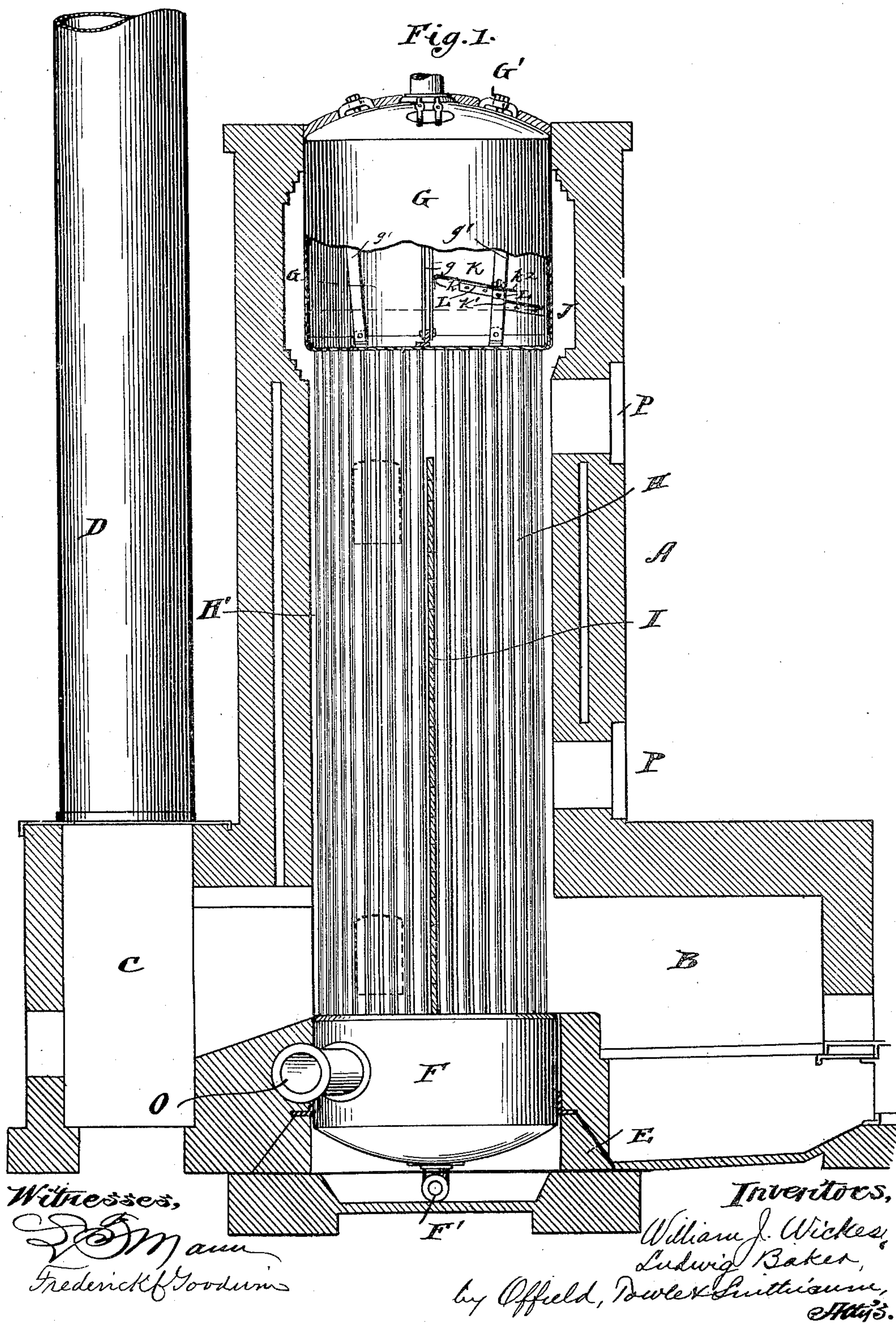


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No. 604,509.

