

(No Model.)

A. J. McINTOSH.  
SMOKE CONSUMING FURNACE.

No. 542,371.

Patented July 9, 1895.

FIG-1-

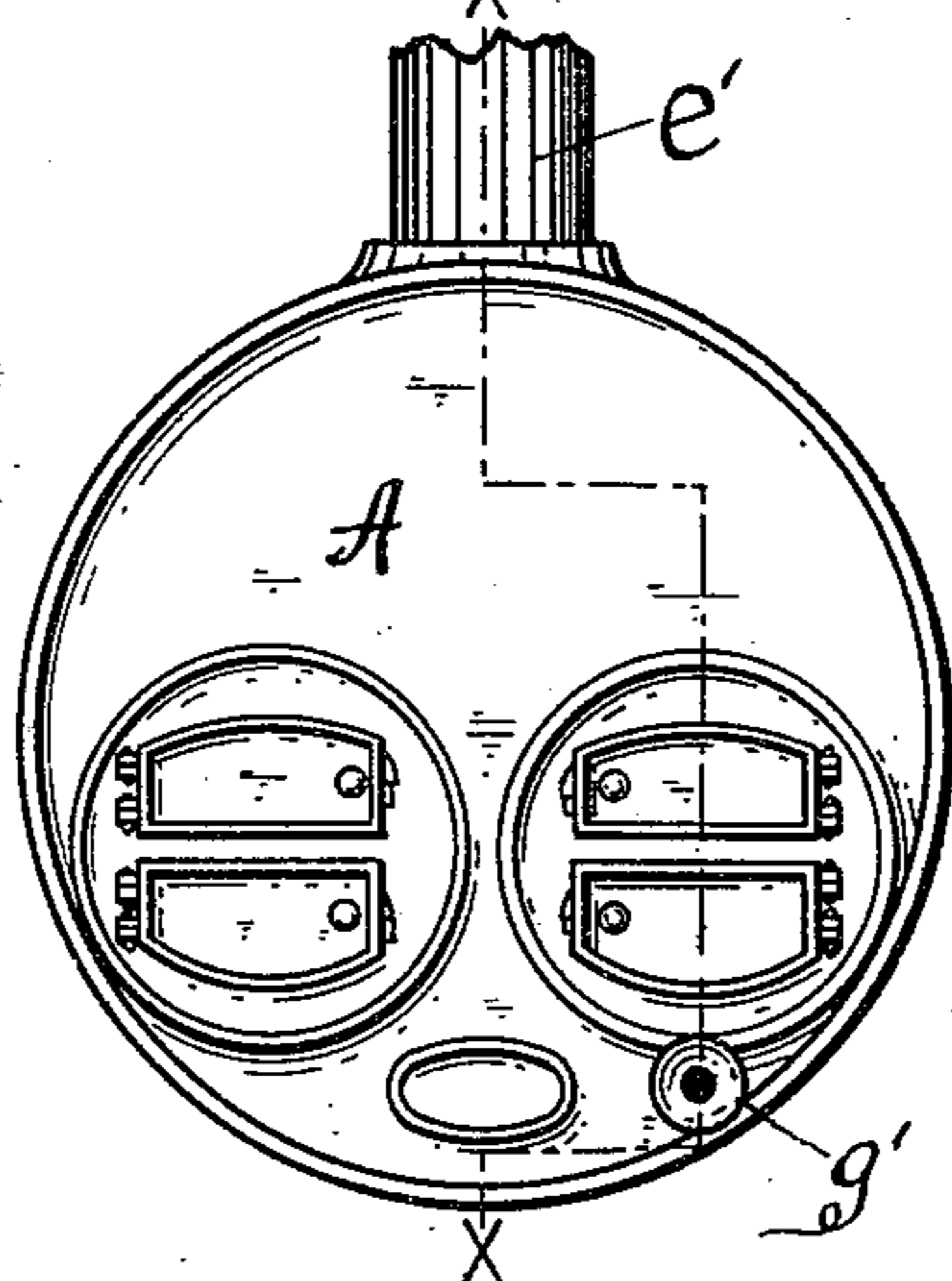


