

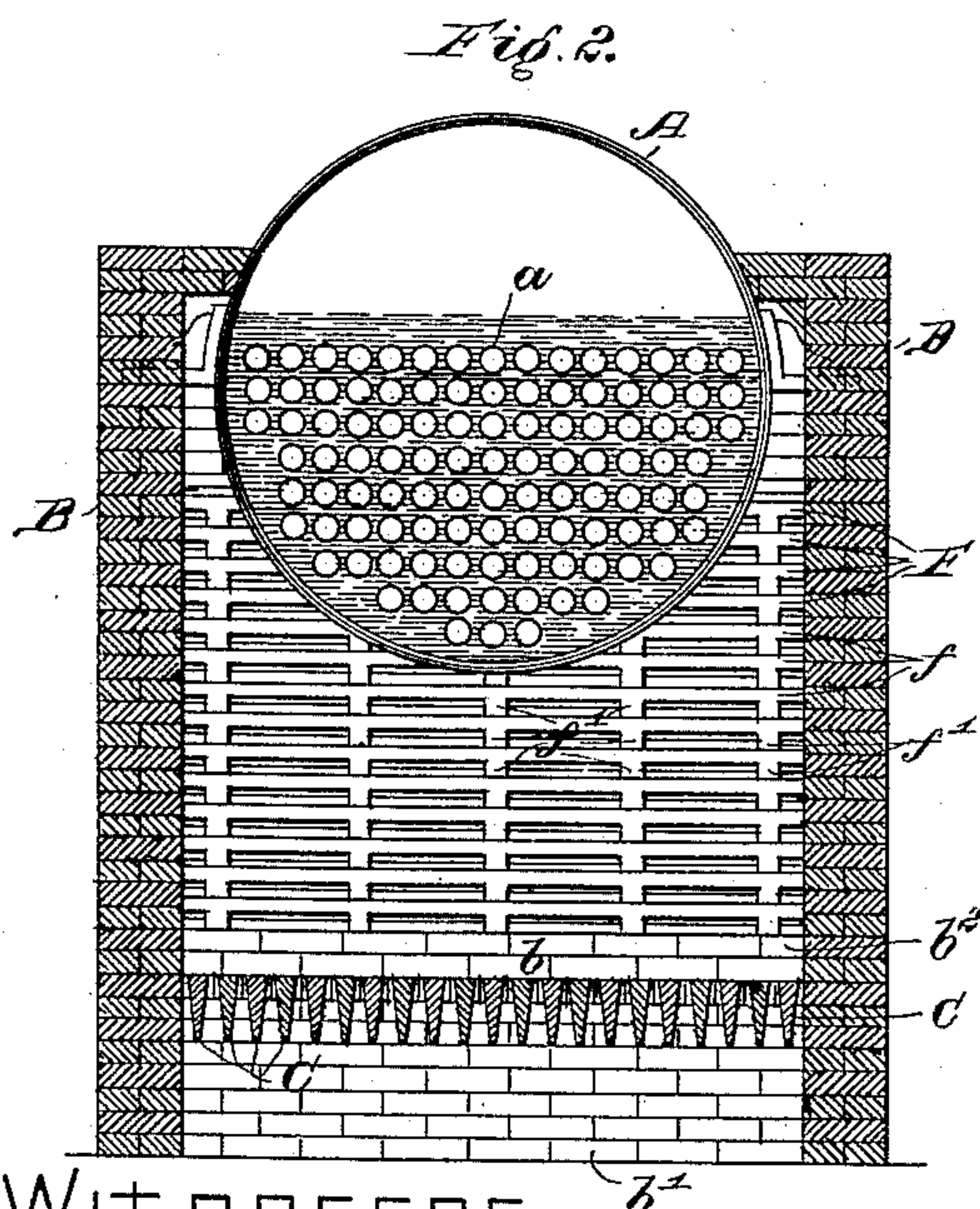