Patented May 24, 1898.



(No Model.)

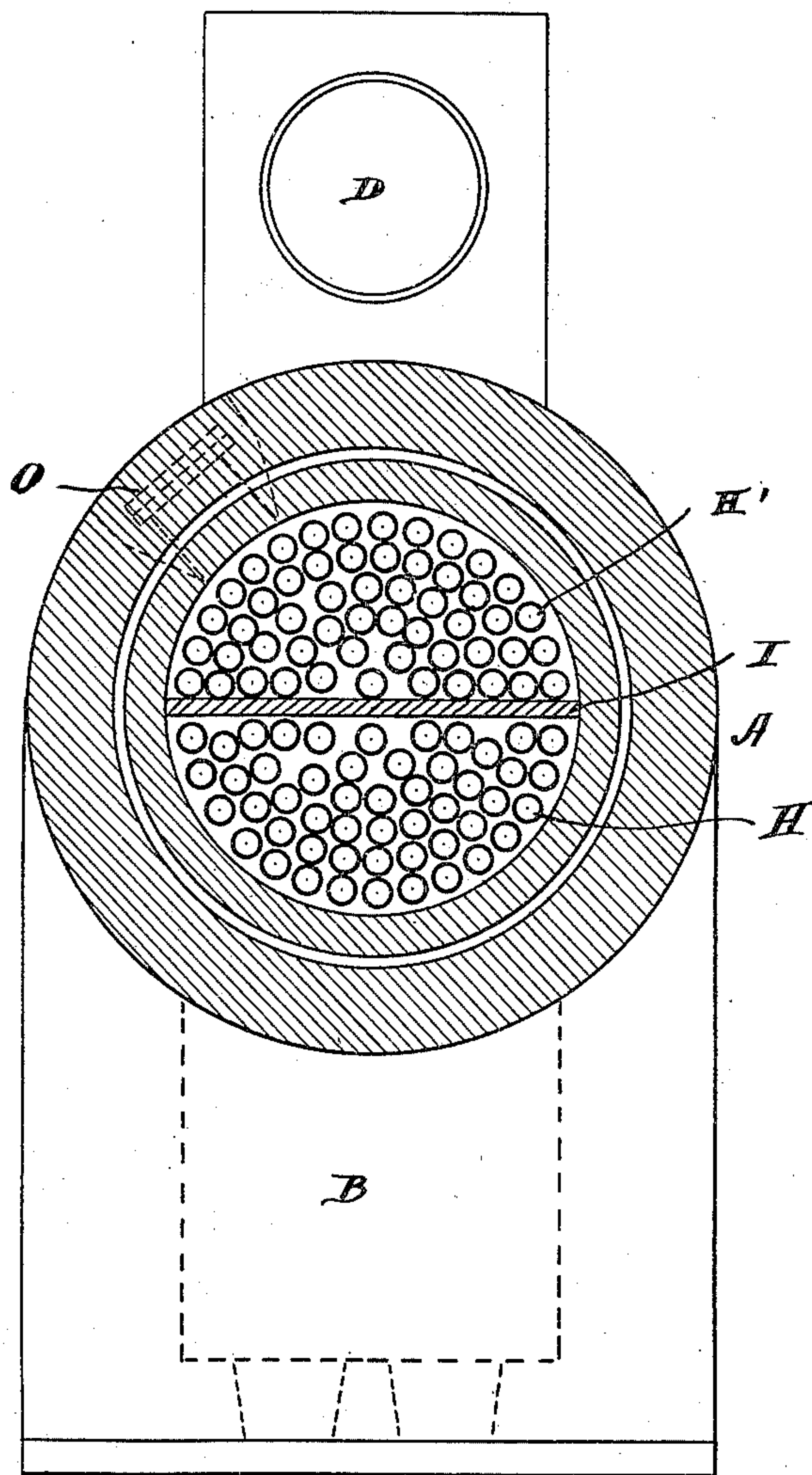
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W. J. WICKES & L. BAKER.  
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*Fig. 2.*



*Witnesses,*

*J. S. Mann*  
*Frederick Gordon*

*Inventors,*

*William J. Wickes,*  
*Ludwig Baker,*

*By* *Offield, Fowler & Smith,*  
*Attys.*



(No Model.)

