

(No Model.)

2 Sheets—Sheet 1.

J. C. TITUS.  
STEAM BOILER.

No. 564,346.

Patented July 21, 1896.

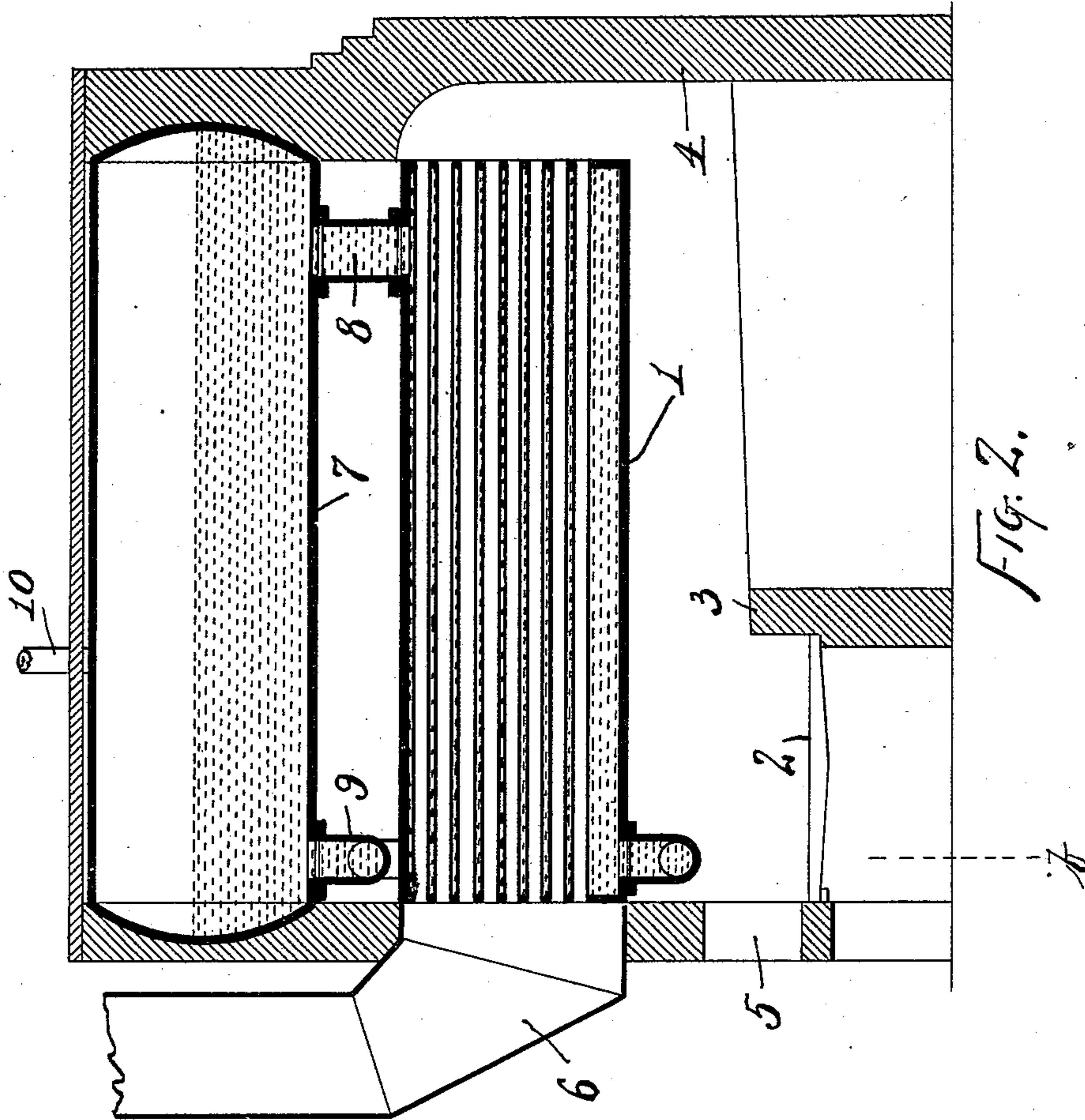


Fig. 2.

