

No. 772,071.

PATENTED OCT. 11, 1904.

J. J. TONKIN.  
STEAM BOILER.

APPLICATION FILED FEB. 17, 1904.

NO MODEL.

4 SHEETS—SHEET 1.

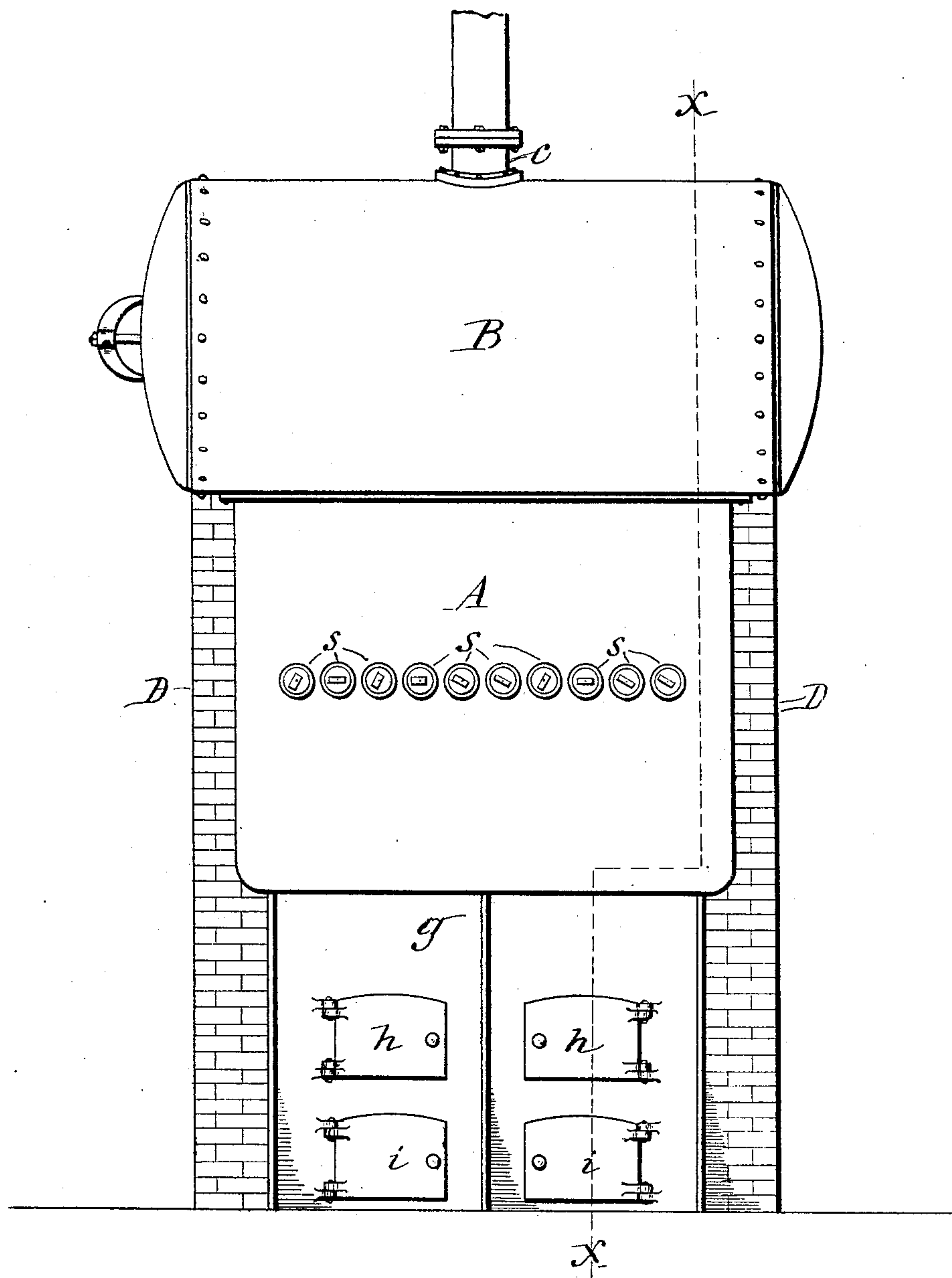


Fig. 1

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G. Van Dorch

INVENTOR

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4 SHEETS—SHEET 2.