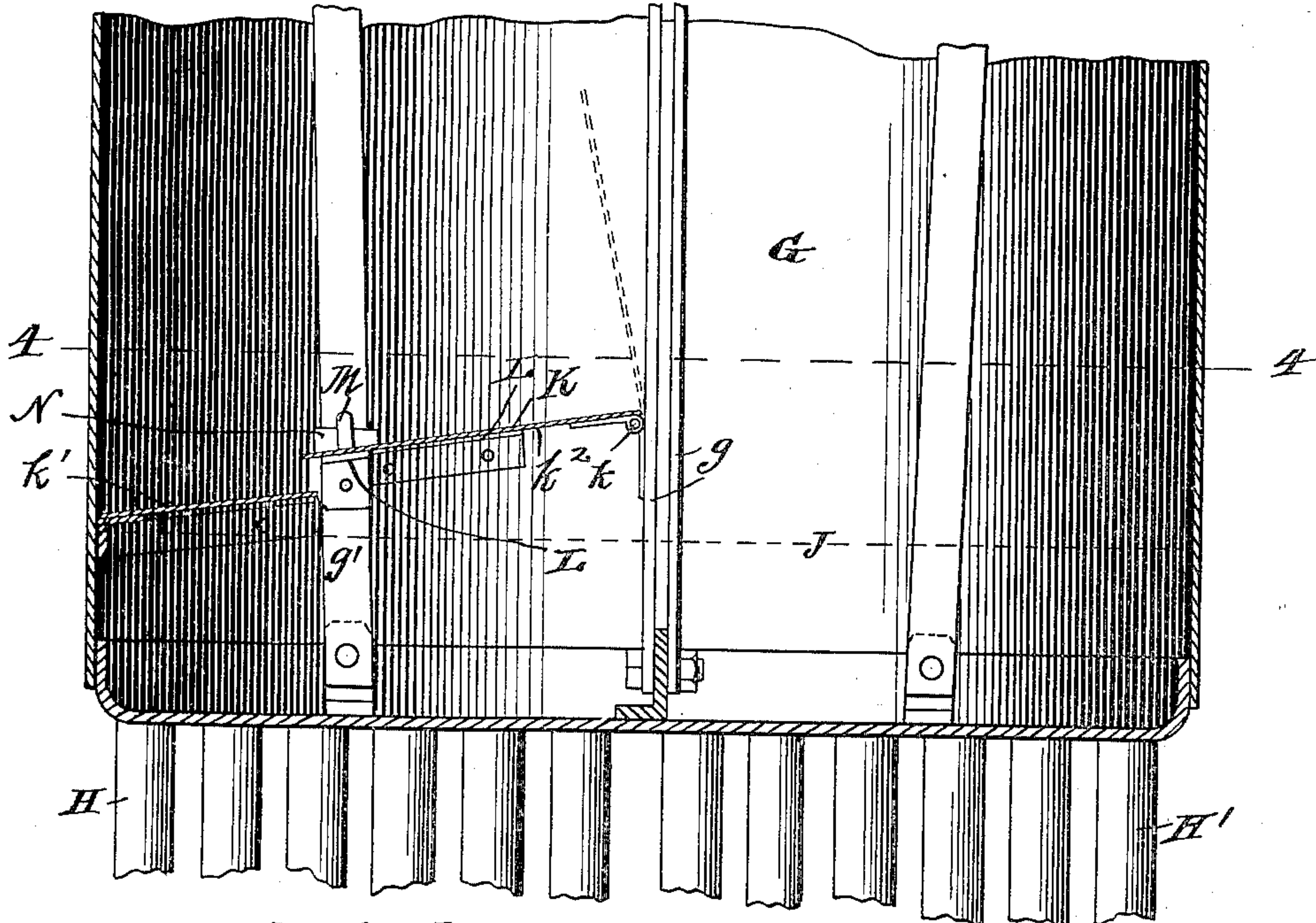
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