

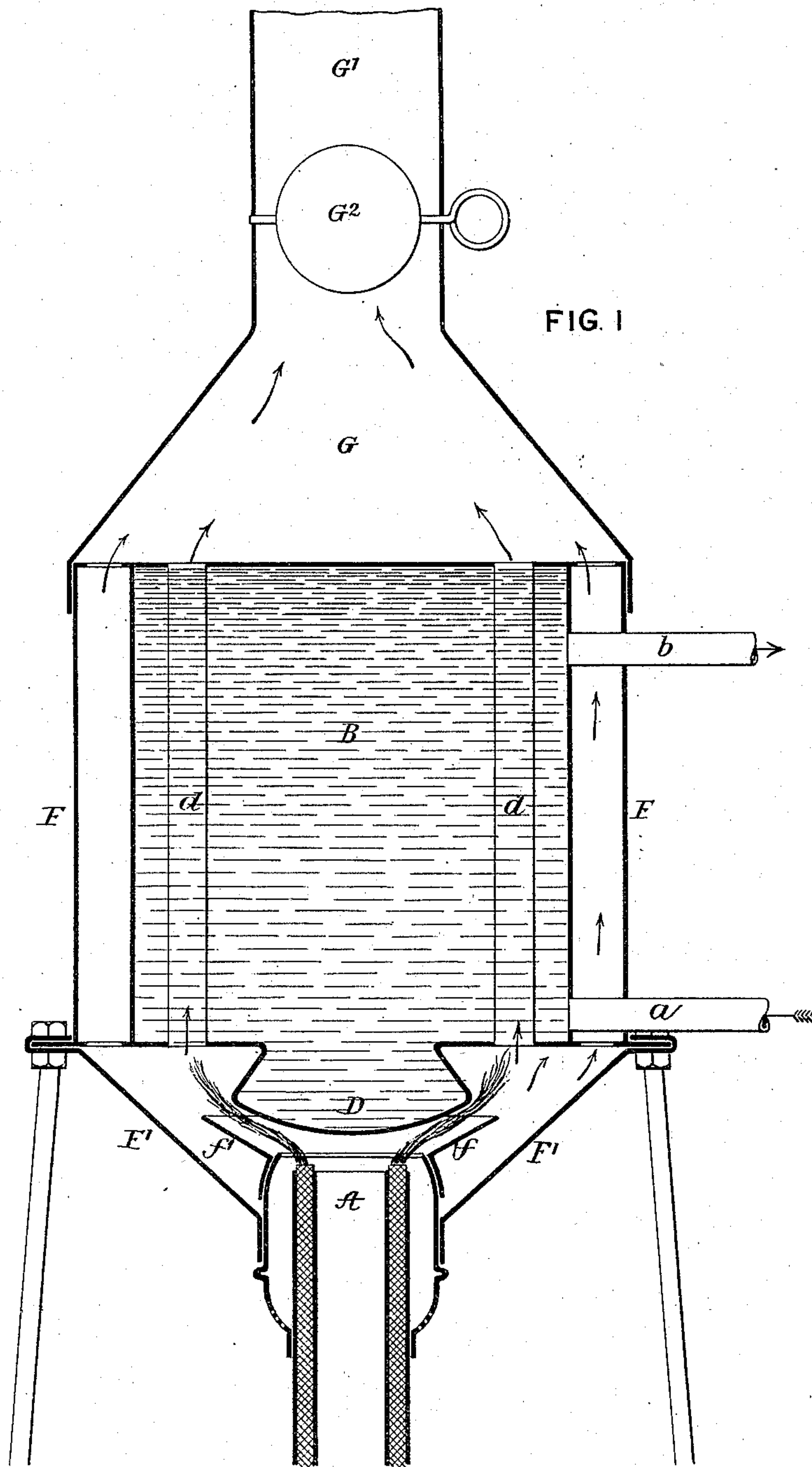
(No Model.)

2 Sheets—Sheet 1.

H. B. TATHAM, Jr.
STEAM BOILER OR WATER HEATER.

No. 533,326.

Patented Jan. 29, 1895.



WITNESSES

F. D. Goodwin

Frank Bechtold

INVENTOR

Henry B. Tatham Jr.

By his Attorneys

Howson & Howson

(No Model.)