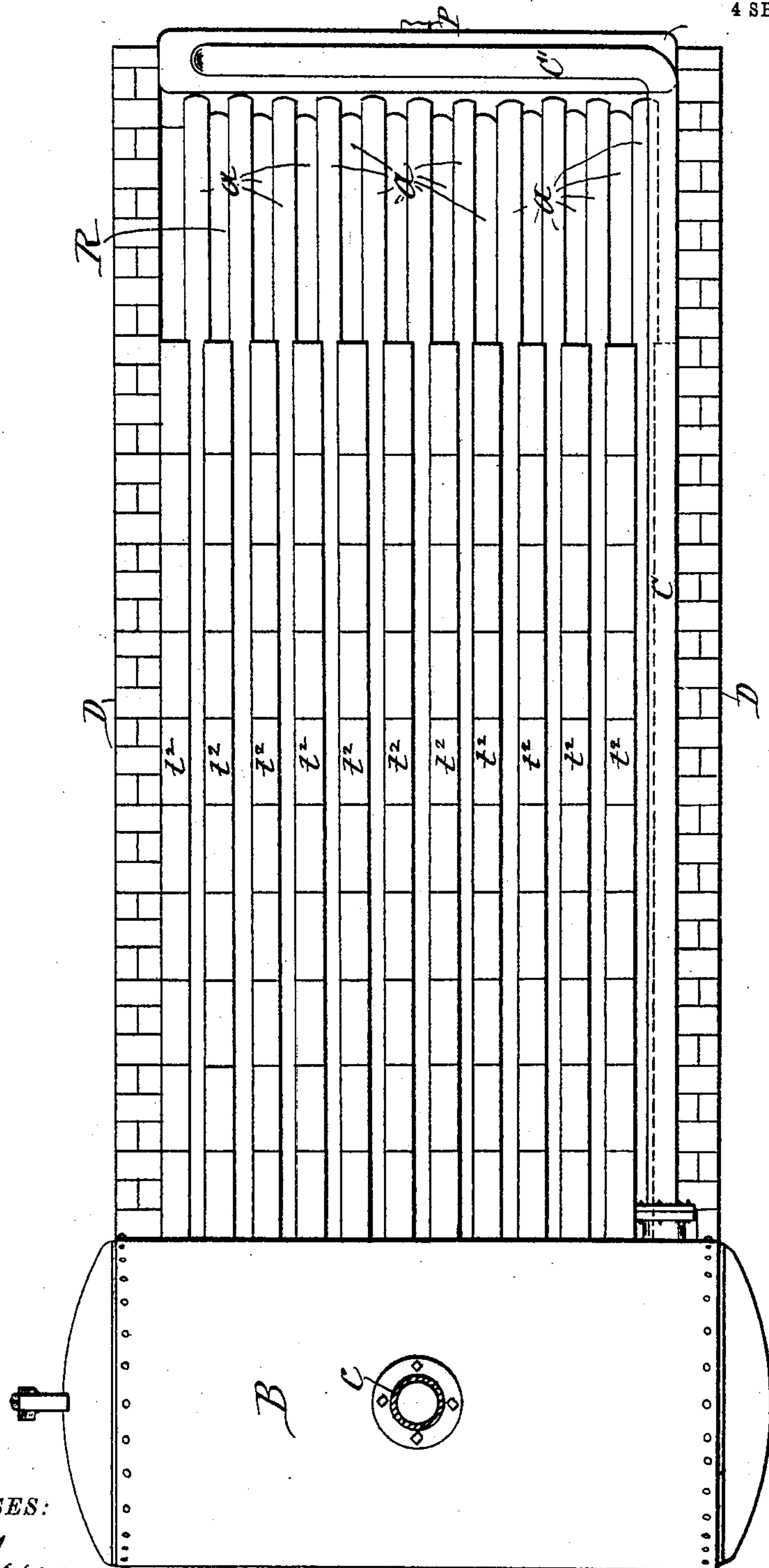


Fig. 2

WITNESSES:

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4 SHEETS—SHEET 3.

