

(No Model.)

2 Sheets—Sheet 1.

T. H. SEARS.
BOILER FURNACE.

No. 597,027.

Patented Jan. 11, 1898.

Fig. 1.

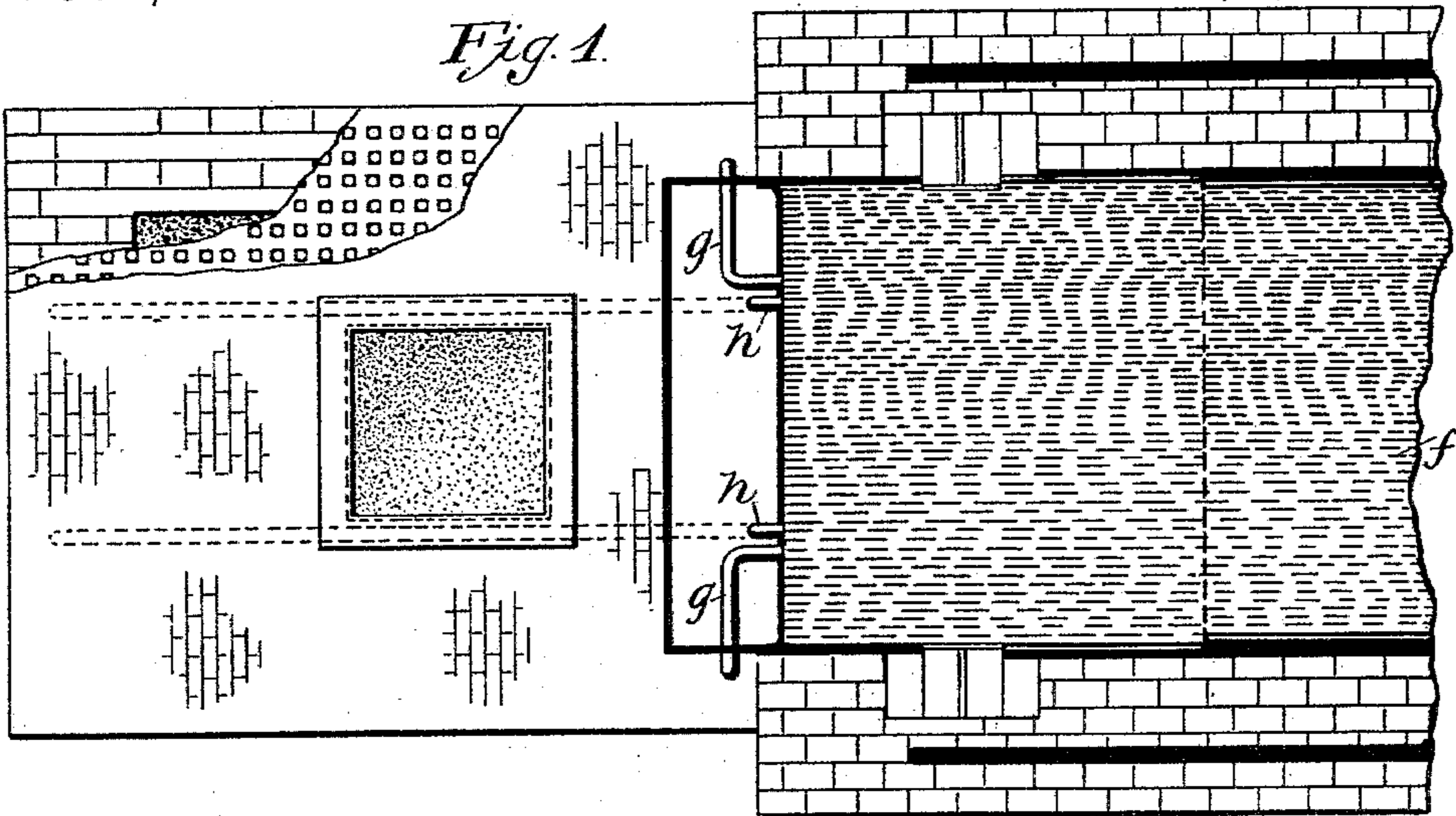
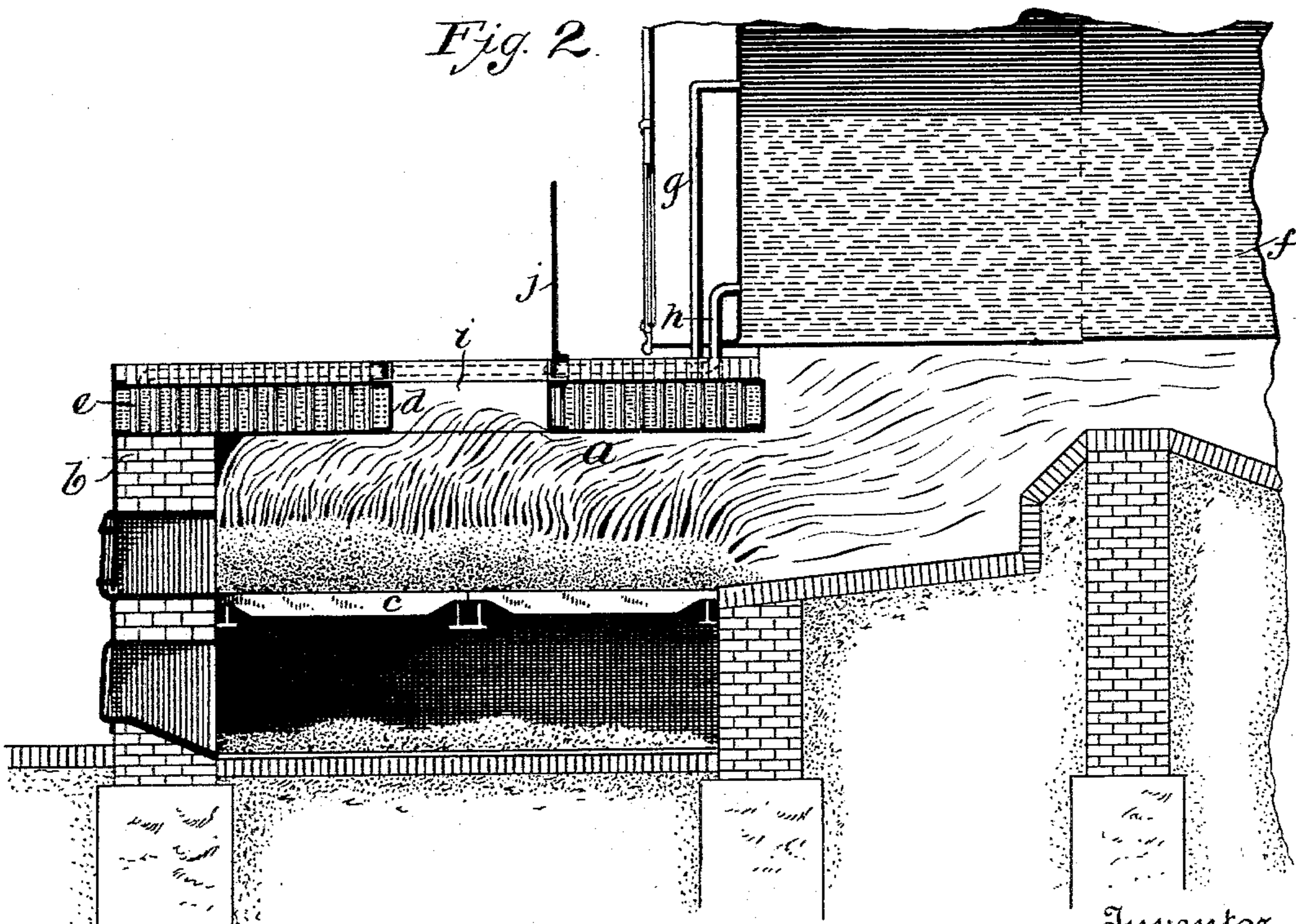