2 Sheets—Sheet 2.

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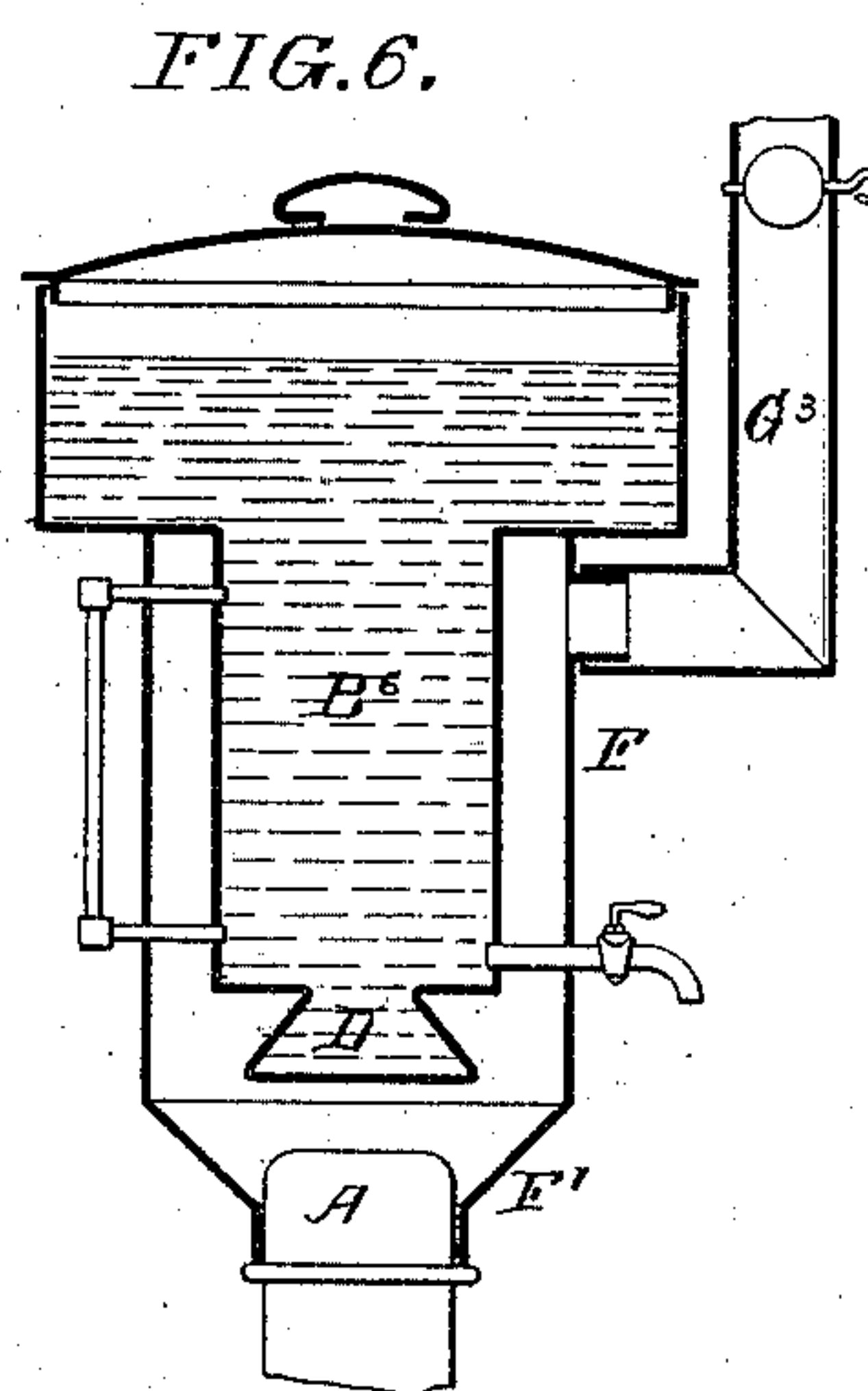
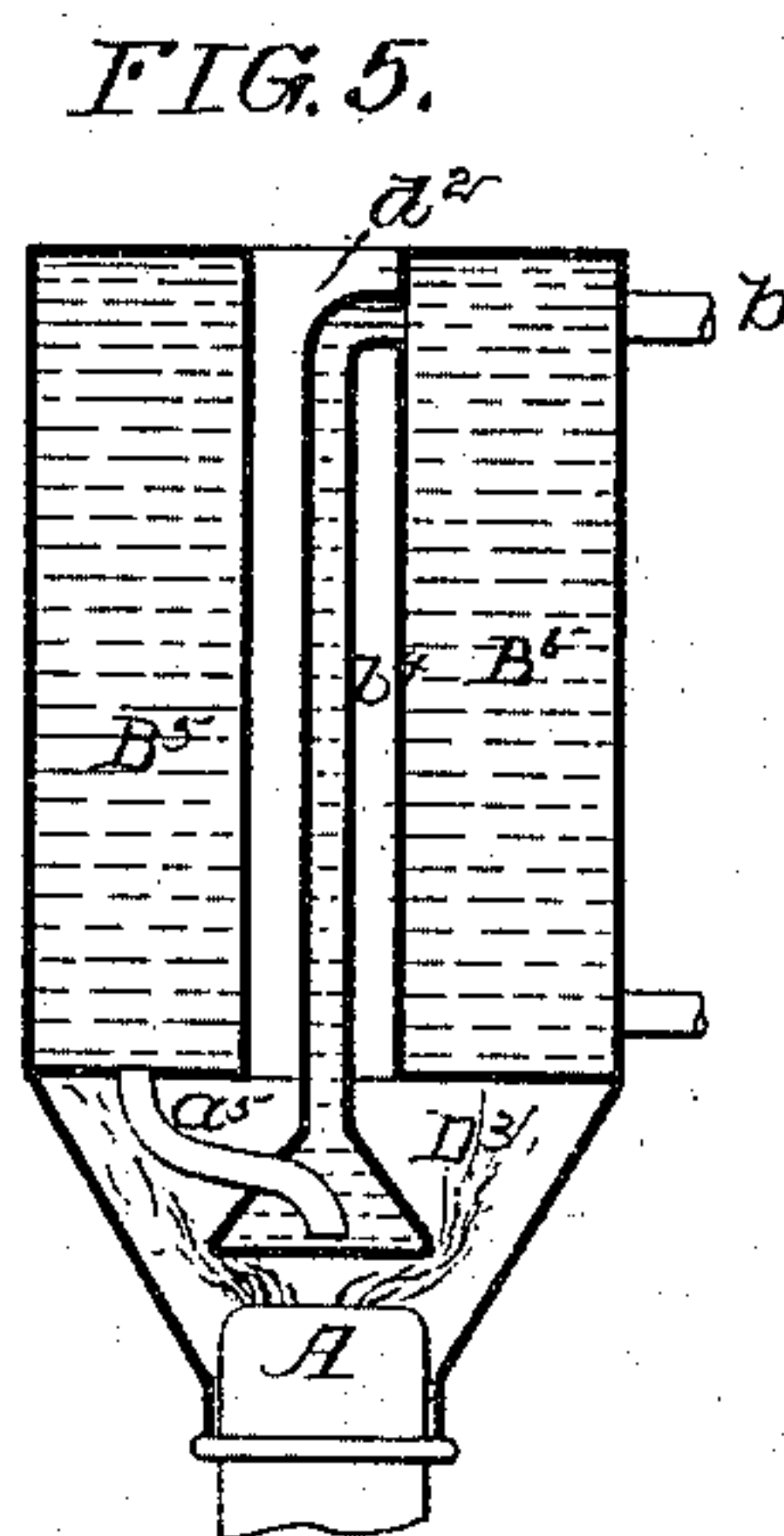
