

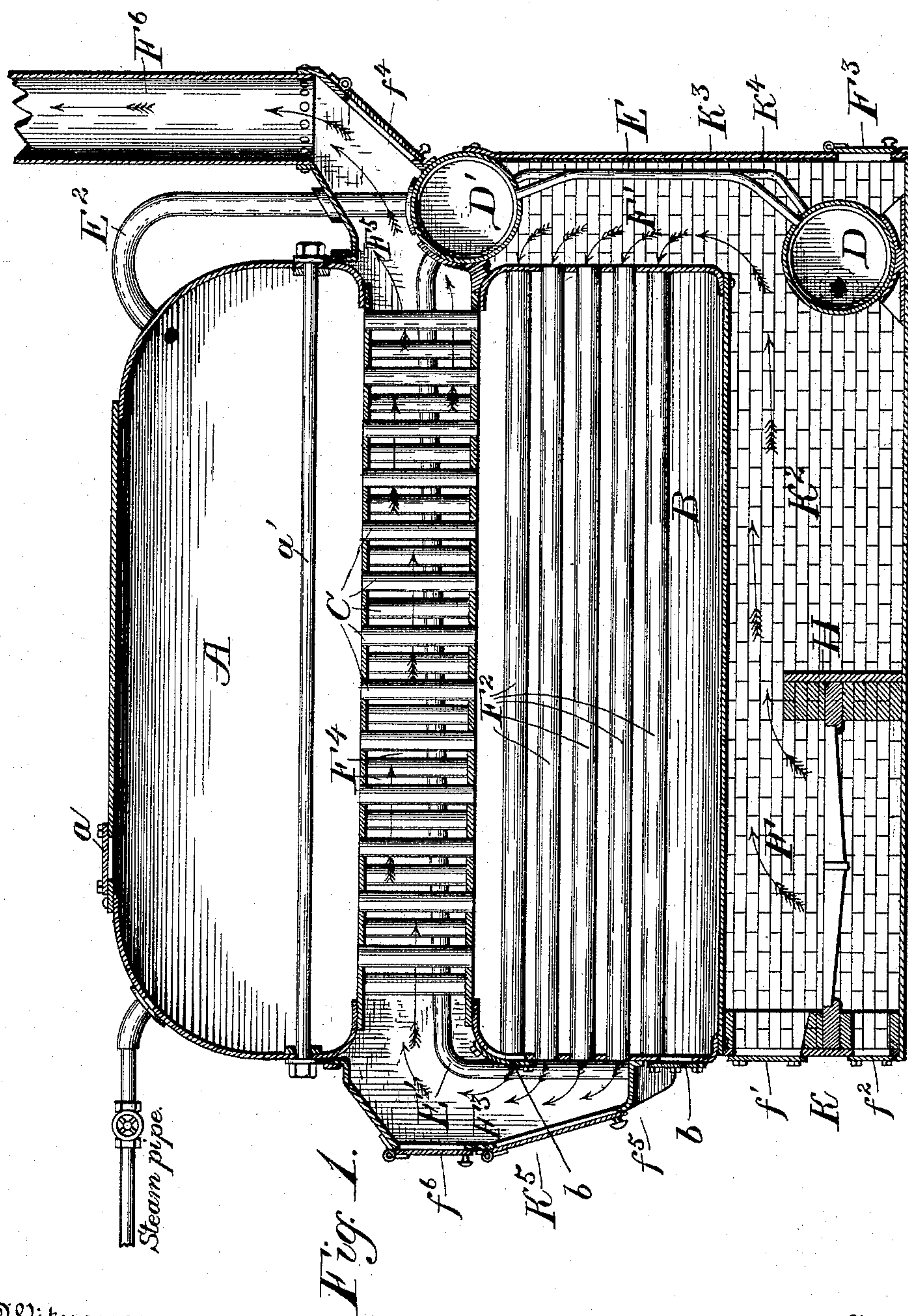
(No Model.)

2 Sheets—Sheet 1.

E. H. SCRIBNER.
BOILER.

No. 483,369.

Patented Sept. 27, 1892.



Witnesses

Rory C. Bowen.
John Q. Wilson.