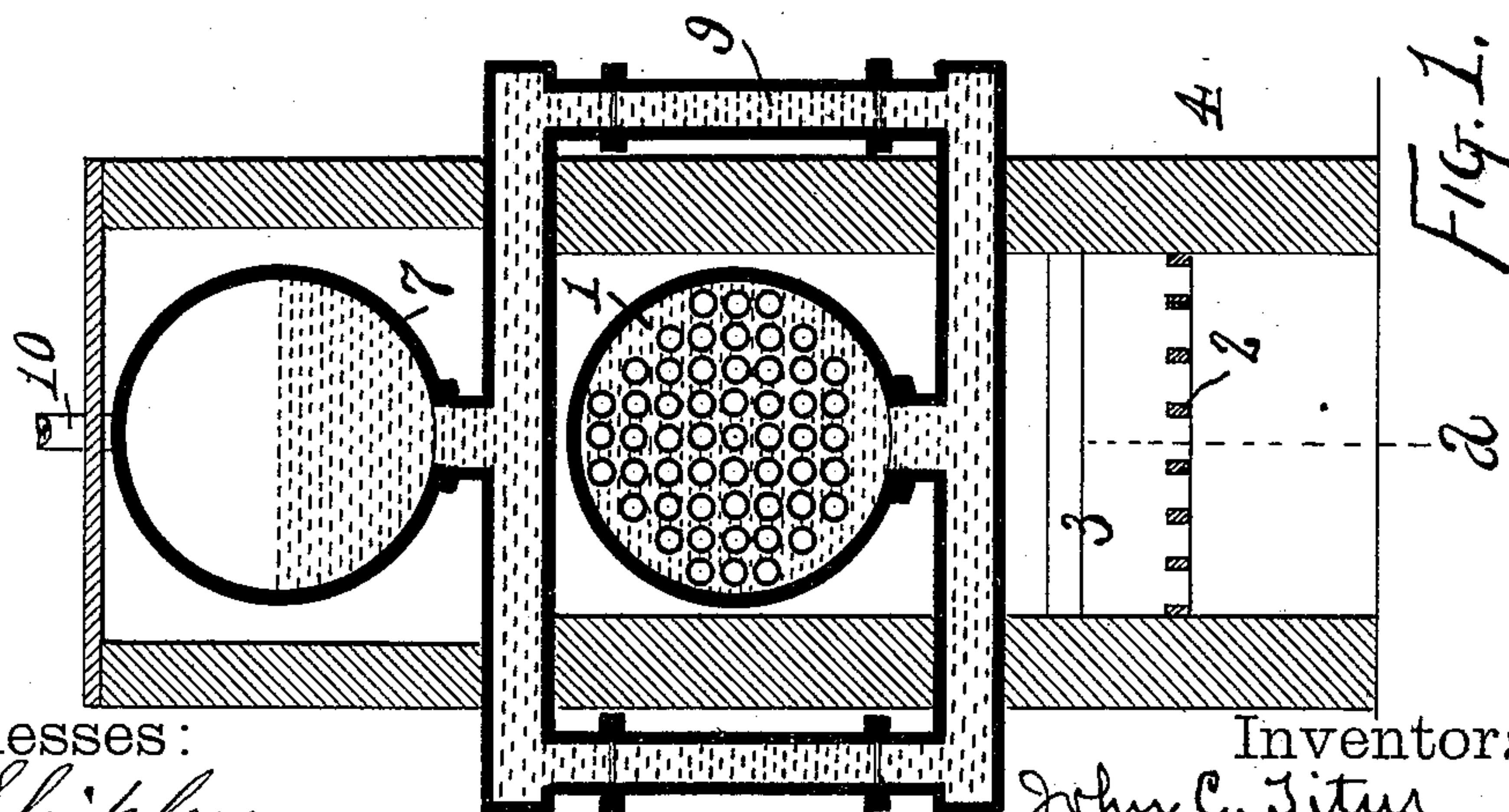


Fig. 1.