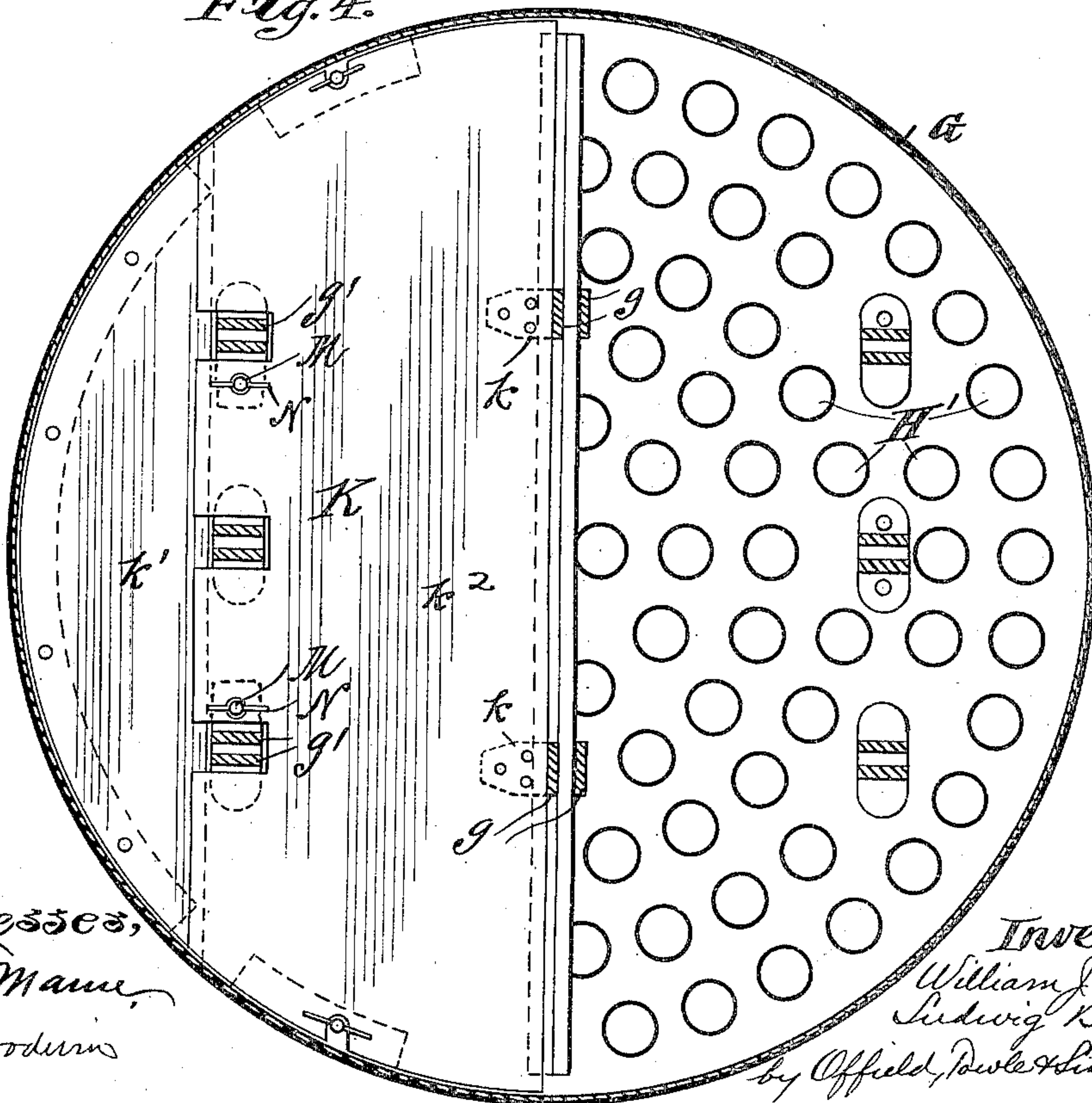
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*Fig. 3.*



