

(No Model.)

C. E. WAKEMAN.
BOILER.

No. 435,989.

Patented Sept. 9, 1890.

Fig. 4.

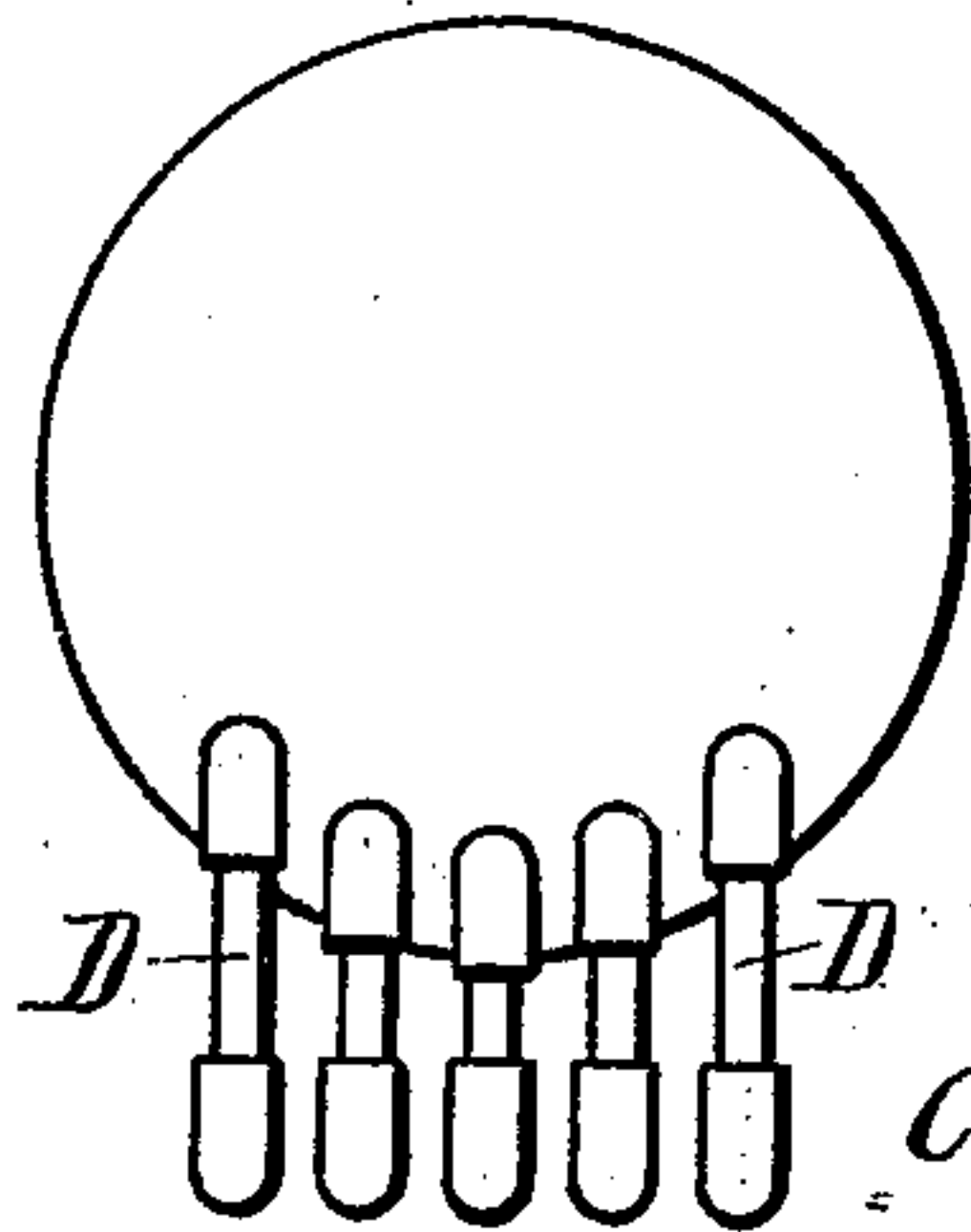


Fig. 1.