FIG-2-

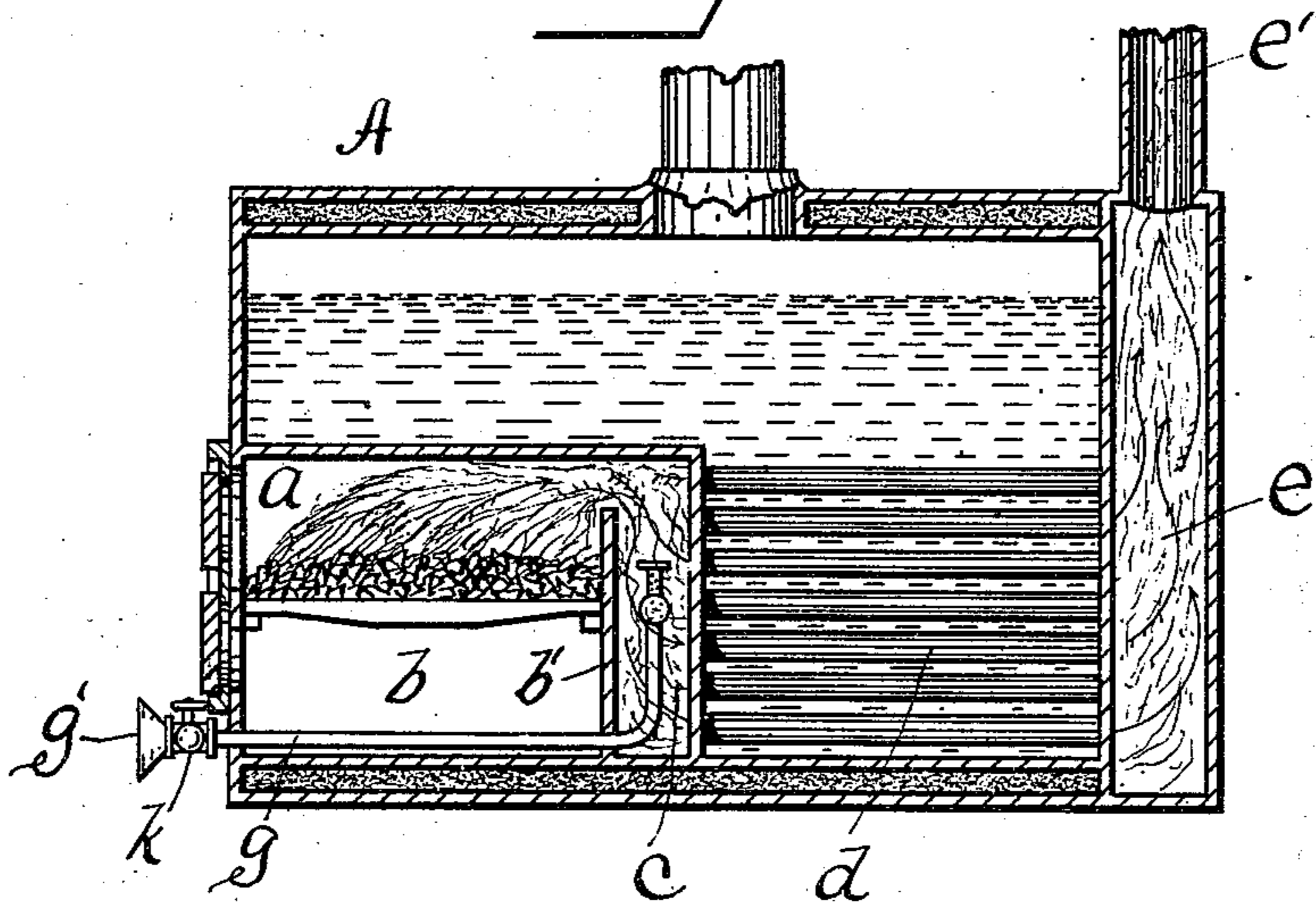


FIG-3-