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by James W. See  
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2 Sheets—Sheet 2.

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Fig. 4.

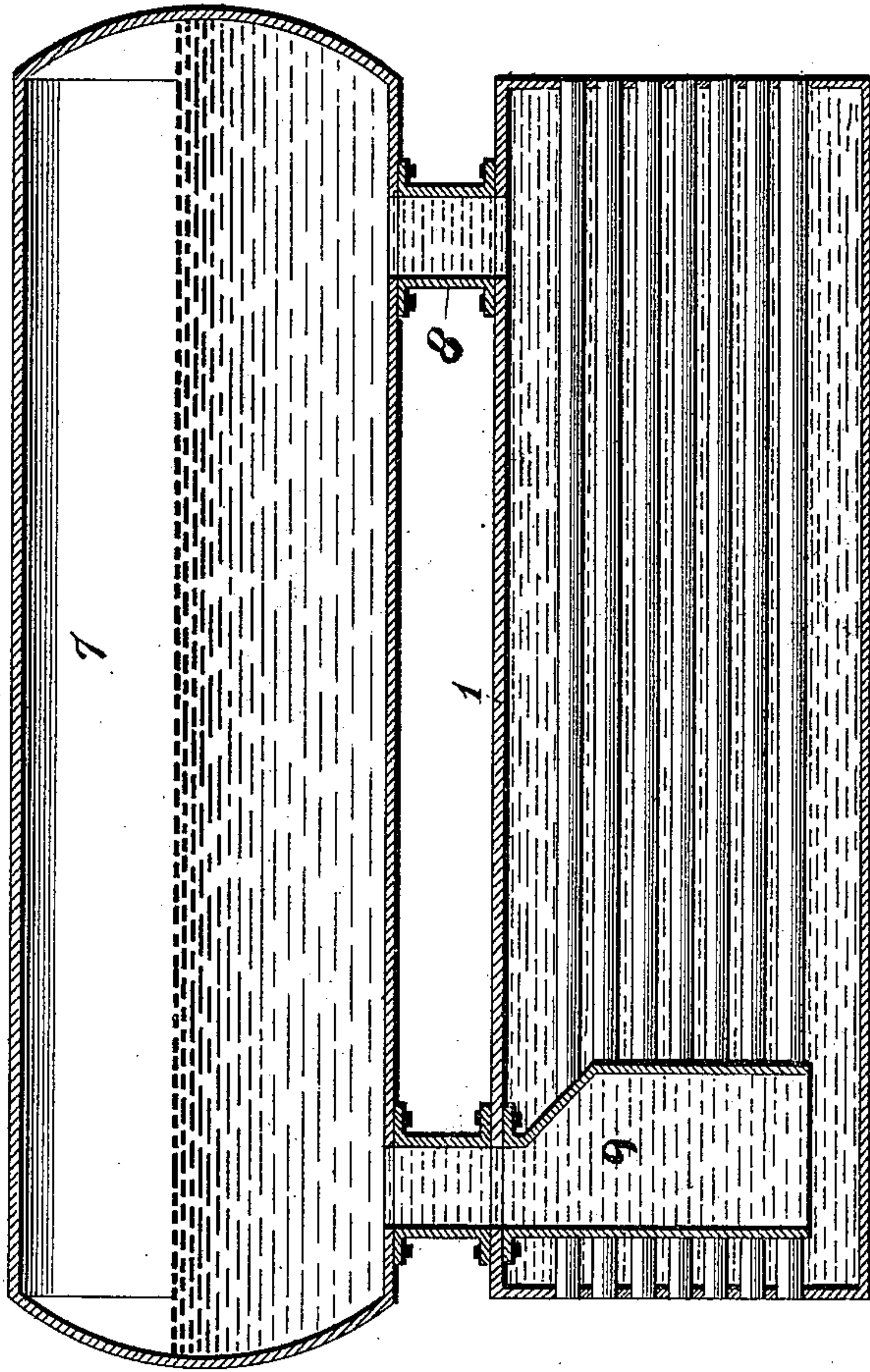
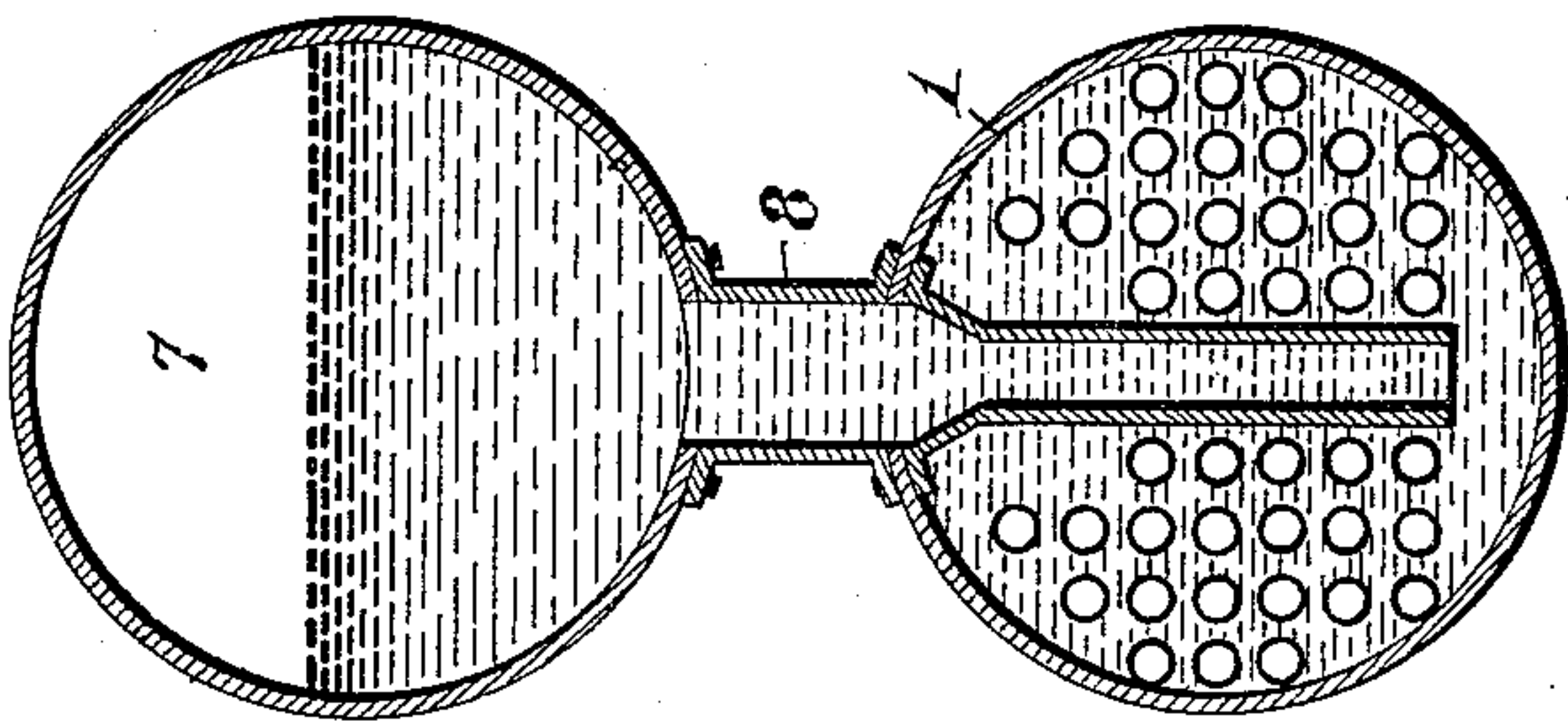


Fig. 3.