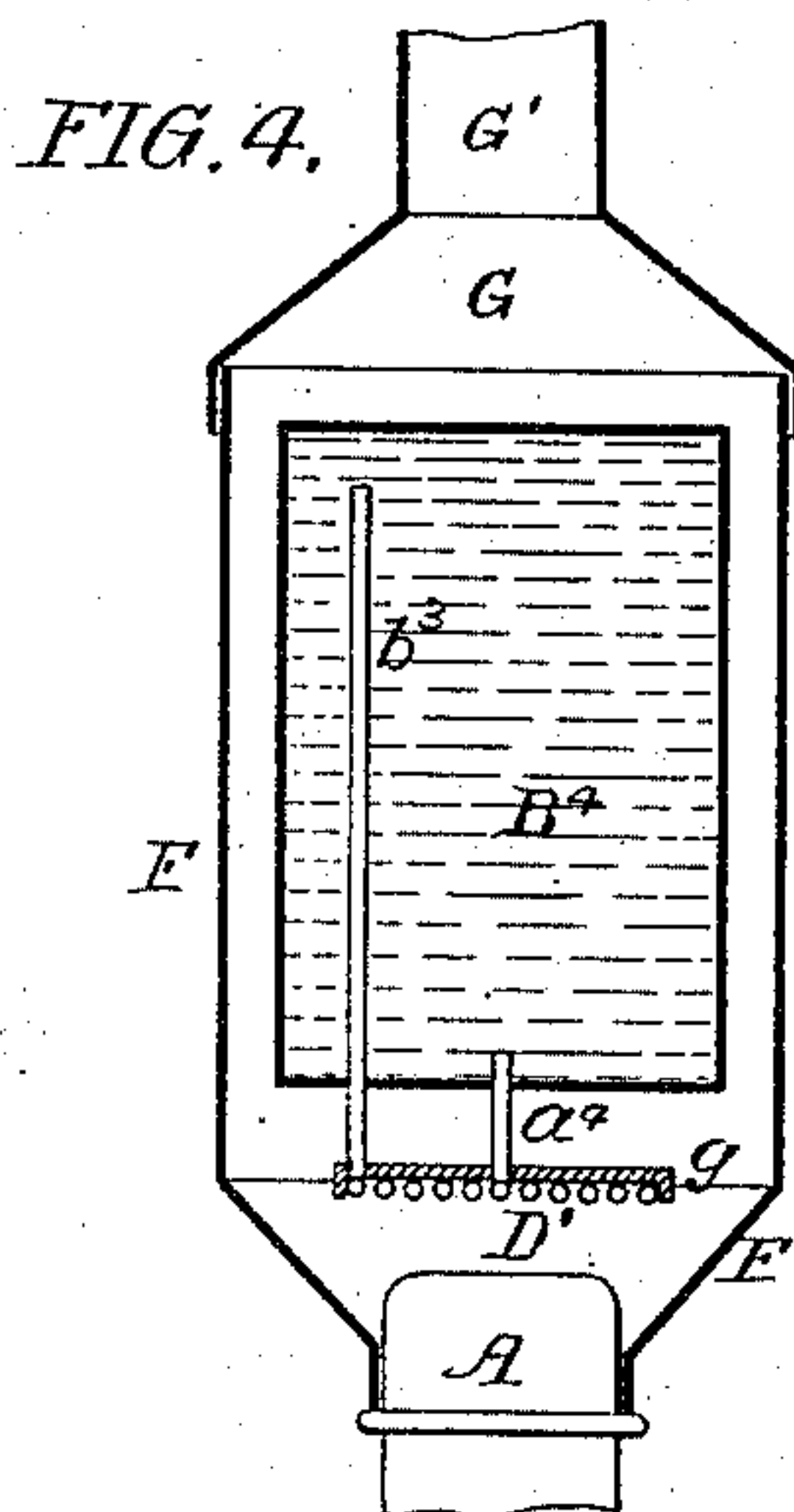