*Fig. 4.*



Witnesses,  
J. M. Mame,  
F. B. Goodwin

Inventors,  
William J. Wickes,  
Ludwig Baker,  
by Offield, Powell & Smith  
Attys



# UNITED STATES PATENT OFFICE.

WILLIAM J. WICKES AND LUDWIG BAKER, OF SAGINAW, MICHIGAN.

## UPRIGHT WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 604,509, dated May 24, 1898.

Application filed October 4, 1897. Serial No. 654,003. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM J. WICKES and LUDWIG BAKER, of Saginaw, Michigan, have invented certain new and useful Improvements in Upright Water-Tube Boilers, of which the following is a specification.

This invention relates to steam-boilers of the upright water-tube variety, and has for its object to provide a boiler of this class having a high efficiency at a low cost for construction and maintenance.

To this end the invention consists in a water-tube boiler comprising a suitable casing or setting having a transverse vertical partition therein, a fire-chamber communicating with the heating-space on one side of said partition and an outlet for the spent gases on the other side thereof, front and rear sets of vertical tubes arranged, respectively, on opposite sides of said partition, a drum connecting the lower ends of said sets, a steam-drum connecting the upper ends of said sets, and a baffle-plate in said steam-drum extending over the set of tubes on that side of the partition into which the fire-chamber opens, whereby the water in the tubes of said last-mentioned set will be prevented from being thrown up into the steam-space in said drum and the steam will thereby be kept and delivered dry.

In the accompanying drawings, Figure 1 is an elevation, partly broken away, of the boiler, the setting being shown in vertical sections. Fig. 2 is a transverse section taken on the line 2 2 of Fig. 1. Fig. 3 is an enlarged view, in vertical section, of the upper portion of the boiler; and Fig. 4 is a transverse sectional view taken on the line 4 4 of Fig. 3.

In the said drawings, A represents the boiler-setting, which may be of any approved type and which is constructed to provide the furnace or fire-chamber B and the boot C, from which rises the stack D. Within the setting and supported upon a cast-iron ring E is the boiler proper, comprising a lower head or mud-drum F and an upper head or steam-drum G, which are connected by two sets of tubes H and H', which will be hereinafter designated, respectively, as the "front" and "rear" sets.

I indicates a partition extending vertically upward from the lower drum F to a point some distance below the steam-drum G and

also extending transversely from one side of the setting to the other, as shown in Fig. 2. The water-line is indicated at J, and above said water-line there is located in the steam-drum G a baffle-plate K, which extends over the front set of tubes H, which receives the products of combustion from the fire-chamber B. This baffle-plate is preferably hinged, as indicated at  $k$ , to the braces or stays  $g$  of the steam-drum, and in practice we prefer to make said baffle-plate in two sections, as shown in detail in Figs. 3 and 4, there being provided a stationary section  $k'$ , adjacent to the wall of the steam-drum, and a hinged section  $k^2$ , arranged slightly above and extending from a point somewhat over the stationary section to the center of the steam-drum, where it is hinged, as hereinbefore set forth. The free end of the baffle-plate rests upon suitable lugs L, secured to the braces or stays  $g'$  and to the wall of the steam-drum, and is secured in position by means of pins M, which pass through suitable apertures in the plate and are themselves slotted to receive locking-wedges N.

The baffle-plate K is preferably given a slight inclination upward toward the central portion of the steam-drum, as clearly indicated in the drawings.

