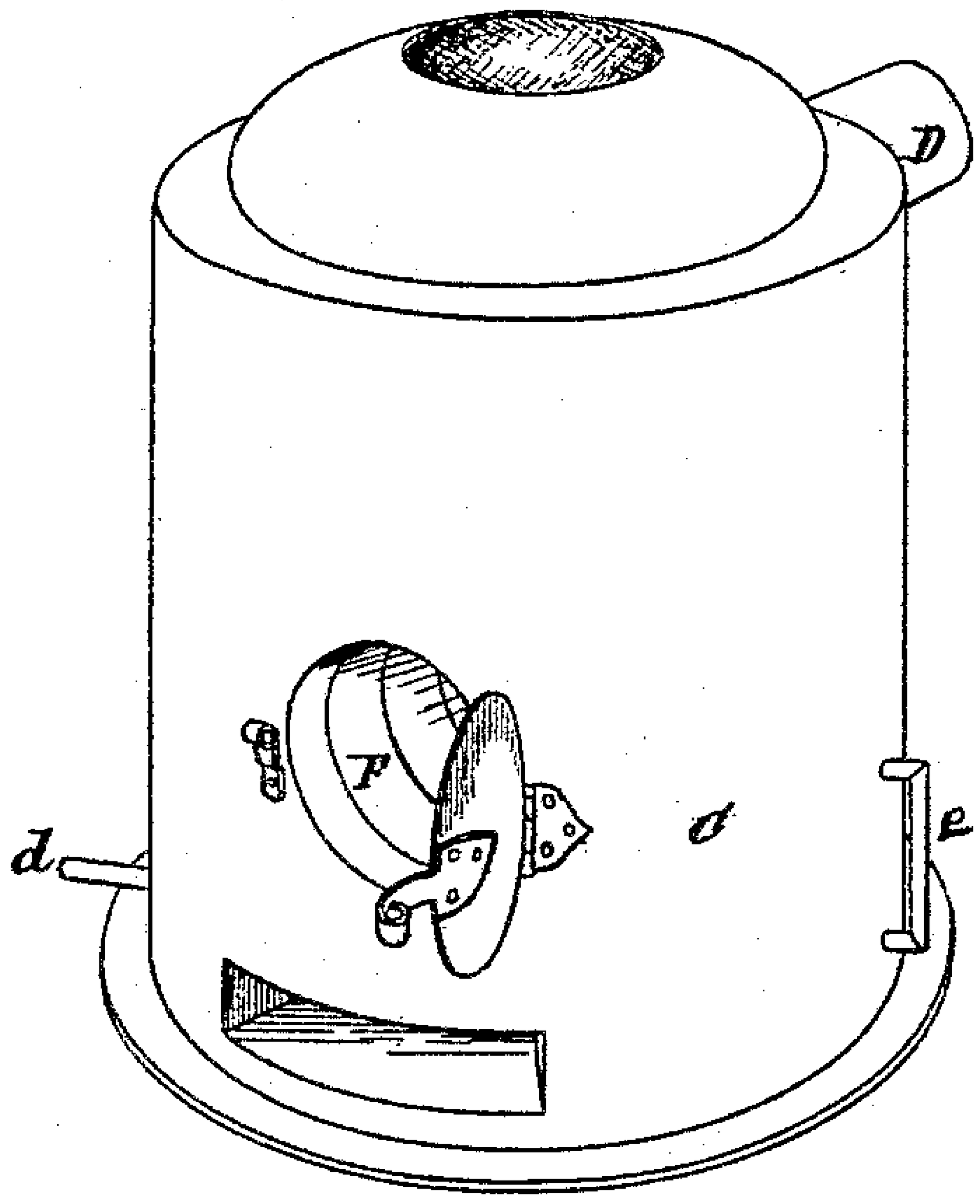
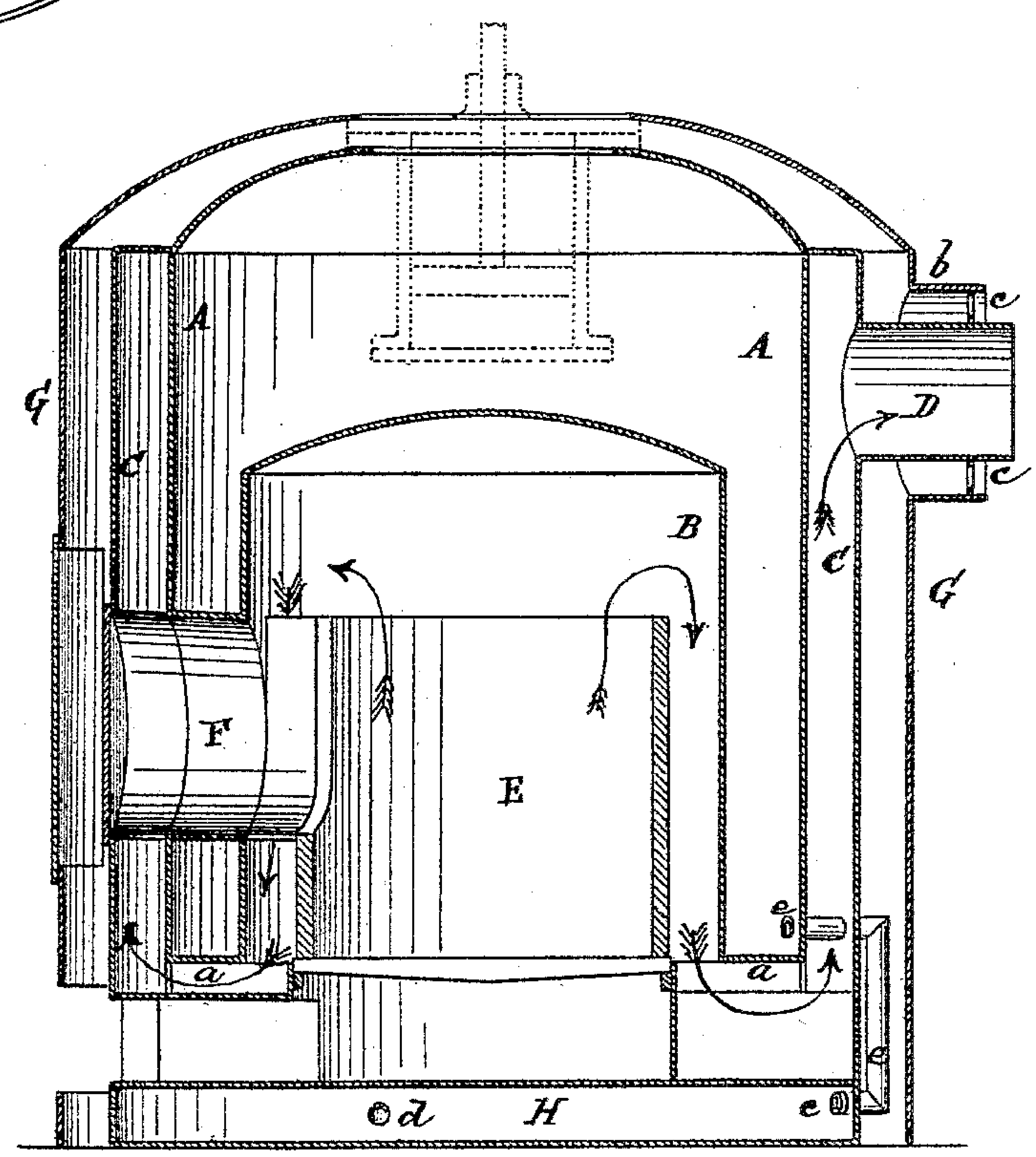