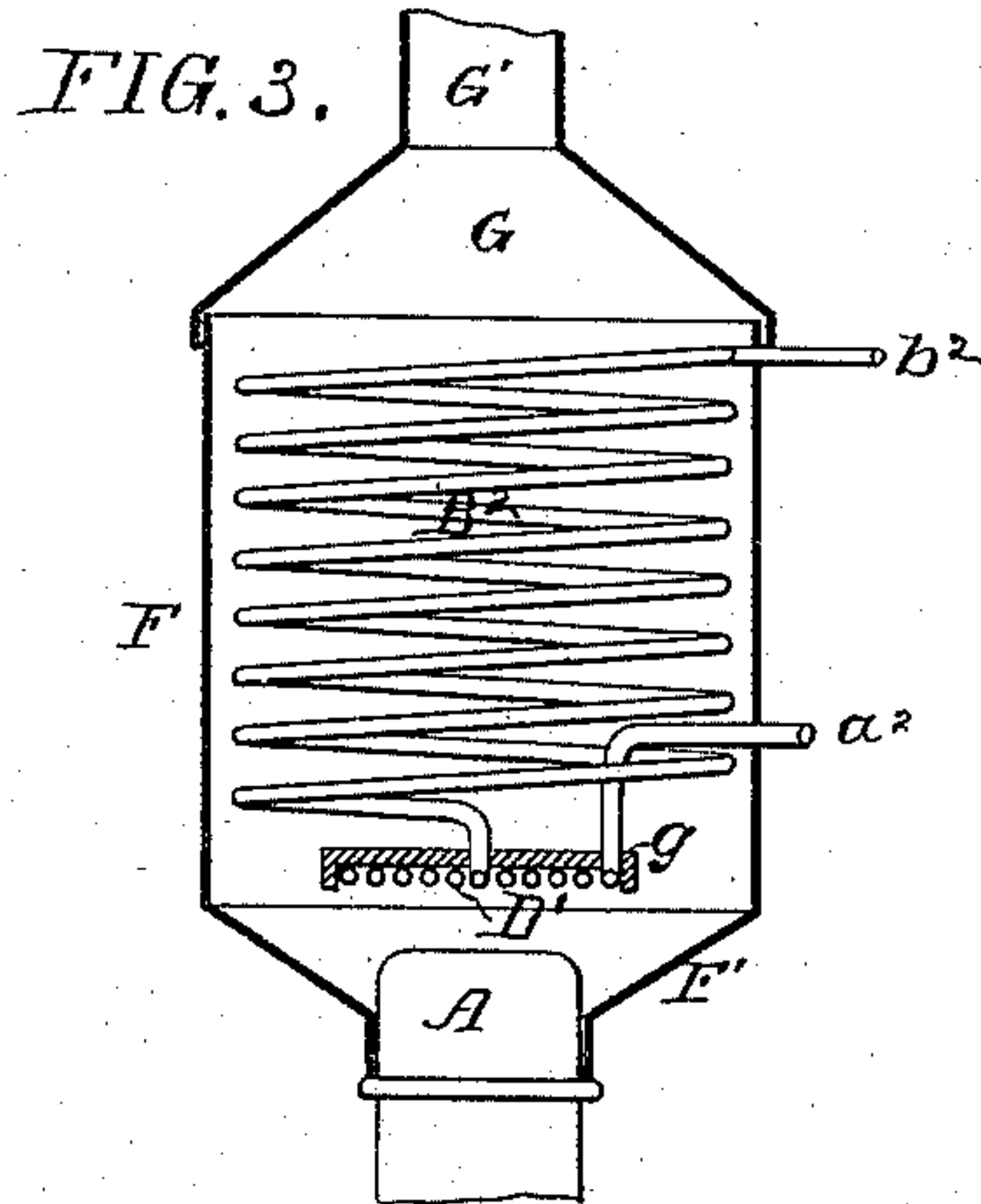
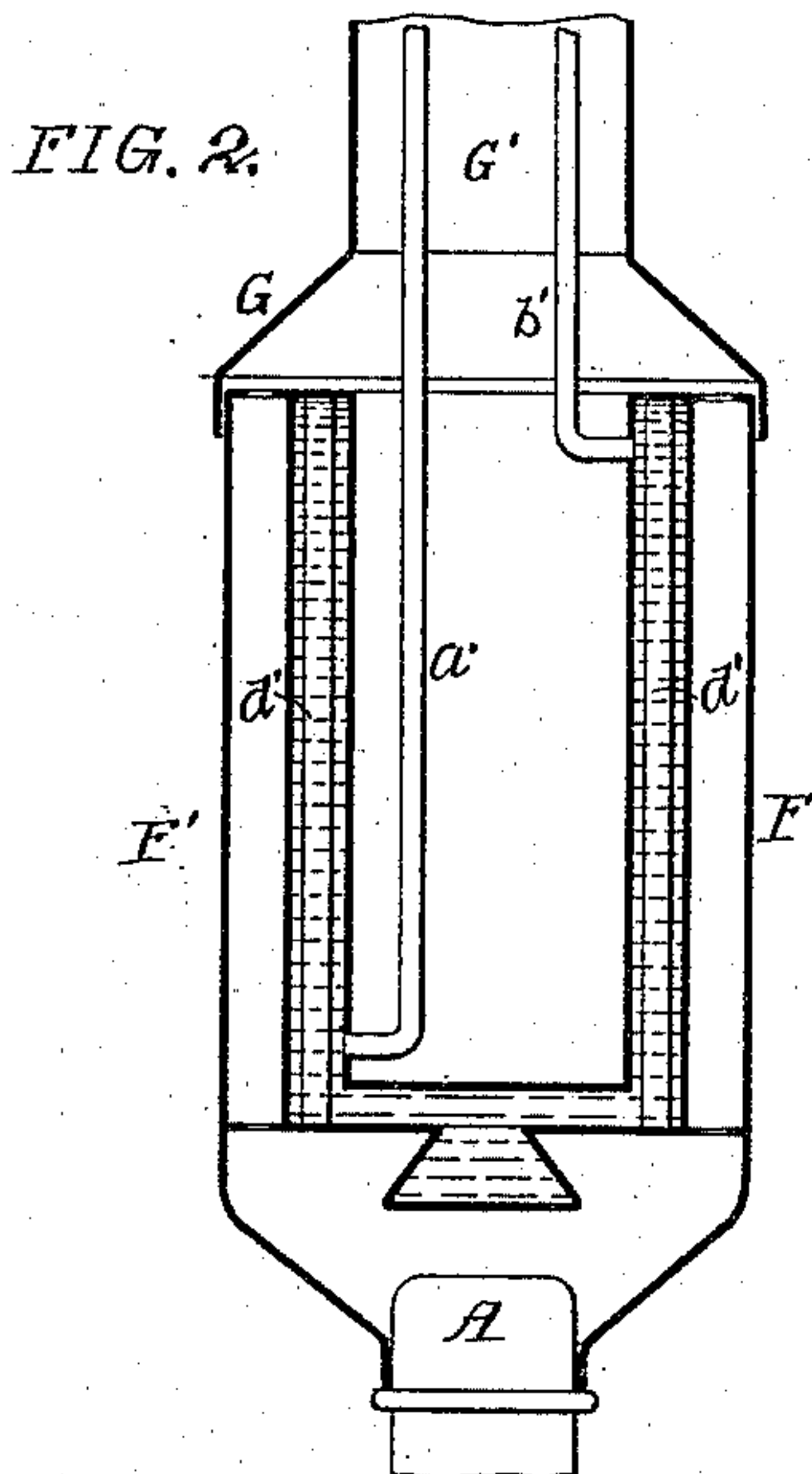