Fig. 2.



Witnesses

L. St. Sforner.
E. C. Strickney.

Inventor

Thomas H. Sears
By Allen Webster
Attorney

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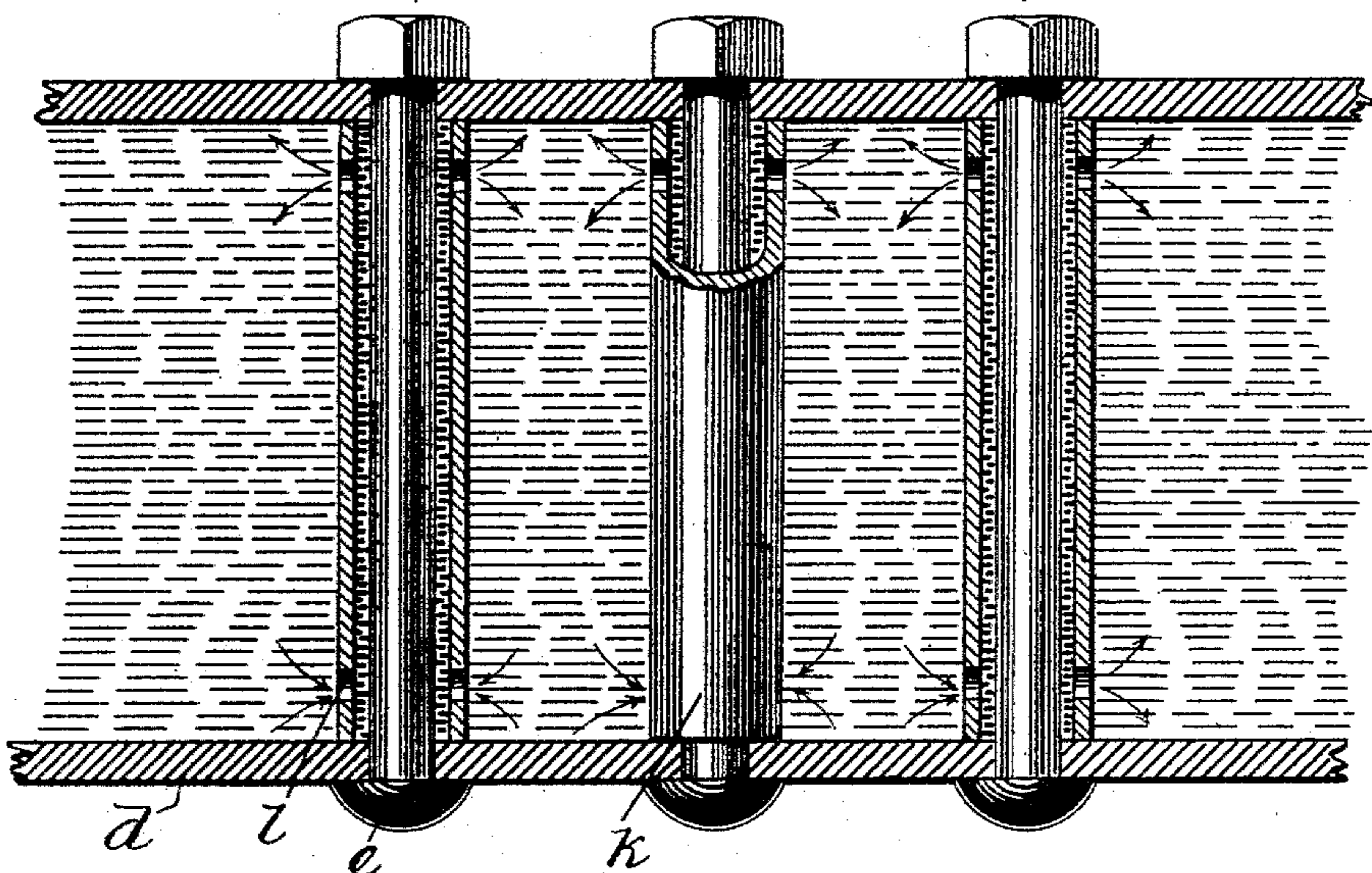
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Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS H. SEARS, OF HOLYOKE, MASSACHUSETTS.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 597,027, dated January 11, 1898.

Application filed May 27, 1896. Serial No. 593,264. (No model.)

To all whom it may concern:

Be it known that I, THOMAS H. SEARS, a citizen of the United States of America, residing in Holyoke, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Boiler-Furnaces and Boilers, of which the following is a specification, reference being had to the accompanying drawings, and letters of reference marked thereon.

My invention relates to an improved construction of furnace and boiler wherein all the heat of the furnace is utilized to the best advantage and an improved construction of furnace construction is provided.