FIG. I.

FIG. 2.



William Baxter
by his attorney
A. Pollok

WITNESSES.
W. Bailey
Wm. H. McCabe

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

United States Patent Office.

, ILLIAM BAXTER, OF NEWARK, NEW JERSEY, ASSIGNOR TO WILLIAM D. RUSSELL AND PETER T. SPEER, OF SAME PLACE.

Letters Patent No. 104,820, *dated June* 28, 1870.

IMPROVEMENT IN STEAM-GENERATORS.

The Schedule referred to in these Letters Patent and making part of the same

To whom it may concern :

Be it known that I, WILLIAM BAXTER, of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification.

The steam-generator I have invented is intended for small power-engines, house-heating purposes, &c., where it is not practicable to use tubular boilers, on account of their being to small too be easily repaired or cleaned out, or where the water may be impure, so that tubes would soon be incrusted.

The boiler I have devised consists of two concentric shells or cylinders, both closed at the top—the outer one of a given height and diameter, the inner one of a smaller diameter and less height, the two being united at their bases by a flange or annulus. The space within the smaller cylinder forms a combustion-chamber, in which the fire-pot or box is placed, and the outer cylinder is surrounded by a jacket or exterior casing, extending up to near the top or dome of the cylinder. The smoke and other products of combustion of the fuel in the fire-pot pass upward into the dome of the inner cylinder or shell of the boiler, thence downward through the annular space between the fire-pot and the shell, thence around the base of the boiler and up through the annular space between the outer cylinder or shell and the casing which surrounds it. Such of the products of combustion as remain unconsumed are carried off by a smoke-pipe inserted in the casing.

I also provide a water bottom for the boiler, located under the grate or fire-pot, so as to protect the floor and utilize whatever heat may be radiated downward, and communicating with the boiler by suitable pipes, so that the water in the water bottom will be under boiler pressure, and will be fed to the boiler according to its needs.

I also combine with the boiler a "summer jacket," or a casing made in two or more parts hinged together, so that it may be easily applied to or removed from the boiler. This outer casing is useful when the boiler is used in warm climates or in occupied rooms in warm weather.