FIG. 7.

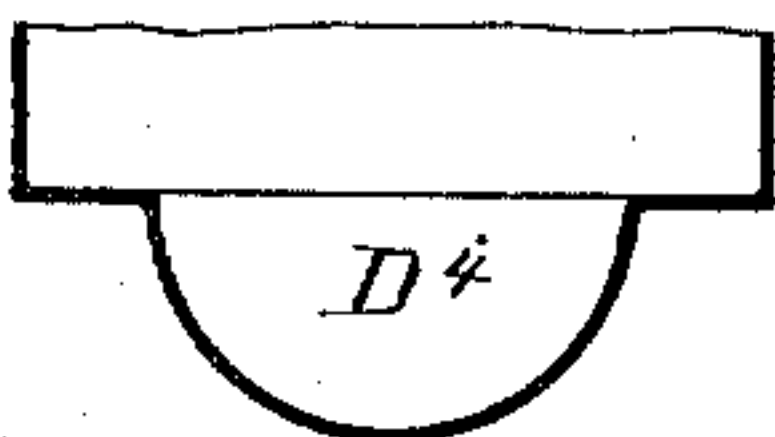


FIG. 8.

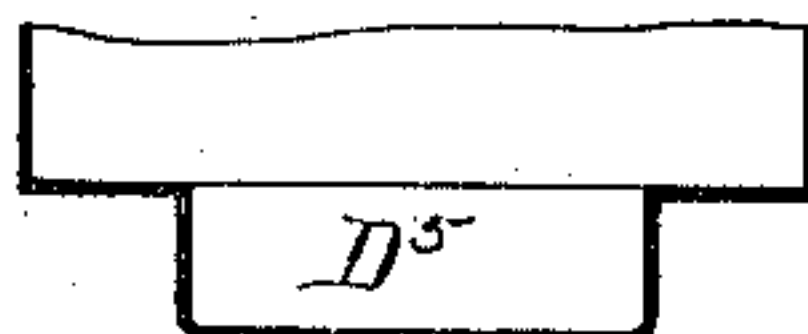
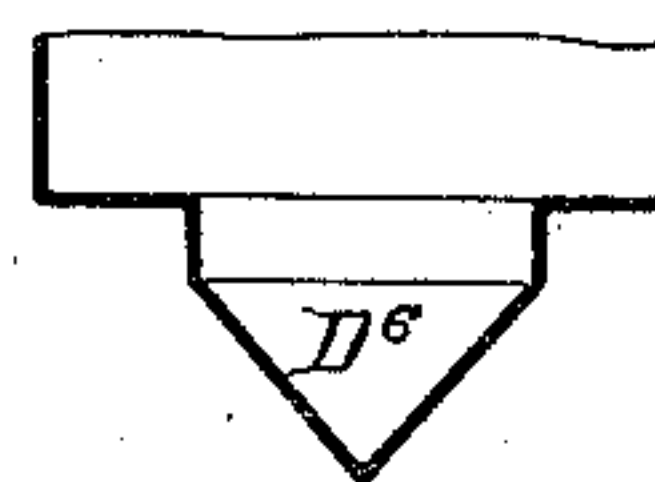


FIG. 9.



Witnesses:
K. E. Naumann
F. J. Goodwin

Inventor:
Henry B. Tatham, Jr.
by his Attorneys
Howe & Howe

UNITED STATES PATENT OFFICE.

HENRY B. TATHAM, JR., OF PHILADELPHIA, PENNSYLVANIA.

STEAM-BOILER OR WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 533,326, dated January 29, 1895.

Application filed December 26, 1893. Serial No. 494,789. (No model.)

To all whom it may concern:

Be it known that I, HENRY B. TATHAM, Jr., a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in Steam-Boilers or Water-Heaters, of which the following is a specification.

My invention consists of a steam boiler or water heater having a lamp as the source of
10 heat and intended for various domestic uses such as the heating of water for toilet or kitchen purposes or for radiators, the heating of coffee urns or the like, or the generation of steam for heating purposes, or for running
15 small engines or pumps.

The main object of my invention is to so construct such a steam boiler or water heater as to utilize to the fullest extent the heat from the burner of the lamp and to prevent the de-
20 posit of carbon in the form of soot upon the bottom or sides of the water vessel. These objects I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

25 Figure 1, is a vertical section of a steam boiler or water heater with sufficient of a lamp burner to illustrate my invention; and Figs. 2, to 9, represent various modified constructions embodying the main feature or features
30 of my invention.

In Fig. 1, A represents a central-draft tubular-wick lamp burner which may be of any ordinary construction, and suitably mounted above this burner is a water vessel B, which,
35 in the present instance, is intended as a circulating boiler, being provided with water inlet pipe *a* and outlet pipe *b*, although, as will be apparent hereinafter, various forms of water vessels may be employed without de-
40 parting from my invention.

The vessel B has, at the bottom, a central depending water leg or disk D which communicates freely with the interior of the ves-
45 sel B and, as shown in Fig. 1, has outwardly flaring sides and a slightly curved or rounded bottom. This water-backed disk D is of such a diameter in respect to the wick tube of the lamp and bears such vertical relation to the