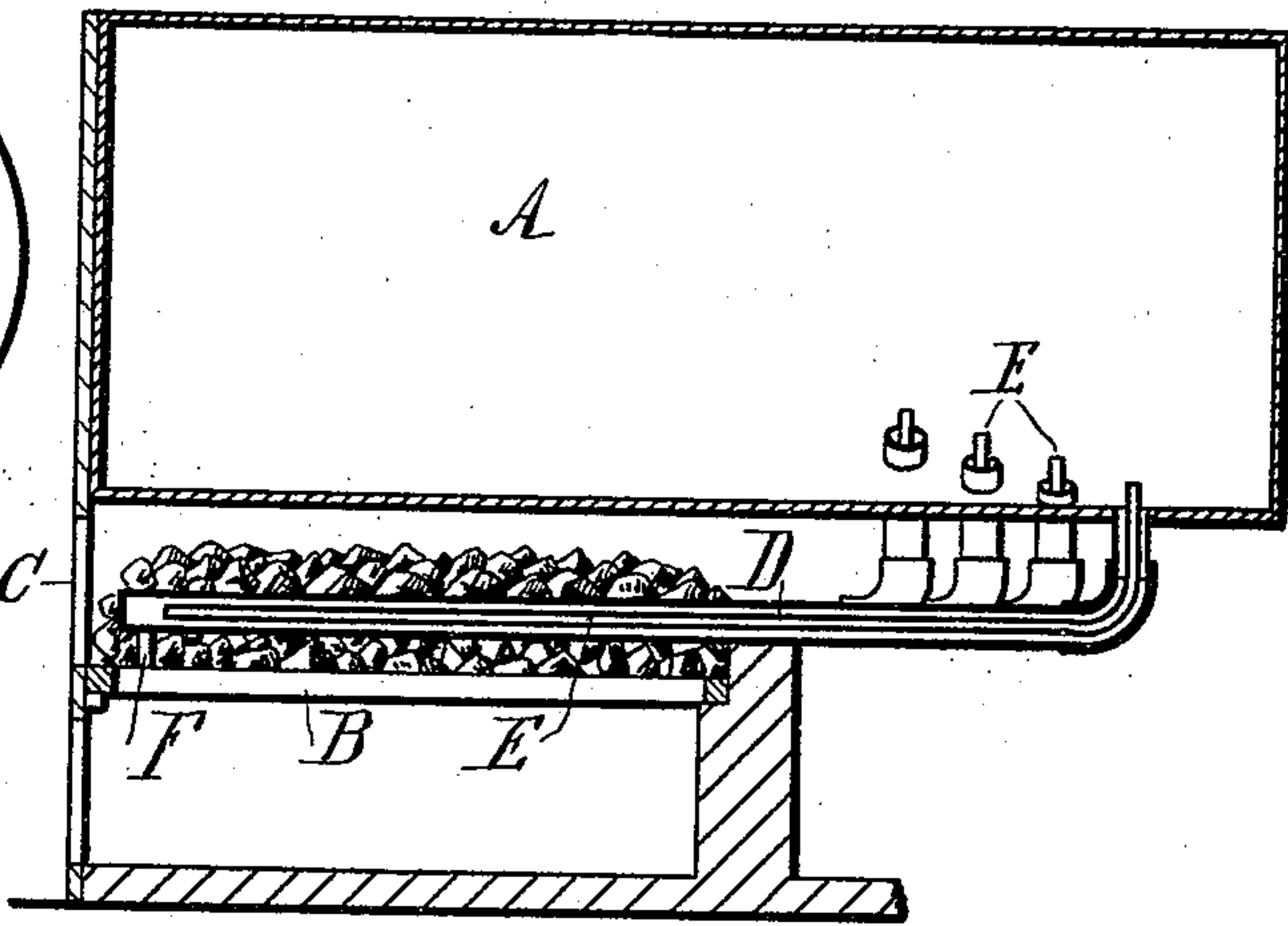


Fig. 2.