To enable those skilled in the art to understand and use my invention, I will now proceed to describe the manner in which the same is or may be carried into effect, by reference to the accompanying drawing, in which—

Figure 1 is a view of the boiler with the "summer jacket" removed.

Figure 2 is a vertical central section of the boiler with the "summer jacket" applied to it.

A is the outer cylinder or shell of the boiler, closed at the top, so as to form a steam-dome.

B is a cylinder, also closed at the top, and having a less height and diameter than the cylinder A, within which it is placed, so as to leave a water space between the tops and the sides of the two cylinders.

The bottom of the boiler is closed and the bases of the cylinders are connected by the flange or annulas *a*, bolted or riveted to the ends of the cylinders.

The outer cylinder A is surrounded by a shell or casing, C, which is of such diameter as to leave an annular space between it and the boiler-shell A.

With the casing C communicates the smoke-pipe D, in the usual manner.

The boiler structure thus made is placed upon a suitable bed or base, and in the space inclosed by the cylinder B, which constitutes the combustion-chamber, I place a fire-pot and grate, E, of cast-iron, so arranged as to leave an annular space between it and the cylinder. The pot may be lined with fire-brick, if desired, and may be made in one piece, or, if desired, for convenient replacement in case of burning out, in sections, so that it may be passed through the fire-door without removing the boiler from its base.

The fire-door or opening F extends through the cylinders and casing, and opens into the combustion-chamber in the usu alnanner; and the usual ash-pit, openings, &c., are made in the base upon which the boiler is supported.

The course of the flame, smoke, &c., when the boiler is in operation, is represented by the arrows, the final discharge of such of the products of combustion as remain unconsumed taking place through the smoke-pipe D.

The general operation of the boiler is similar to that of the boiler for which Letters Patent were granted to me October 28, 1868, reissued April 20, 1869, although its construction is much simplified. I contemplate using with the present boiler the same arrangement of steam-cylinder described in said Letters Patent, and indicated by dotted lines in fig. 2; but I do not limit myself to such use, as the boiler is adapted to be employed with any engine of ordinary or suitable construction.

I combine with the boiler a "summer jacket," G, which, being composed of two or more sections hinged together, can be put on or taken off whenever desired. It has one or more doors corresponding with the doors of the boiler, and has an opening, *b*, so as to admit of the passage of the smoke-pipe. As above stated, this jacket is useful where it is desired to use the boiler in occupied rooms in warm weather or in warm climates. When the doors are shut, the draught will pass in through perforations *c* around the smoke-pipe, thence around through the annular space between the jacket and boiler-casing, and under the grate to feed the fire, thereby keeping the jacket comparatively cool

and at the same time partially heating the air to aid combustion. Consequently, whatever heat is carried into the fire by this means adds to the power, and prevents the heating of the room.

As shown in fig. 2 of the drawing, and as above stated, the base of the boiler forms a water bottom, for the purpose of obtaining safety from fire and of heating the water by downward radiation before it enters the boiler. The base is provided with a water-chamber or water-space, H, which is cored out in casting. As the chamber is wide and flat, it is necessarily braced or stayed, so that it will stand the requisite boiler pressure. Into this chamber the water is pumped through a pipe, *d*, and thence enters the boiler through pipe *e*. As the water bottom is heated by downward radiation from the fire, it forms, at one and the same time, a floor protector and water heater.

The induction and eduction-pipes *d e* are arranged diametrically opposite to each other, so that the water must pass entirely across and through the chamber before entering the boiler. The blow-off cock is attached to the same side at which the water is pumped into the base.

It will be seen that this bottom also forms a mud-drum, in which the greater part of the sediment will be deposited, so that when the blow-off cock is open the water and steam are blown through the bottom, consequently clearing it thoroughly each time.

The bottom may also be provided with a number of plugs on its lower side, which should be screwed in so as to be readily removed, if found necessary, to clean out the chamber.

I have shown and described this water bottom as combined with my improved boiler, but it may be applied to and used with any tubular or other boiler. As it receives water from the feed-pump, and is connected by pipes with the boiler, and, consequently, is under boiler pressure, it may, indeed, be considered a part or section of the boiler.

Having now described my invention, and the manner in which the same is or may be carried into effect,

What I claim, and desire to secure by Letters Patent, is—

1. The use of a removable outer casing or "summer jacket," composed of two or more sections hinged together, substantially in the manner and for the purposes shown and described.

2. The formation of a series of draught-openings or perforations in that part of the "summer jacket" surrounding the smoke-pipe, substantially as and for the purposes described.

3. The arrangement beneath the fire-pot or box of a boiler of otherwise ordinary or suitable construction, of a water bottom communicating with the feed and the boiler, substantially in the manner described, so as to be under boiler pressure, receiving water from the feed and transmitting it to the boiler, and serving at once as a floor protector and a water heater.

In testimony whereof, I have signed my name to this specification before two subscribing witnesses.

WILLIAM BAXTER.

Witnesses:

GORGE S. TICKENOR,

S. H. PENNINGTON, Jr.