Inventor

E. H. Scribner

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Attorneys

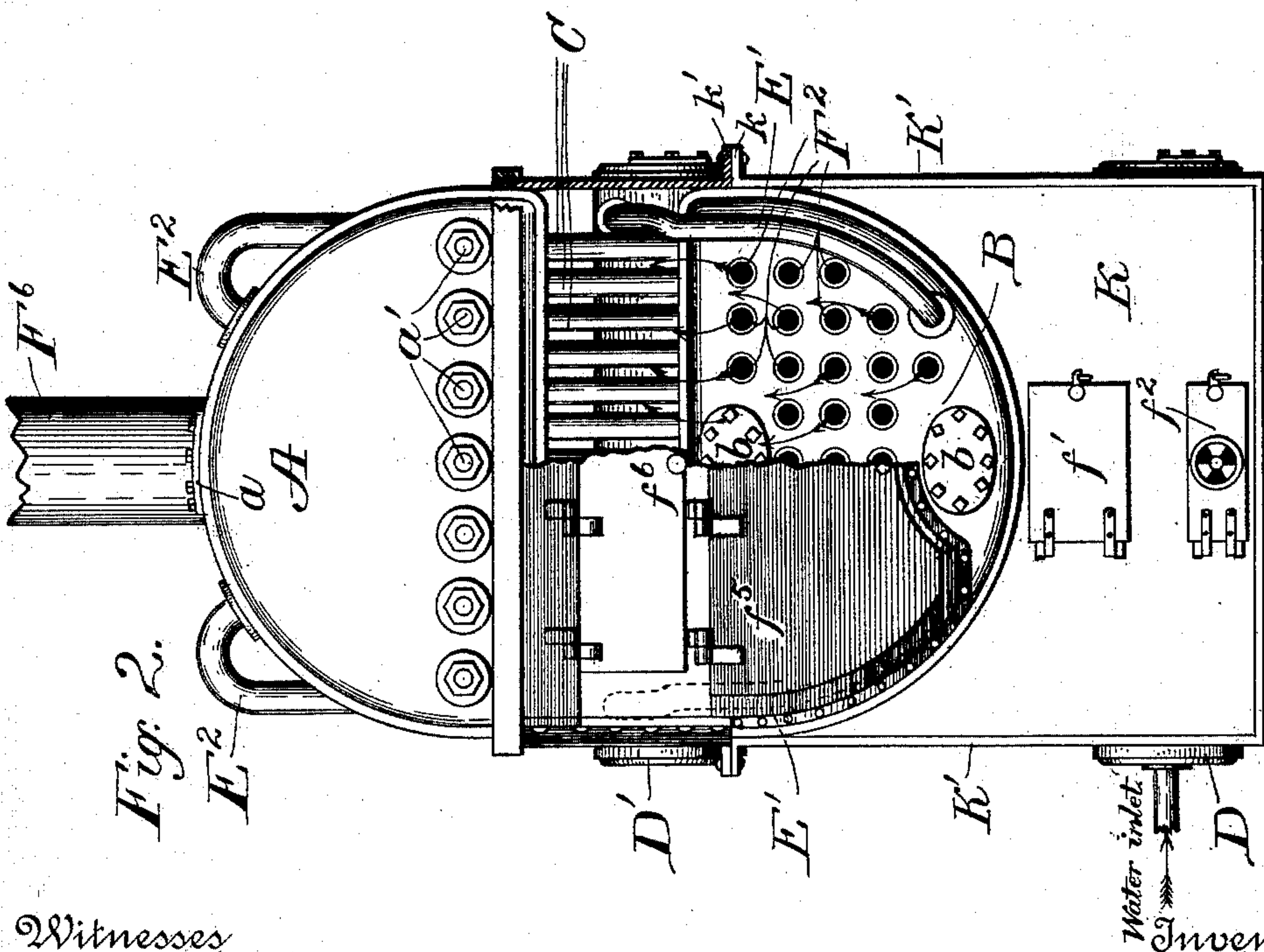