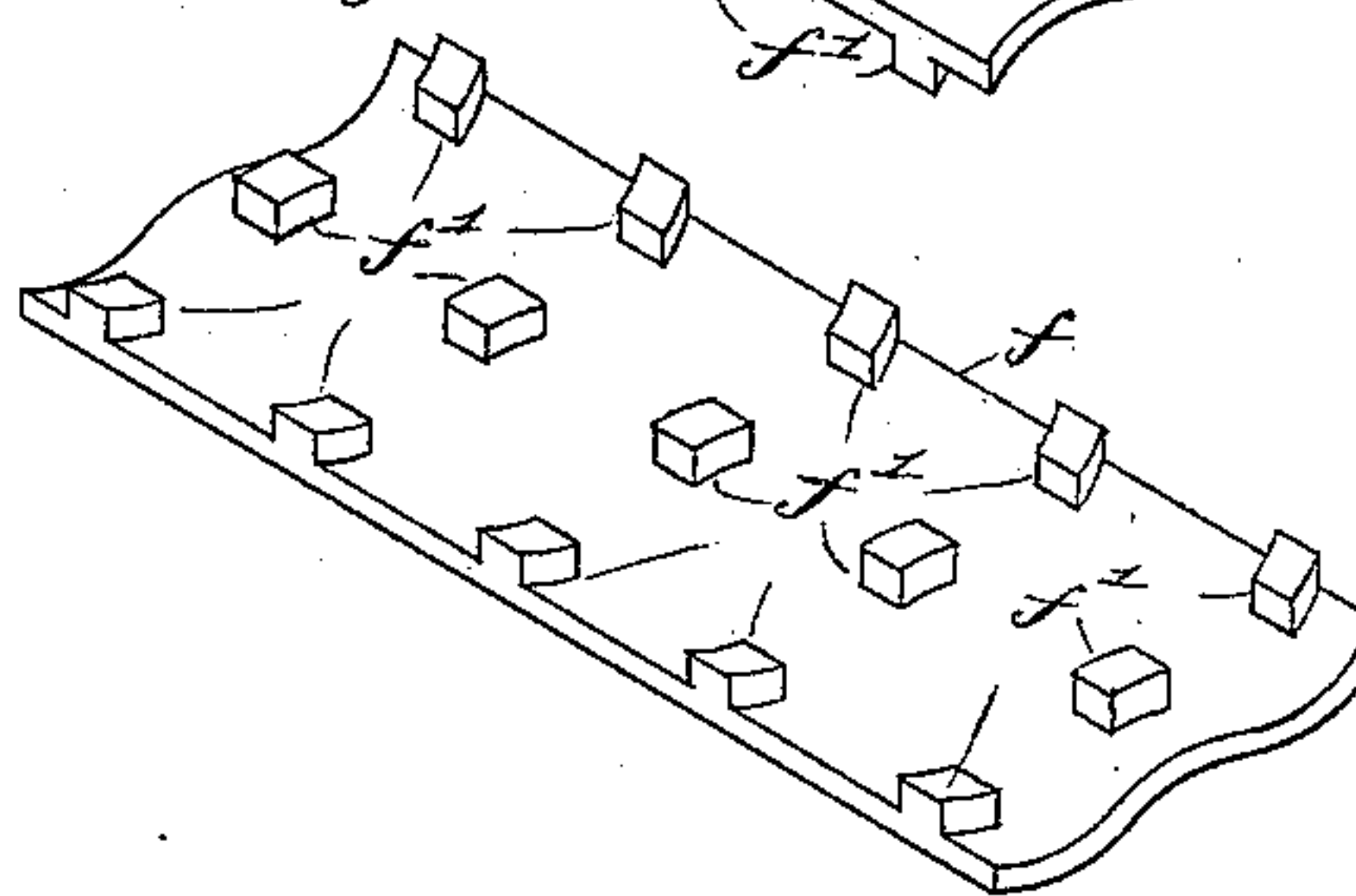