50 top of said wick tube, that it serves as a deflector for the flame and is within the circumferential limits of said flame, so that the outer edges of the latter will rise around the sides

of the disk as shown, care being taken, how-
ever, that the disk projects sufficiently be-
yond the bottom of the vessel B that, when 55
the flame is at its normal height, that is to say, as high as it can be maintained without smok-
ing, the upper edges of the flame will not
touch the bottom of the vessel. By this means
I prevent any deposit of carbon in the form 60
of soot upon the bottom of the vessel and thus overcome a serious objection to the use of a
lamp as a means of heating.

Extending upward through the water ves-
sel, beyond the circumferential limits of the 65
disk D, are a series of tubes *d*, which serve to convey the heated products of combustion
from the flame through the water vessel and
thus materially aid in heating the water
therein. 70

Such portions of the heated air or products
of combustion as do not pass upward through
the tubes *d*, rise around the water vessel and
between the same and an outer casing or
jacket F, said heated air or products of com- 75
bustion finally escaping into a hood G mount-
ed above the water vessel and having a chim-
ney G' with suitable damper G², so as to pro-
vide for the necessary draft, although in cases
where the water heater is of considerable 80
height, this hood and chimney may be dis-
pensed with. The hot air jacket F may also
be dispensed with, if desired, although its use
is preferred for the purpose of utilizing to the
utmost all of the heat developed by the flame 85
of the lamp. An inverted conical hood F' ex-
tends from the lower portion of the jacket F
to the burner A and serves to prevent the ac-
cess of any cold air to the chamber around
the top of the burner so that the only air 90
which can gain access to the tubes *d* or hot
air jacket F is that which has been brought
into intimate contact with the flame of the
burner and has been intensely heated there-
by, while the only air which can gain access 95
to the disk D is that which enters through the
central draft tube of the burner and is like-
wise intensely heated by direct contact with
the flame.