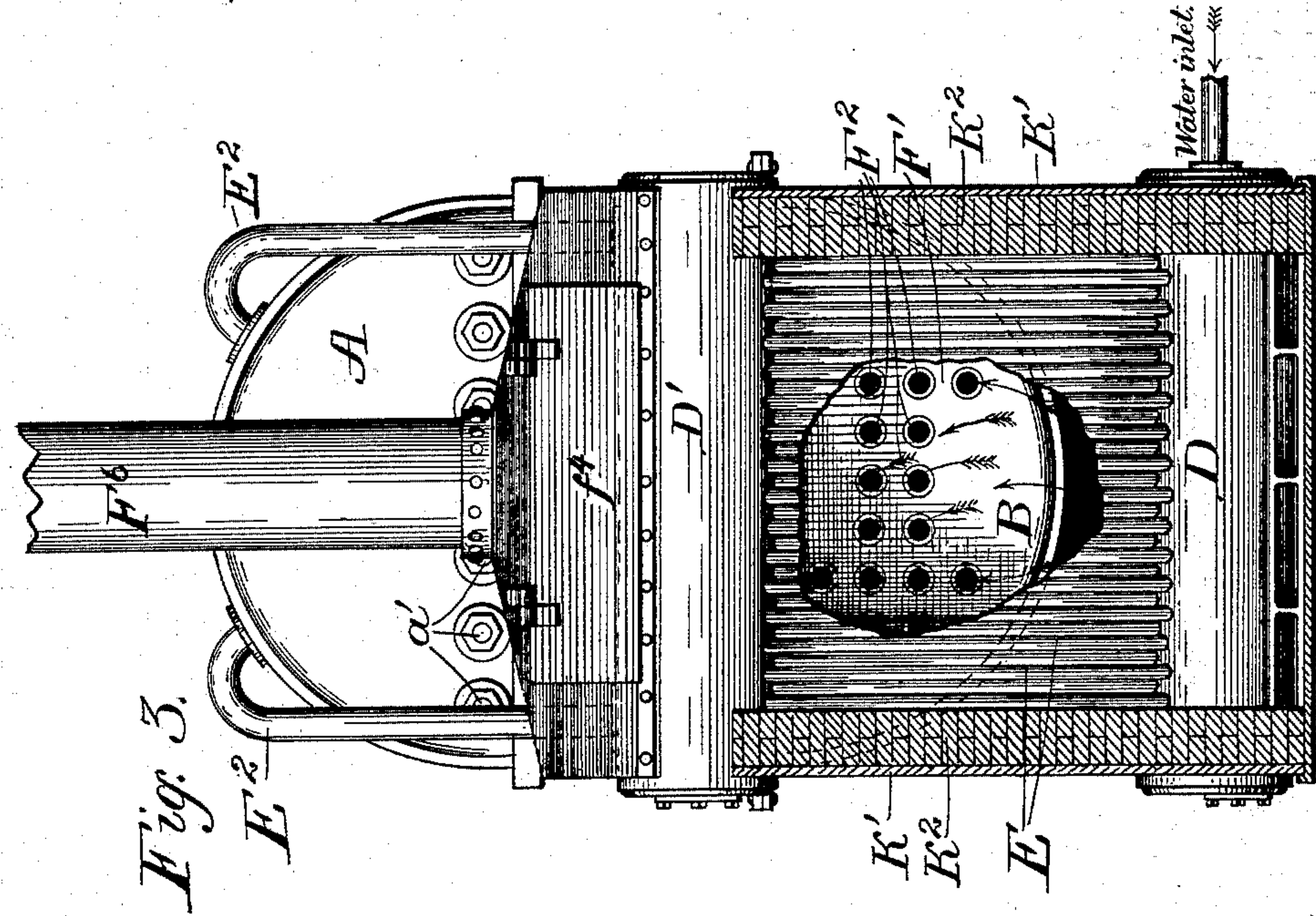
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UNITED STATES PATENT OFFICE.