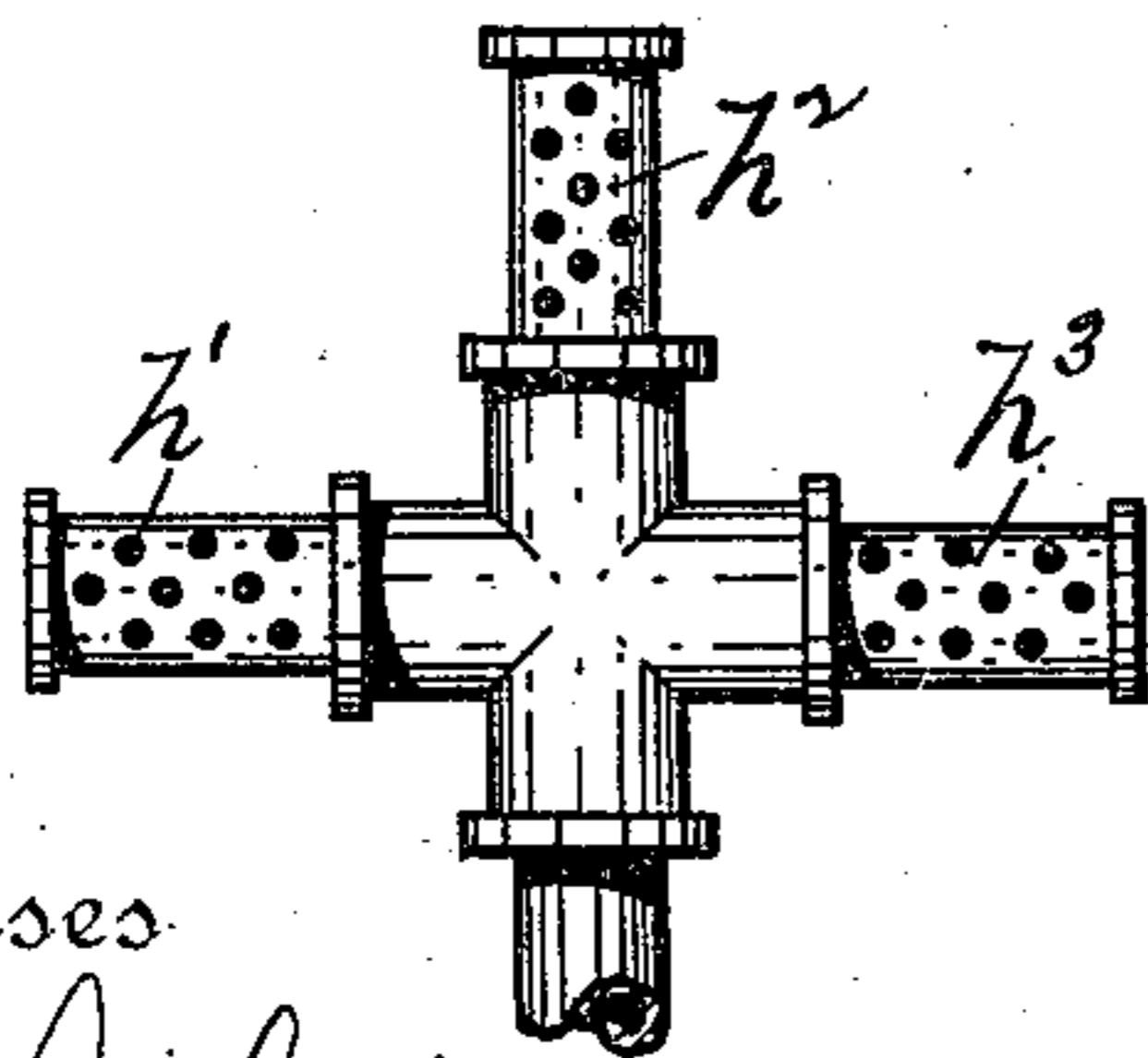
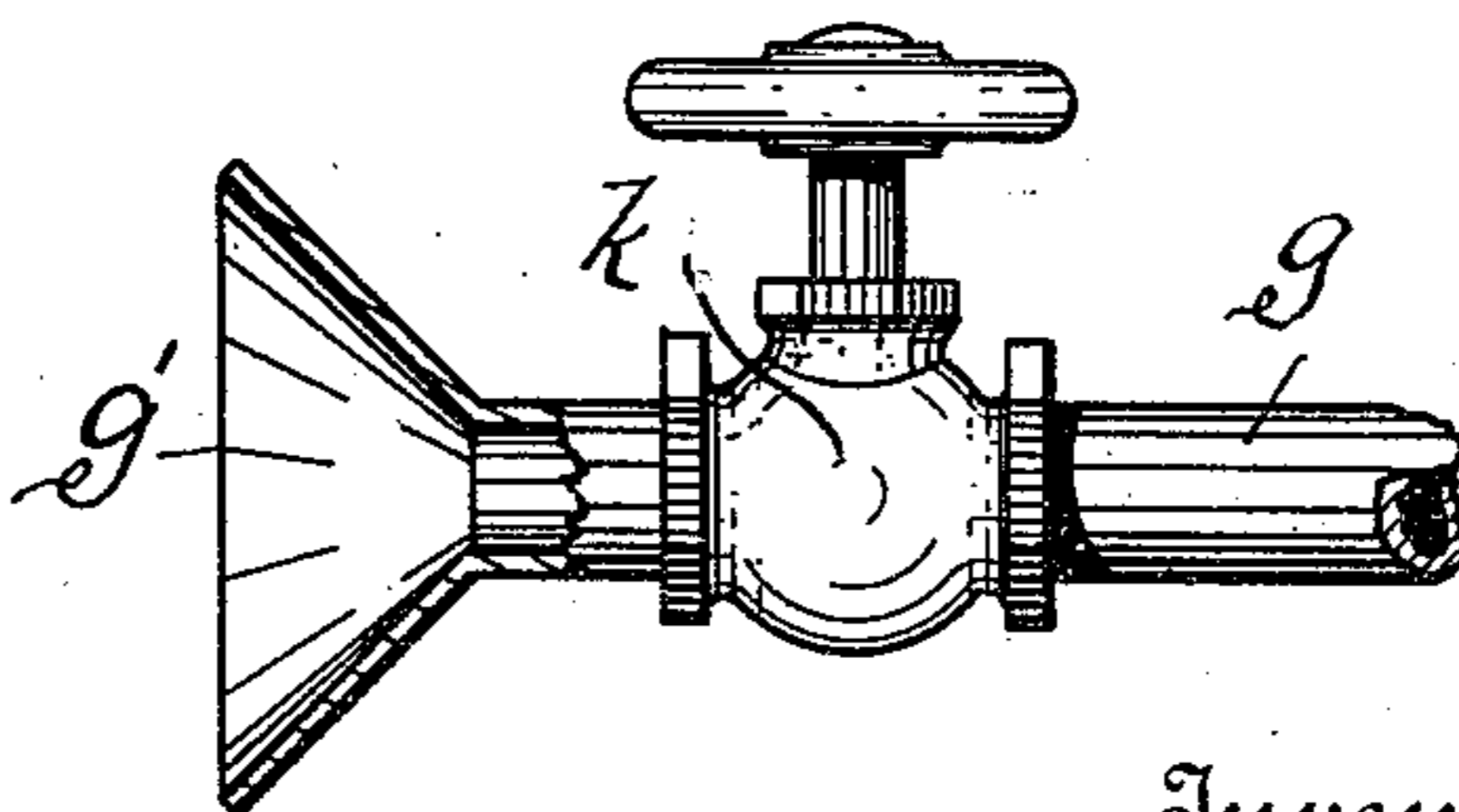