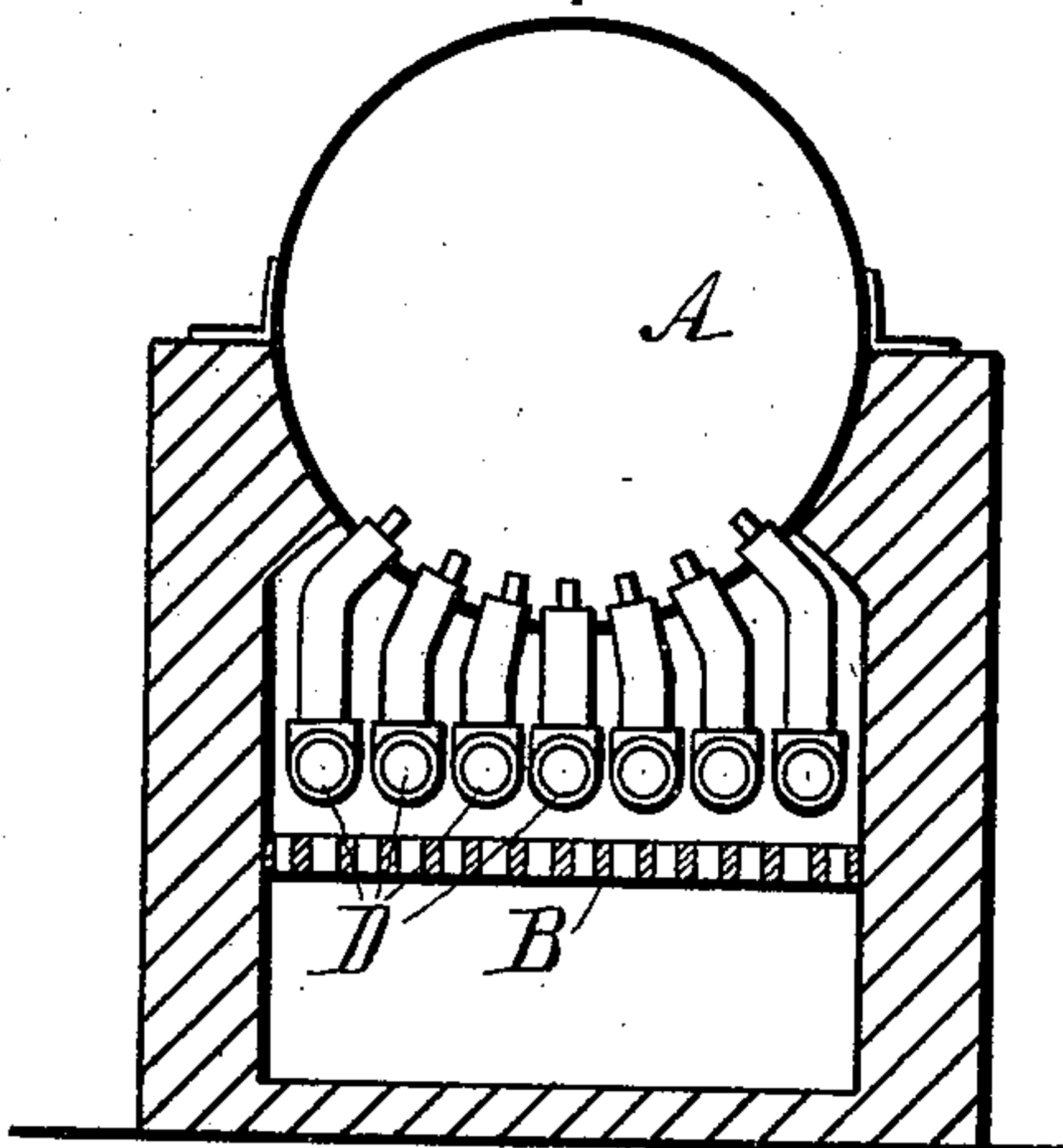