The object of my invention is to provide a construction of furnace and boiler wherein any sort of fuel may be employed and wherein a supplementary heating-shell is provided to the end that fuel may be economically employed and no part of the heat be carried away by the products of combustion, and wherein the construction of the furnace is such that a truss top is provided and the life of the furnace is increased; and I accomplish the objects of my invention by the construction herein shown.

In the accompanying drawings, in which like letters of reference indicate like parts, Figure 1 is a plan view of my improved construction. Fig. 2 is a side elevation in section of the same, and Fig. 3 is an enlarged sectional view illustrating a portion of the detail of construction.

In detail, *a* indicates the fire-box or combustion-chamber; *b*, furnace-wall; *c*, grate-bars; *d*, a water box or shell; *e*, bolts; *f*, main boiler; *g*, conduit extending from the steam-space in the main boiler to the water box or shell *d*; *h*, conduit extending from the water-space in the main boiler to the water box or shell *d*; *i*, opening through water-box; *j*, cover for the same; *k*, tubes through which the bolts *e* pass, and *l* openings in said tubes.

While the fire-box, grate-bars, and other well-known parts of the furnace and boiler equipment may be of the common construction, I prefer in my device to use and employ the construction illustrated in the drawings.

For the purpose of economically utilizing all the heat from the furnace I arrange directly

above the combustion-chamber or fire-box a rectangular water-box *d*, formed of sheet metal, the same forming practically a supplementary boiler, and to maintain the walls thereof in proper position under pressure I at frequent intervals arrange the bolts *e*, passing through the upper and lower plates of the water-box, and arranged around these bolts are the tubular pieces *k*, the interior openings in which are of greater diameter than the diameter of the bolts, and to protect the bolts from the heat I provide the tubular pieces *k* with openings *l* at both top and bottom, so that there will be a constant circulation of water between the surface of the bolts and the inner walls of the tubes.

A conduit *h* is provided opening at one end into the water-space in the main boiler and at the opposite end opening into the shell *d* through the top plate, and also a conduit *g*, connected at one end with the steam-space in the main boiler and at the other end opening through the top plate of the shell *d* at a point somewhat remote from the point of connection of the conduit *h* therewith, so that there will be established a constant circulation of water between the boiler and shell. This arrangement of the circulating-pipes *g* and *h* removes them from the direct action of the furnace-heat and conduces to their preservation and simplifies and cheapens the construction.

The main boiler is located at the rear of the shell *d*, so that the escaping products of combustion will give off its heat in passage, and in this manner substantially all of the heat will be utilized.

It will readily be seen that upon the water in the shell becoming heated a circulation will be at once established between the contents of the shell and the contents of the boiler, and in this manner I am enabled to heat the water in the boiler in less time and more economically than would be the case if the heat of the furnace were directed against the main boiler only.

A fuel-opening *i* is formed vertically through the middle of the water-box substantially over the center of the fuel-chamber, metal walls extending about the opening, as shown in the drawings, through which sawdust and other like fuel (which it is found inconvenient to

feed through the furnace-door opening in the end) is fed, and a lid *j* is provided to close the opening *i*.

It will be perceived that the tubes *k* serve as spacing-tubes between the opposite plates of the shell *d*, and being provided with ports or openings they afford circulation of the water to and about the bolts and prevent them from becoming overheated by the action of the furnace.

The openings for the circulation of water within the tubes *k* may of course be of any desired shape or size and may consist of a groove formed in the ends, so that the water could pass therethrough.

Having therefore described my invention, what I claim, and desire to secure by Letters Patent, is—

The combination with a furnace and a

boiler, of a metal water-box, comprising a rectangular metal shell *d* arranged over and covering the fuel-chamber of the furnace and having interior vertical walls at its central portion to form a rectangular fuel-opening over the middle of the fuel-chamber, a door to close the fuel-opening, a plurality of spacing-tubes formed with circulating-ports, arranged between the upper and lower plates of the water-box, stay-bolts of less diameter than the spacing-tubes passed through the tubes to hold the upper and lower plates of the water-box in place, and circulating-pipes *g h* leading from the boiler and opening into the water-box through the top plate thereof.

THOMAS H. SEARS.

Witnesses:

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