FIG-4-



Witnesses

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Inventor,

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By Attorney  
Frank H. Allen.

# UNITED STATES PATENT OFFICE.

ALBERT J. MCINTOSH, OF SAG HARBOR, ASSIGNOR OF TWO-THIRDS TO  
SAMUEL GRIFFIN, OF RIVERHEAD, AND CHARLES M. GRIFFING, OF  
SHELTER ISLAND, NEW YORK.

## SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 542,371, dated July 9, 1895.

Application filed July 28, 1894. Serial No. 518,849. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT J. MCINTOSH, a citizen of the United States, residing at Sag Harbor, in the county of Suffolk and State of New York, have invented certain new and useful Improvements in Smoke-Consuming Furnaces, which improvements are fully set forth and described in the following specification, reference being had to the accompanying sheet of drawings.

This invention has for its immediate object the production of certain inexpensive improvements for use chiefly with boilers in which the bridge-wall is located between the fire-box and the flues, as in marine boilers, whereby more perfect combustion will be assured than is ordinarily obtained. In carrying into effect my improvements I have, of necessity, utilized a principle well known and frequently adopted in this class of boilers—namely, that of introducing directly into the combustion-chamber a supply of air independent of that which passes through the grate and fire-pot, thus supplying needed oxygen to the gases, which otherwise would be non-inflammable and which would pass off through the stack. By thus rendering it feasible to ignite said gases and produce perfect combustion all smoke, cinders, and other matter mingled with said gases may be consumed and the resulting caloric utilized to aid in making steam.

Heretofore more or less difficulty has been experienced in distributing the supply of air throughout the combustion-chamber to oxygenate the gases in the type of boiler to which I apply my improvement, before portions of the latter escape into the stack, without interfering with the draft or obstructing the passage to the flues for the purpose of cleaning them, and it has also been difficult to estimate and provide the exact volume of air required to produce the best results under all conditions.

My present improvements overcome the described difficulties by very simple and inexpensive apparatus, and they also provide for ready attachment of such apparatus to old

boilers as well as new and for the heating of the inducted air before it reaches the combustion-chamber.

In the annexed drawings, Figure 1 is an end view of a marine boiler embodying my invention; and Fig. 2 is a longitudinal sectional view of the same, taken on line *xx* of Fig. 1. Fig. 3 is an enlarged detached view of the distributing end of the induction-pipe. Fig. 4 is an enlarged view, partly in section, of the exposed end of said pipe, showing also a valve for regulating the inflow of air.

In the drawings, the letter A indicates as a whole a boiler of the horizontal-flue type. *a* denotes the fire-pot of one of its furnaces; *b*, the ash-pit; *c*, the combustion-chamber, located, as here shown, immediately at the rear of the fire-wall *b'*; *d*, the tubes of flues leading into a smoke-chamber *e*, and *e'* the smoke-stack.

In the bottom of the ash-pit is located a tube or pipe *g*, having its exposed end provided with a bell-mouth *g'*. Said pipe extends through the fire-wall *b'* into the combustion-chamber *c*, and its end is bent upward to a point about midway said chamber in Fig. 2, whence branch pipes *h'* *h<sup>2</sup>* *h<sup>3</sup>* lead in directions calculated to discharge and distribute the supply of oxygen to the gases within said combustion-chamber most advantageously, each of said branch pipes being perforated, as shown. By locating the bridge-wall between the fire-box and the flues and at a short distance from the ends of the flues and placing the perforated end of the pipe *g* in the chamber thus formed between the bridge-wall and the end of the flues, whereby the unconsumed particles are forced down over the ends of the branch pipes, I am thus able to insure the perfect and instant intermingling of oxygen and gases, permitting said gases to ignite and burn all inflammable matter within the combustion-chamber, and by thus converting said gases and matter into caloric the best possible results are obtained from the fuel used.

The location of the induction-pipe *g* in the extreme lower part of the ash-pit should be

noted, as the high temperature of said ash-pit serves to heat the pipe *g* and the current of air flowing therethrough, so that when the said air reaches the combustion-chamber it is  
5 raised to approximately the temperature of said chamber and has no depressing effect upon the gases therein.

In the projecting exposed end of the induction-pipe *g* is a valve *k*, of any suitable form,  
10 by means of which the inflow of air may be regulated or entirely shut off. This is desirable, in fact, necessary, for the reason that under varying conditions more or less air is  
15 needed to oxygenize the gases within the furnace, and it is also desirable to shut off the supply of air when not using steam or when it is desirable to "bank" the fires, and this may be readily done by partially or completely closing the valve *k*.

20 My invention costs very little, is easily applied to old or new boilers, and I find in practice that it results in a marked saving of fuel.

Having described my invention, I claim as new and wish to secure by Letters Patent—

In combination, a steam boiler provided 25 with a fire box and an ash pit at one end a smoke chamber at the rear, tubes intermediate the fire box and the smoke chamber, and a bridge wall between the fire box and the flues and at a short distance from the flues, whereby 30 a combustion chamber is formed between the bridge wall and the ends of the flues, and an air induction pipe leading from the front of the boiler through the ash pit into the combustion chamber, the outer end of which is 35 provided with a valve and the inner end is bent upward to a point substantially midway of the combustion chamber and provided with perforated branch pipes, substantially as set forth.

ALBERT J. MCINTOSH.

Witnesses:

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