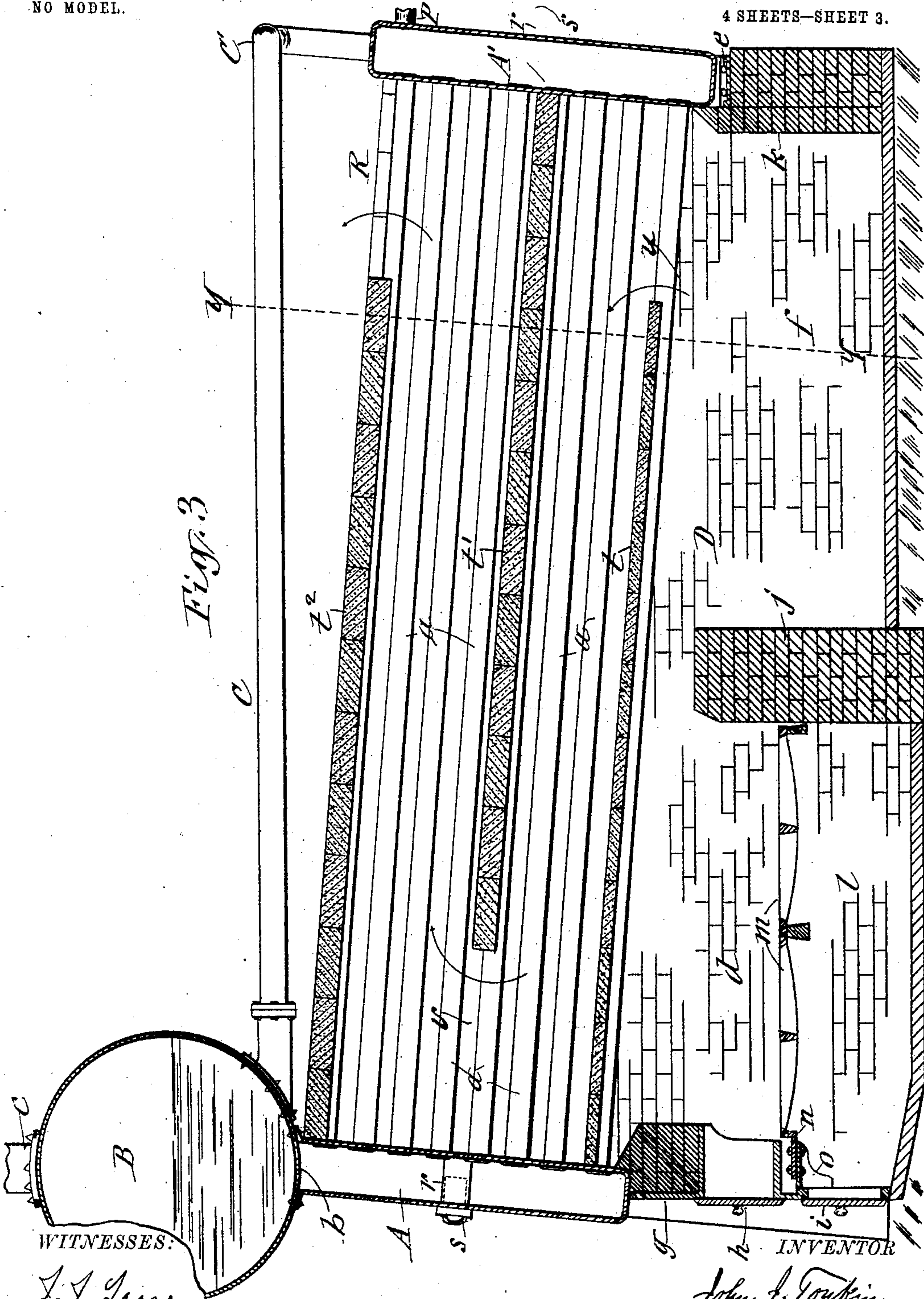


Fig. 3

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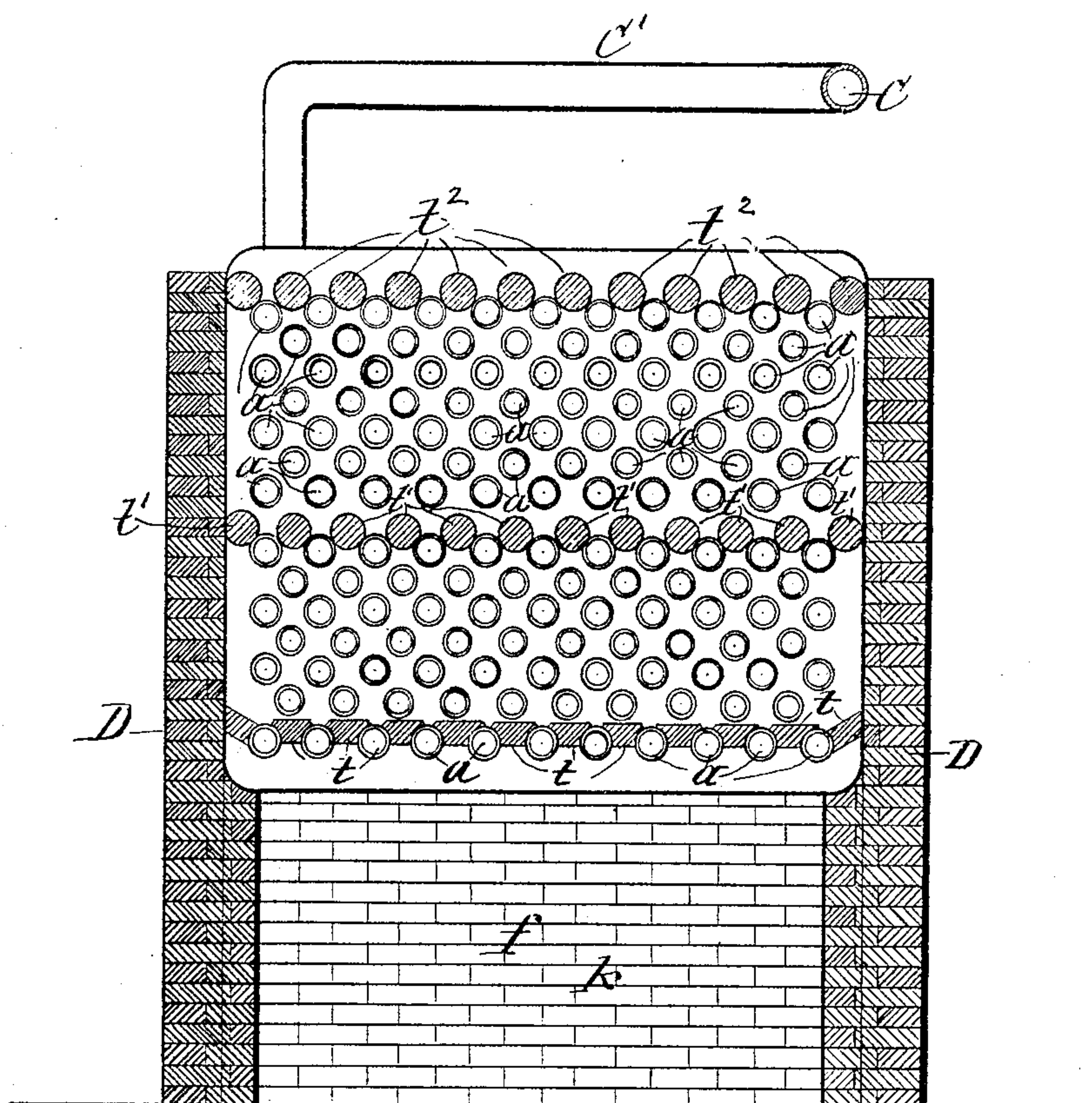
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NO MODEL.

4 SHEETS—SHEET 4.



*Fig. 4*

WITNESSES:

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# UNITED STATES PATENT OFFICE.

JOHN J. TONKIN, OF OSWEGO, NEW YORK.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 772,071, dated October 11, 1904.

Application filed February 17, 1904. Serial No. 194,022. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN J. TONKIN, a citizen of the United States, and a resident of Oswego, in the county of Oswego, in the State of New York, have invented new and useful Improvements in Steam-Boilers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to the class of multitubular boilers in which the water circulates through the tubes and the products of combustion pass between the said tubes and are baffled in their passages to cause the tubes to effectually absorb the heat.

The object of the invention is to provide a steam-boiler which shall be simple in construction, efficient in operation, and shall allow the tubes to expand and contract lengthwise without straining the tubes and shall also afford ready access to the baffle bricks or tiles for repairing or renewing them; and to that end the invention consists in the improved construction of the boiler hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a front elevation of a boiler embodying my invention. Fig. 2 is a top plan view of the same. Fig. 3 is a vertical longitudinal section on line *xx* in Fig. 1, and Fig. 4 is a vertical transverse section on line *yy* in Fig. 3.

Similar letters of reference indicate corresponding parts.