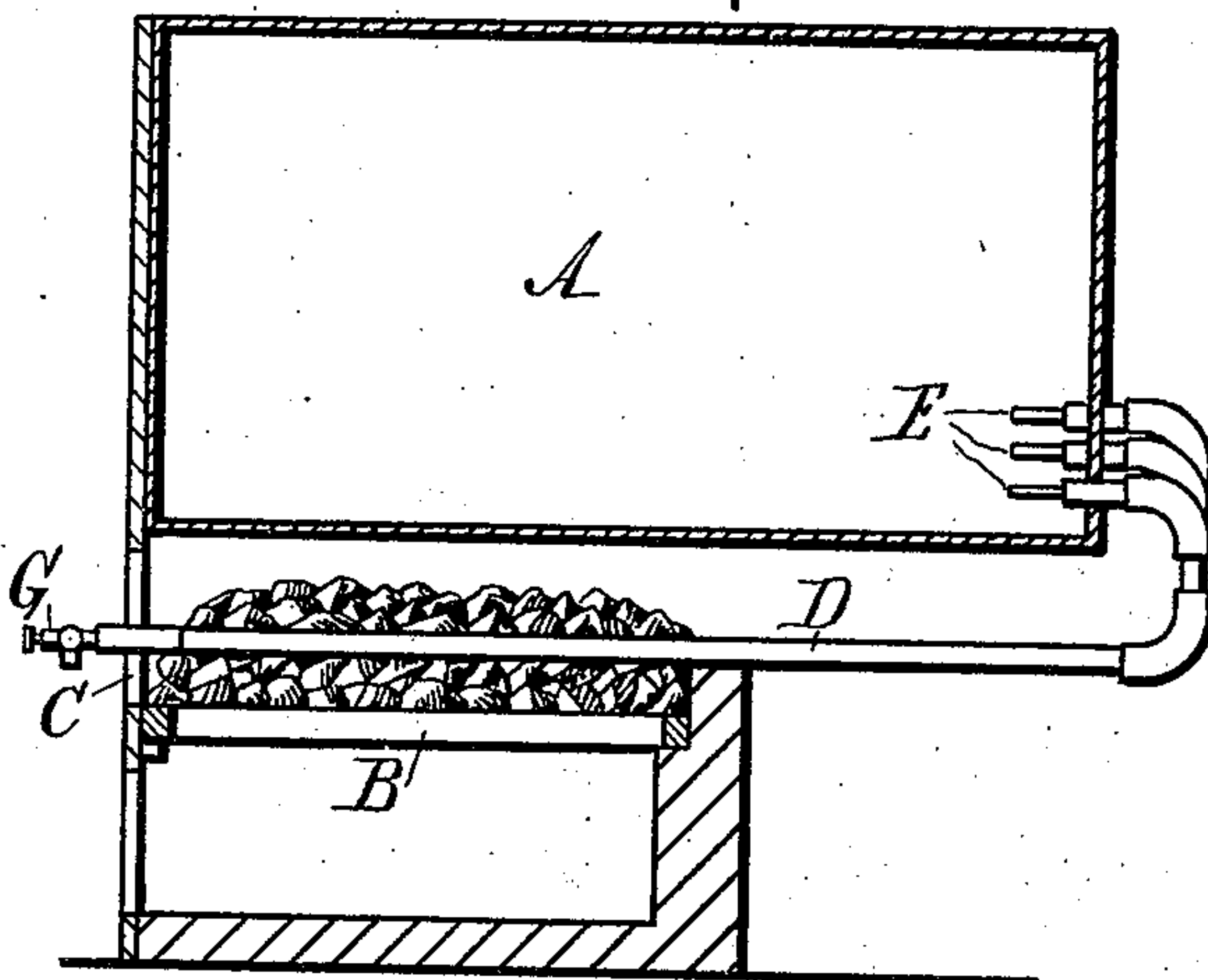