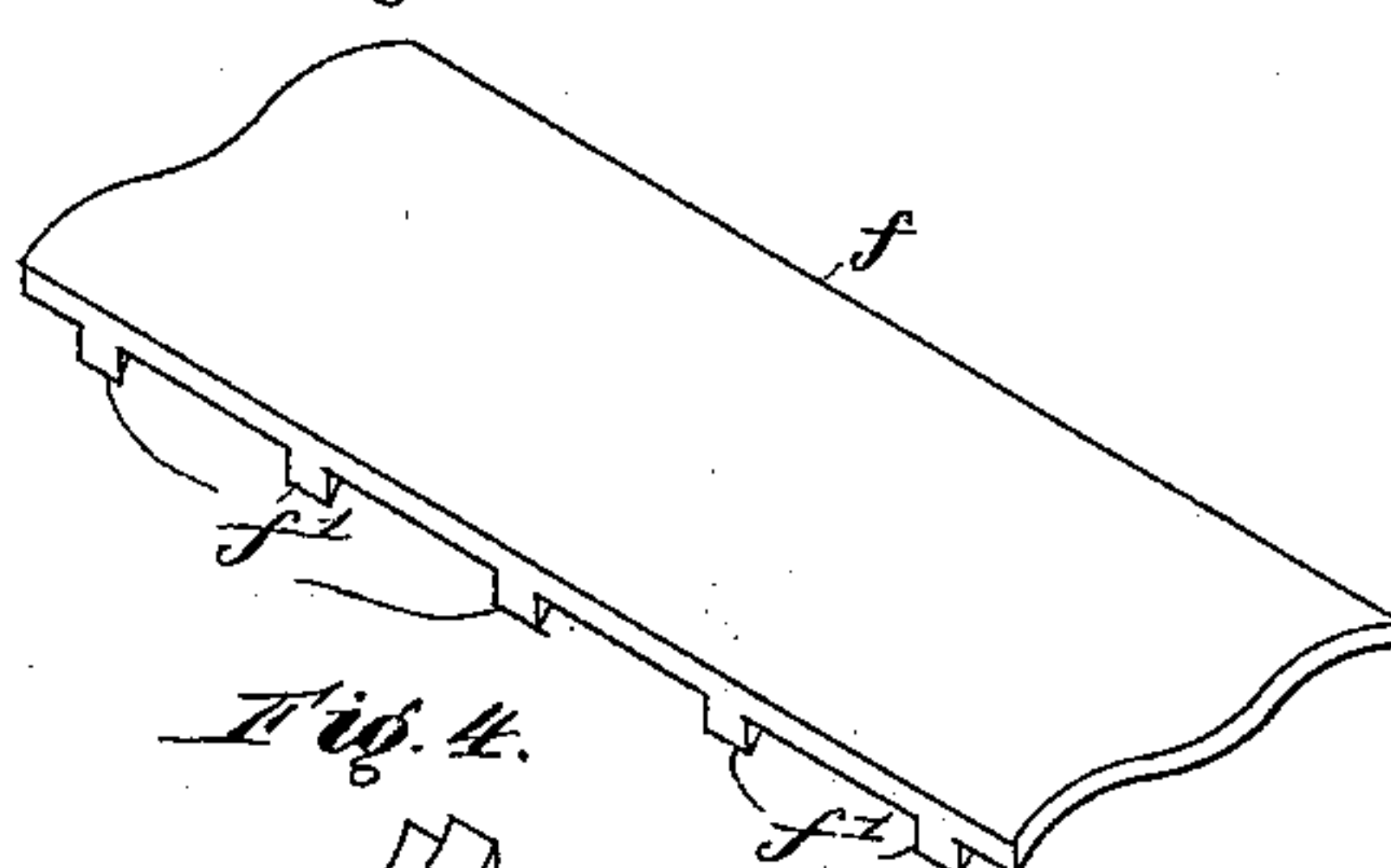