In boilers of the type herein described the set of tubes on that side of the partition adjacent to the fire-chamber receive the products of combustion and heated gases directly from said chamber, and the water in said tubes is subjected to a high degree of heat, and steam is quickly produced. The tubes on that side of the partition adjacent to the stack are not so highly heated, and a circulation of water is thus produced up the front set of tubes and down the rear set of tubes, thus exposing all of the water successively to the action of the greatest heat and thereby increasing the efficiency of the boiler. We have found, however, that the heating action in the front set of tubes is sometimes so great that the water in said tubes is thrown out upward therefrom, and if unobstructed rises into the steam-space above the water-line in the steam-drum and thus tends to saturate the steam, making it difficult to obtain dry steam from the boiler. By reason of the construction which we have devised the baffle-plate located above the front set of tubes serves to prevent the water



from said tubes from rising into the steam-space and deflects the water downward and rearward toward the rear set of tubes, thus increasing the efficiency of the circulation in the boiler. We prefer to employ a hinged baffle-plate, for the reason that said plate when hinged may be lifted up into the position shown in dotted lines in Fig. 3 for the purpose of giving access to the front set of tubes in order that they may be inspected and cleaned. By constructing the baffle-plate when hinged in two sections, the hinged section overlapping and arranged above the fixed section, the free edge of the hinged section is rendered more accessible for the purpose of raising and lowering the same.

It is obvious that various modifications in the details of construction may be made without departing from the principle of our invention. For instance, although we have shown a casing and boiler circular in section, it is obvious that they may be rectangular, polygonal, or of other form. The mud-drum will of course be provided with a suitable blow-off, such as is indicated at F', and with one or more manholes O. The steam-drum will be provided with suitable manholes G', and the setting or casing will be provided with suitable clean-out openings P. We therefore do not wish to be understood as limiting ourselves to the precise details of construction shown in the drawings and hereinbefore described.

We claim—

1. An upright water-tube boiler comprising a suitable setting or casing having a transverse partition therein, a fire-chamber communicating with the heating-space on one side of said partition and an outlet for the spent gases on the opposite side of said partition, front and rear sets of tubes arranged respectively on opposite sides of said partition, a drum connecting the lower ends of said sets, a steam-drum connecting the upper ends of said sets, and a baffle-plate in the steam-drum extending over the front set of tubes only, substantially as described.

2. An upright water-tube boiler comprising a suitable setting or casing having a trans-

verse partition therein, a fire-chamber communicating with the heating-space on one side of said partition and an outlet for the spent gases on the opposite side of said partition, front and rear sets of tubes arranged respectively on opposite sides of said partition, a drum connecting the lower ends of said sets, a steam-drum connecting the upper ends of said sets, and a baffle-plate in the steam-drum extending over the front set of tubes only and hinged to permit access to said tubes, substantially as described.

3. An upright water-tube boiler comprising a suitable setting or casing having a transverse partition therein, a fire-chamber communicating with the heating-space on one side of said partition and an outlet for the spent gases on the opposite side of said partition, front and rear sets of tubes arranged respectively on opposite sides of said partition, a drum connecting the lower ends of said sets, a steam-drum connecting the upper ends of said sets, and a baffle-plate in the steam-drum extending from the wall of the drum inward in an upwardly-inclined direction over the front set of tubes only, substantially as described.

4. An upright water-tube boiler comprising a suitable setting or casing having a transverse partition therein, a fire-chamber communicating with the heating-space on one side of said partition and an outlet for the spent gases on the opposite side of said partition, front and rear sets of tubes arranged respectively on opposite sides of said partition, a drum connecting the lower ends of said sets, a steam-drum connecting the upper ends of said sets, and a baffle-plate arranged in the steam-drum extending over the front set of tubes and comprising a fixed section adjacent to the wall of the drum and a hinged section located above the fixed section and extending therefrom inward to the central line of the drum, substantially as described.

WILLIAM J. WICKES.  
LUDWIG BAKER.

Witnesses:

HARRY G. ADAMS,  
FRANK H. RANDALL.