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# UNITED STATES PATENT OFFICE.

JOHN C. TITUS, OF NEW BREMEN, OHIO.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 564,346, dated July 21, 1896.

Application filed March 30, 1896. Serial No. 585,350. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN C. TITUS, of New Bremen, Auglaize county, Ohio, have invented certain new and useful Improvements in  
5 Steam-Boilers, of which the following is a specification.

This invention pertains to improvements in steam-boilers, and the improvements will be readily understood from the following description, taken in connection with the accompanying  
10 drawings, in which—

Figure 1 is a vertical transverse section of a boiler exemplifying my improvements, the section being in the plane of line *b* of Fig. 2; and Fig. 2, a vertical longitudinal section of the same in the plane of line *a* of Fig. 1. Fig. 3 is a vertical transverse section of a modified  
15 form of my device, and Fig. 4 is a vertical longitudinal section of the same.

In the drawings, 1 indicates a horizontal tubular boiler; 2, its grate; 3, the bridge-wall; 4, the walls of the setting; 5, furnace-door; 6, the chimney connection; 7, a boiler-shell arranged above the boiler 1, parallel  
25 with it and directly over it; 8, a water connection between the boiler 1 and the shell 7 at one extremity of the two connected structures; 9, a water connection between the lower part of boiler 1 and the lower part of shell 7 at the extremity of those structures  
30 opposite the connection 8, and 10 the steam-pipe connecting with the upper portion of shell 7.

The lower boiler 1 is entirely filled with  
35 water, and the water is carried in the upper structure 7 to about its mid-depth, leaving sufficient room in the top for steam. The circulation of the water is endwise through the two structures, but in opposite directions  
40 respectively. The lower boiler 1 becomes the generating-boiler, or the one in which the heat is imparted to the water, and the vaporization or steam formation takes place in the upper shell 7, and the steam is taken  
45 out at the upper shell away from the level of the boiler in which the generation and violent ebullition takes place, resulting in economy of heat, in dryness of steam, and in such a pronounced circulation as to greatly tend  
50 to avoid deposits of impurities, the system

well lending itself to any of the modern skimming systems for dealing with the impurities at the vaporizing-surface of the water in the upper shell.

In the drawings the form and setting of boiler 1 is of ordinary type, with the chimney  
55 connection at the front end of that boiler; but it is obvious that the chimney connection may be taken off at a higher level, so as to subject the upper shell more to the action of  
60 the hot gases and that the generating-boiler may have any usual form or arrangement of structure and furnace. The disposition of the upper shell parallel with and directly  
65 over the lower boiler is not essential, it being sufficient that shell 7 is higher than boiler 1. In Fig. 1 it will be seen that the connection 9 is carried out from under the lower boiler and up its sides outside the furnace-walls  
70 and then to a connecting-point under the upper shell; but a more direct connection at this point may be made, if desired, as illustrated in Figs. 3 and 4 of the drawings, by carrying the connection 9 from shell 7 directly down into boiler 1 to a point near the  
75 bottom of the latter, tubes being omitted to make room.

I claim as my invention—

In a steam-boiler, the combination with a horizontal generating-boiler consisting of a  
80 single straight chamber, of a horizontal shell located in a higher plane than the generating-boiler, and communicating pipes at the opposite extremities only of the shell and chamber, both of said pipes communicating with  
85 the bottom of the shell and with the top and bottom, respectively, of the generating-chamber, whereby a constant circulation through the shell and generating-boiler in opposite  
90 directions and continuously from end to end is maintained, the circulation in each of said chambers being in one direction only and having no means of ingress and egress except adjacent to the opposite extremities of the shell and boiler.

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