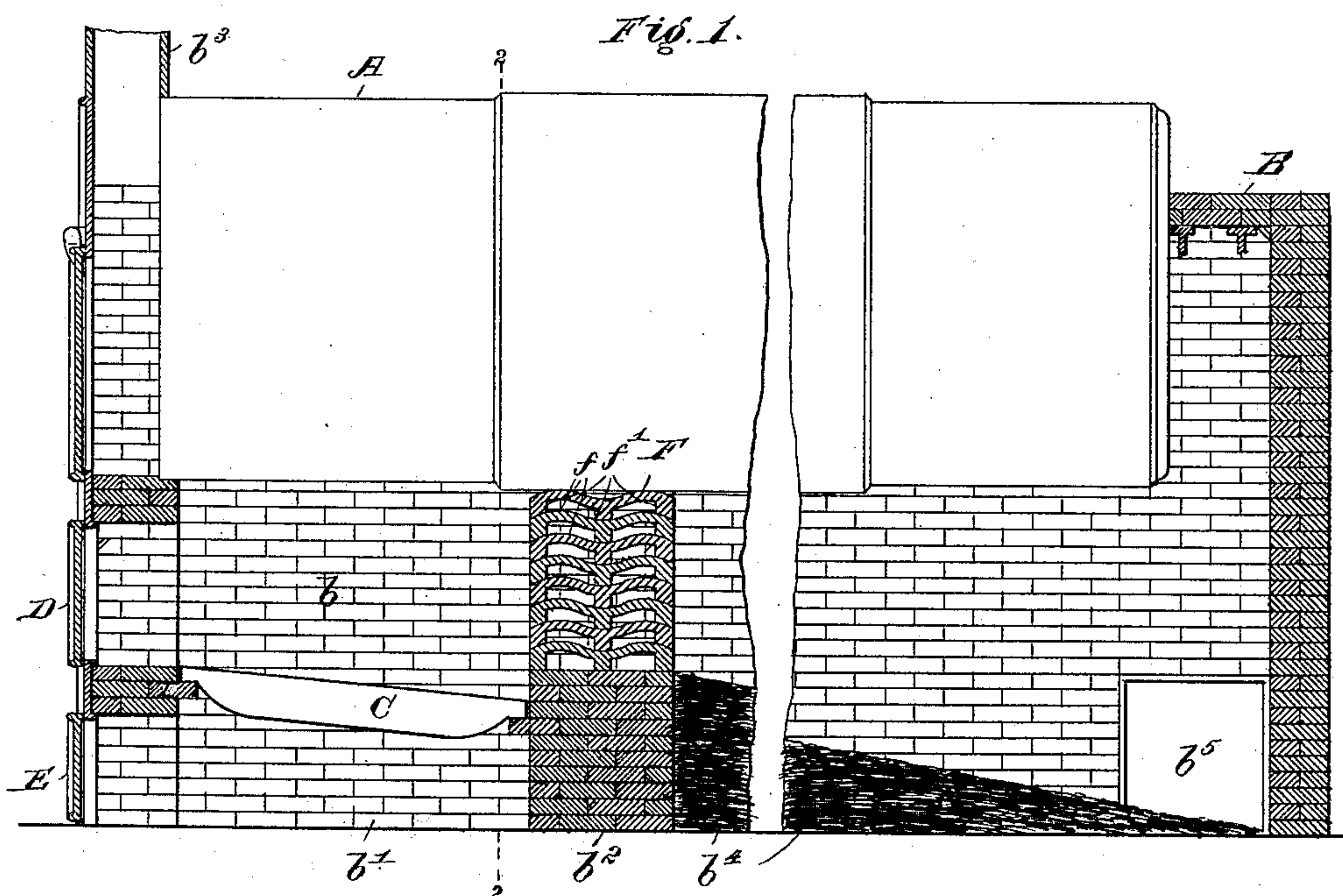
(No Model.)