EDWARD H. SCRIBNER, OF THE UNITED STATES NAVY.

BOILER.

SPECIFICATION forming part of Letters Patent No. 483,369, dated September 27, 1892.

Application filed June 29, 1892. Serial No. 438,458. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. SCRIBNER, assistant engineer in the United States Navy, serving on board the United States steamer *Boston*, at Mare Island, in the county of Solano and State of California, have invented certain new and useful Improvements 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 appertains to make and use the same.

My invention relates to improvements in steam-boilers for use either on land or at sea; and it consists of certain novel features hereinafter described and claimed.

Reference being had to the accompanying drawings, wherein the same parts are indicated by the same letters throughout the several views, Figure 1 represents a vertical central longitudinal section through the axis of the boiler and its connections. Fig. 2 represents a front view of the boiler, parts being broken away. Fig. 3 represents a rear view of the boiler with the end plate removed and parts being broken away.

The boiler proper consists of two semicylindrical portions A and B, connected together by a number of vertical water-tubes C, or the sides of the semicylinder may be prolonged somewhat to allow the water-tubes to be put in place. The feed-water enters through the mud-drum D at the base of the fire-box, passes up through a plurality of water-tubes E, preferably tangent to each other, and enters the drum D' abreast of the water-tubes C. From this drum the feed-water passes through the downcast pipes E'—one on either side of the boiler, as shown—through the space F⁴ and front connection F³ down to the lower front end of the boiler. In its passage through the heated products of combustion the water has become considerably heated, and the danger of throwing cold water on the highly-heated crown-sheets is obviated. Equilibrium-pipes E² are provided connecting the drum D' to the upper portion of the boiler for the purpose of avoiding any conflicting current that might interfere with the free flow of water through the downcast pipes to the front of the boiler. Manholes *a* and *b* are provided in the upper and lower portions A and B, respectively, and braces *a'*

connect the ends of the upper section of the boiler. The lower portion B of the boiler is sufficiently braced by the fire-tubes F². The products of combustion pass from the furnace F to the back connection F', through the fire-tubes F², front connection F³, fire-space F⁴, uptake F⁵, and smoke-stack F⁶, thus passing three times along the length of the boiler and heating the pipes E, drums D and D', and pipes E', as well as the portions of the boiler exposed to the products of combustion.

The front of the furnace K and sides K' are preferably made of iron lined with brick K². The rear plate of the boiler is made, preferably, of iron K³, lined with asbestos K⁴. The first connection K⁵ is preferably of iron. For use at sea compactness is desired; but for land service these various parts, except the front connection, may be made of ordinary walls of fire-brick.

H represents the bridge-wall.

f' f² f³ f⁴ f⁵ f⁶ represent doors for feeding the furnace and for removing ashes, cinders, soot, &c., respectively.

The lower portion B of the boiler may be supported in any convenient way; but I have shown it as resting at the front end of the furnace K and having along its sides a long flange or angle-iron *k'*, riveted thereto and resting on the flange *k* of the side pieces *k'* of the furnace. The upper portion is supported by the vertical tubes only, so as to allow free expansion, and it can be stayed diagonally, if desired, to prevent injury from a ship's rolling at sea.

These boilers may be joined together side by side or back to back and connected to one common smoke-stack, as when aboard ship, without materially modifying the arrangement herein shown.

It will be seen that the boiler herein described possesses the advantages of economy, having great heating-surface and high steaming capacity, compactness, and accessibility to the various parts for cleaning and repairs, as any tube may be replaced without interfering with any other, and any one of the water-tubes may be plugged.

The riveted joints are out of the fire with one exception. The circulation of the water is such that no hydrokineters or other arti-

5 ficial means are necessary. Being adapted for cleaning salt, salt water may be used to a certain extent without injury. The weight of the individual shell-plates is reduced over those used in large equivalent cylindrical boilers, and the space occupied per square foot of heating-surface is small. For these and other reasons the boiler is especially adapted for use at sea.

10 It will be evident that many modifications might be used without departing from the spirit of my invention.

What I claim, and desire to secure by Letters Patent of the United States, is—

15 1. An apparatus for generating steam, comprising a boiler composed of two sections joined together by vertical water-tubes and having fire-tubes in the lower section and a fire-space around the said water-tubes, a mud-drum situated in the lower part of the fire-box, water-tubes leading from this drum to a heating-drum in rear of the boiler, and down-
20 cast or water pipes leading from said heating-drum through the fire-space around said water-tubes to the lower front portion of the lower section of the boiler, substantially as described.

25 2. An apparatus for generating steam, comprising a boiler composed of two sections joined together by vertical water-tubes and having fire-tubes in the lower section and a fire-space around the said water-tubes, a mud-drum situated in the lower part of the fire-

box, water-pipes leading from this drum to a heating-drum in rear of the boiler, and wa- 35
ter-pipes leading from said heating-drum through the fire-space around said water-tubes to the lower front portion or lower section of the boiler, and equilibrium-pipes leading from said heating-drum to the upper sec- 40
tion of the boiler, substantially as and for the purposes described.

3. An apparatus for generating steam, comprising a furnace F, a boiler composed of two semicylindrical sections connected together 45
by water-tubes set over said furnace, fire-tubes in the lower section of said boiler, and a fire-space around said water-legs for the passage of the products of combustion, a front connection connecting said flues and said fire- 50
space, a mud-drum situated in the lower portion of the fire-box, heating-pipes leading upward from said mud-drum inside of the back connection, a heating-drum inside of the back connection, a heating-drum connected to said 55
heating-pipes at the rear of the boiler, and downcast pipes leading from said drum to the lower section of the boiler, substantially as and for the purposes described.

In testimony whereof I affix my signature 60
this the 17th day of June, 1892.

EDWARD H. SCRIBNER.

Witnesses:

PERCY C. BOWEN,
JOHN C. WILSON.