Fig. 3.



WITNESSES

F. Clough
C. J. Shipley

INVENTOR

Charles E. Wakeman
By Helle H. Leggett & Co.
Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES E. WAKEMAN, OF PONTIAC, MICHIGAN.

BOILER.

SPECIFICATION forming part of Letters Patent No. 435,989, dated September 9, 1890.

Application filed November 11, 1889. Serial No. 329,932. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. WAKEMAN, a citizen of the United States, residing at Pontiac, county of Oakland, State of Michigan, have invented a certain new and useful Improvement in Boilers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

In the drawings, Figure 1 is a longitudinal section of the apparatus embodying my invention. Fig. 2 is an end elevation of the same. Fig. 3 illustrates a variation in which the circulating-pipes are carried into the end of the boiler-shell instead of into the bottom. Fig. 4 is a rear elevation of Fig. 3.

In the use of boilers as at present constructed a great loss of time and waste of fuel are incurred in generating steam, from the fact that when the fire is started it has to heat the large body of water, which must be necessarily kept in the boiler at a higher level than the flues.

The object of my invention is to so construct a boiler that as soon as the fire is started the water will be circulated and quickly heated and the steam generated in a much shorter time than has heretofore been the case.

In carrying out my invention, A represents the shell of the boiler, B the fire-grate, and C the fuel-door.

D is a series of pipes tapping the shell of the boiler near the rear end and extending forward under the shell and above the fire-grate. I prefer that the space between the grate and these pipes shall be about three inches, more or less; but of course this may be varied at will, and if desired the pipes may be laid directly on the grate-bars. Within these pipes D are arranged a series of smaller pipes E, which extend in the pipes D to the forward end, and are opened at this point; or, if desired, this inner pipe may have perforations for the water to pass through. They are also opened or perforated at or adjacent to the end projecting into the boiler. It will thus be seen that when the fire is started the pipes D, being in so close proximity to the grate, will be entirely surrounded by the

burning fuel and will immediately become heated. This will cause the water in the outer pipe D to rise up into the shell, and will draw cold water from the shell down through the interior pipe. A thorough and rapid circulation is thus obtained without the necessity of heating a large body of water in the shell before or after the steam is generated. It is obvious that this arrangement might also be applied to an ordinary flue-boiler, such as now in use, and would by acting as a circulator heat the water and generate the steam much more quickly, and consequently with a much less expenditure of fuel.

If desired, the tubes or pipes D E may, instead of tapping the bottom of the shell, be extended back and upward and tap the end of the shell, as shown in Figs. 3 and 4, and the forward or front ends may be supported by a bridge or cross-piece F. So, also, if desired, the ends of the tubes D might be projected beyond the fire-door and be provided with a try-cock G, or in case the tubes tap the ends of the shell these try-cocks might be located on the rear ends.

It will be observed that when the boiler-shell is built expressly for my apparatus and the ordinary flues omitted the shell itself will serve as a steam-dome and may be tapped for steam at any suitable point, thus obviating the necessity of the steam-dome, as is now generally the case. This is applicable to any kind of a boiler or steam-generator, whether the same be for use in a furnace or in an upright or horizontal boiler for use with an engine or other appliance.

In all the constructions hereinbefore described the forwardly-projecting portions of the tubes are so arranged that they shall lie close to the surface of the grate in such proximity thereto that they shall rest there in the body of the fuel on the grate. This feature of my device insures that the pipes shall be in the most intensely-hot portion of the boiler-furnace, where the temperature is very greatly in excess of the temperature at any point above the body of the fuel. At the same time the pipes do not themselves constitute the grate, thus leaving the grate-bars free to be agitated or removed or dumped without disturbing any of the said tubes.

What I claim is—

The combination, with a boiler-shell and its grate, of a series of tubes tapping said shell at different levels extending along above the fire-grate and adjusted to lie within the body
5 of the fuel on the grate, each of said tubes provided with an interior circulating-tube, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

CHARLES E. WAKEMAN.

Witnesses:

W. H. CHAMBERLIN,
F. CLOUGH.