G. A. FARWELL.

# GAS AND SMOKE CONSUMER FOR STEAM BOILER FURNACES.

No. 452,344.

Patented May 12, 1891.



Witnesses \_\_\_\_\_

Kirkley Hyde.

Myrtle C. Beale.

Inventor\_

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His Attorney.



# UNITED STATES PATENT OFFICE.

GEORGE A. FARWELL, OF LOWELL, ASSIGNOR TO RICHARD W. PRATT, OF BOSTON, MASSACHUSETTS.

## GAS AND SMOKE CONSUMER FOR STEAM-BOILER FURNACES.

SPECIFICATION forming part of Letters Patent No. 452,344, dated May 12, 1891.

Application filed January 6, 1891. Serial No. 376,863. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE A. FARWELL, a citizen of the United States, residing at Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Gas and Smoke Consumers for Steam-Boiler Furnaces, of which the following is a specification.

My invention relates to gas and smoke consumers for steam-boiler furnaces; and it consists in the devices and combinations hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a tubular boiler set in brick-work, showing the fire-space, ash-pit, chimney-casing, doors, and chimney in vertical section, also my improvement in vertical longitudinal section, a portion of the boiler and casing being broken away; Fig. 2, a vertical transverse section on the line 2 2 in Fig. 1, showing the bridge-wall and my improvement in front elevation; Figs. 3 and 4, isometric views of one of the plates of which the gas and smoke consumer is constructed, Fig. 3 showing the upper and Fig. 4 the under surface of the same.

The tubular boiler A, set in brick-work, having a fire-space *b*, fire-grate C, ash-pit *b'*, bridge-wall *b''*, chimney *b'''*, fire-door D, through which fuel is introduced into the fire-space above the grate C, and E, the ash-pit door, are all of the usual construction and operation. From the fire-space the products of combustion, except the ashes and cinders, pass over the bridge-wall to the rear of the boiler, up behind the same, through the boiler-tubes *a* into the chimney, except that a part of the ashes falls through the grate into the ash-pit, and a part into the space at the rear of the bridge-wall, as indicated at *b''*, which represents a pile of ashes. Some part of the ashes enters the boiler-tubes and requires to be removed therefrom occasionally, and the ashes are removed from the space behind the bridge-wall through an ash-door *b''*.

It is well known that in boiler-furnaces the combustion is imperfect, as such furnaces are usually constructed, and that large quantities of inflammable gases pass through the boiler-tubes into the chimney without combustion,

and that the smoke also contains a large amount of unoxidized carbon, which is not only wasted but clogs up the boiler-tubes and chimney and impedes the draft.

The object of my invention is to produce a more perfect combustion of the inflammable gases generated from the coal and a more perfect combustion of the particles of carbon contained in the smoke. To accomplish this I arrange between the top of the bridge-wall and the bottom of the boiler a perforated wall F, of a material adapted to be intensely heated by the heat in the fire-box and to impart its heat to said gases and particles of carbon, the perforations in said wall F having the same general direction as that taken by said gases and smoke. I prefer to make the wall F of plates *f*, provided with projections or legs *f'*, as shown, to enable said plates to be piled upon each other above the bridge, so as to leave spaces between the lower plate and the top of the bridge-wall and between each plate and the one above it. The body of each plate is preferably curved, as shown, to expose a greater surface to the hot air, smoke, and gases, and to be thereby more readily heated and more capable of heating the same. The plates *f* may be of iron where the heat of the furnace is not too great; but where a very great heat is employed said plates should be made of fire-brick or other infusible material or material fusible only at very high temperatures. The height of the wall F will depend upon circumstances, and is to be determined by the facts of each case in which they are used. Of course the wall F to a certain degree impedes the draft, and this fact constitutes an advantage to the extent that when the fire-door is opened for the introduction of fuel the draft of air through said fire-door is so violent frequently as to cool off the boiler appreciably; but the use of the wall F equalizes this draft, and being heated heats the current of air which enters the fire-door. The plates *f* are not secured to each other, but rest upon each other and are held in place merely by their own weight, so that all or any portion of the same may be quickly removed and the wall F may be lowered or raised to a greater height as the draft may require.

By the use of the improvement herein de-

scribed I have secured a more uniform draft,  
more perfect combustion, and less fouling of  
the boiler-tubes. By the use of said improve-  
ment equally satisfactory results can be ob-  
5 tained with less grate-surface and less fuel.

I claim as my invention—

The combination, with a boiler furnace  
having a fire-space and a bridge, of a wall  
consisting of plates of material adapted to be  
10 heated by the gases and smoke from said fire-  
space and to equalize the heat of said gases

and smoke, said plates being curved, as de-  
scribed, and having legs or projections and  
being superimposed on said bridge, as and  
for the purpose specified.

In witness whereof I have signed this speci-  
fication, in the presence of two attesting wit-  
nesses, this 24th day of December, A. D. 1890.

GEORGE A. FARWELL.

Witnesses:

ALBERT M. MOORE,

JAMES A. LOGAN.

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