A and A' represent two water-legs or headers constituting the end walls of the boiler. Each of these headers or water-legs extends directly across the boiler and has its inner sheet perforated to constitute a continuous flue-sheet across the end of the boiler. The rear header A' is placed lower than the front header A and communicates therewith through a series of inclined water-tubes *aa*, disposed in rows extending horizontally across the boiler.

To the top of the front header A is attached a steam and water drum B, which is disposed transversely in relation to the boiler and is provided in its bottom with an opening *b*, by which it communicates with the open top of the header A.

C represents a water-circulating pipe which leads from the drum B to the top of the rear header or water-leg A' and is deflected intermediate its ends, as shown at C', to allow said pipe to bend and yield to longitudinal strain to the movement imparted to the headers by the expansion and contraction of the water-tubes *aa*. One of said headers or water-legs rides on rollers *ee* to allow free movement of said header, and thus relieve the connections of the water-tubes *aa* from excessive strain.

The top of the drum B is provided with a steam-outlet *e*, to which the steam-pipe is connected.

The sides of the boiler are closed by walls D D, extending from the front header A to the rear header A' and below said headers sufficiently to form the side walls of the furnace *d*, ash-pit *l*, and flue *f* under the boiler.

The front header is mounted on an iron frame or plate *g*, which is provided with the fire-doors *h h* and ash-pit doors *i i*. The rear header A' is supported upon a transverse wall *k*, extending to the side walls D D.

The described construction of the boiler constitutes one of the salient features of my invention in that I dispense with the usual boiler-shell or any other rigid connection of the two headers A and A', and thus allow the said headers to yield and accommodate themselves to the expansion and contraction of the water-tubes *aa* and relieve said tubes from undue strain.

Between the flue *f* and furnace *d* is a bridge-wall *j*, which supports the rear end of the grate *m*, the front end of which is supported on a transverse plate *n*, secured to or formed integral with brackets *o*, projecting from the front frame or plate *g*.

P denotes the feed-water inlet, which is preferably attached to the rear header A' at or near the top thereof.

*t*, *t'*, and *t''* represent baffle-floors, the first of which is placed on the bottom row of tubes *aa* and extends from the front header A rearward to form the crown over the furnace *d* and terminates at a proper distance from the rear header A' to form a passage *u* for the products of combustion from the rear end of the flue *f* up into the spaces between the wa-

ter-tubes  $a\ a$ . The second baffle-floor  $t'$  is  
 disposed nearly central between the bottom  
 row of water-tubes and the top row of water-  
 tubes and extends from the rear header  $A'$   
 5 forward and terminates at a suitable distance  
 from the front header  $A$  to form the upward  
 passage  $v$  for the products of combustion.  
 The third baffle-floor  $t''$  is mounted on the top  
 row of water-tubes  $a$  and extends from the  
 10 front header  $A$  rearward a sufficient distance  
 to leave an exit  $R$  for the products of com-  
 bustion, which are conducted thence to a smoke-  
 stack. (Not shown.) Each of the said baffle-  
 floors is formed of fire-bricks or tiles sup-  
 15 ported on one of the rows of water-tubes  $a$ .  
 In order to allow the second or central baffle-  
 floor  $t'$  to be readily renewed or repaired, I  
 secure to each of the headers  $A\ A$  a series of  
 dry tubes  $r\ r$ , extending through the header  
 20 and disposed in a row parallel with the baffle-  
 floor  $t'$ . Each of said tubes is provided with  
 a suitable cover  $s$ , which is removable to af-  
 ford access to the said baffle-floor, the bricks

or tiles of which are shaped to permit them  
 to be introduced or removed through the said 25  
 tubes.

It is obvious that in case the second or cen-  
 tral baffle-floor  $t'$  is dispensed with the tubes  
 $r\ r$  are not needed.

What I claim as my invention is— 30

A steam-boiler comprising two water-legs  
 extending directly across the ends of the boiler  
 and formed with flue-sheets at their inner  
 sides, longitudinal water-tubes connected at  
 their ends to said flue-sheets, rollers support- 35  
 ing one of said water-legs, a steam and water  
 drum superposed on one of the water-legs and  
 communicating therewith, and a water-circu-  
 lating pipe extending from said drum to the  
 water-leg at the opposite end of the boiler 40  
 and deflected intermediate its ends to yield to  
 longitudinal strain as set forth.

JOHN J. TONKIN. [L. s.]

Witnesses:

L. H. FULMER,  
 G. VAN VORST.