In order to insure the intimate contact of 100
the air with the outer surface of the flame, as
well as to throw said flame toward the disk
D, I prefer to provide the burner A with a
flaring shield *f*, which extends upward and

outward in close proximity to the under surface of the annular flame, as shown in Fig. 1.

When it is desired to effect the rapid heating of the water the vessel B may be so constructed as to contain but a limited volume of water. For instance in Fig. 2 I have shown a construction in which the vessel B' has an annular body provided with internal circulating pipes a' and b' , the hot air tubes d' passing up through the annular body of the vessel, and in Fig. 3 I have illustrated a construction in which the water vessel is in the form of a coil B², the depending disk in this case being in the form of a close horizontal coil D', one end of which receives the water from the supply pipe a^2 , the other end communicating with the lowermost convolution of the coil B², the uppermost convolution of the latter discharging through a pipe b^2 . When this construction is adopted it is preferable to mount upon the coil D' a flanged cap plate g so as to prevent any draft which might otherwise be caused through the coil D' by reason of the spaces or channels between the convolutions of the same.

The depending water-backed deflecting disk may also be used as a means of heating and causing the circulation of water in reservoirs disconnected from the disk except by means of the circulating pipes. For instance in Fig. 4 I have shown a coiled disk with flanged cap, such as shown in Fig. 3, this disk receiving its supply of water through a pipe a^4 from a reservoir B⁴ above the same, the heated water being discharged into the upper portion of the reservoir through a pipe b^3 , and in Fig. 5 I have shown an annular water chamber B⁵ having a central draft passage or flue d^2 through which extends a pipe b^4 , serving as a means of conveying the heated water from the disk D³ to the upper portion of said annular vessel, said disk receiving its supply of water through the pipe a^5 communicating with the lower portion of said annular vessel.

In some cases the products of combustion may be carried away from the upper end of the air jacket by means of a side pipe G³, as shown for instance in Fig. 6, the water vessel B⁶ there shown having its upper portion enlarged in diameter. The use of the central chimney is preferred, however, wherever such is possible.

Various forms of deflecting disks may be adopted within the limits of my invention.

For instance, in Fig. 7 I have shown a disk D⁴ of semi-spherical form, and in Fig. 8, a cylindrical disk D⁵, while in Fig. 9 the disk D⁶ is of an inverted conical form.

Although I have described, and in all cases I prefer to use a central draft burner having an annular wick and forming an annular flame, my invention may be used in connection with other forms of burner in which the flame is capable of spreading. For instance, I may use a duplex burner forming two flames having an air supply between them, so that they can be deflected respectively to the right and left by the action of the disk of the water vessel. Hence the phrase "tubular burner" in the claims is intended to cover such modified construction. In all cases however the central supply of air must be such as to form an air film between the flame and the bottom of the water backed disk, or bottom of vessel so as to prevent any contact of the flame therewith and any deposit of soot thereupon.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination of the lamp having a tubular burner, with the water vessel having at the bottom a water leg provided with a disk or bottom of a diameter within the normal circumferential limits of the lamp flame and occupying such relation to the burner as to serve as a deflector for said flame, a pocket for the extreme edge of the flame being formed above and beyond the edge of the disk or bottom, substantially as specified.

2. The combination of the lamp having a tubular burner, with the water vessel having at the bottom a water leg provided with a disk or bottom of a diameter within the circumferential limits of the lamp flame, and occupying such relation to the burner as to serve as a deflector for said flame, the bottom of the vessel and the sides of the water leg forming a pocket for the extreme edge of the flame, said water vessel having one or more flues communicating with said pocket and serving to convey the products of combustion through the water vessel, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY B. TATHAM, JR.

Witnesses:

FRANK BECHTOLD,
JOSEPH H. KLEIN.