

**C. D. SMITH.**  
**Boiler-Furnaces.**

No. 143,305.

Patented September 30, 1873.

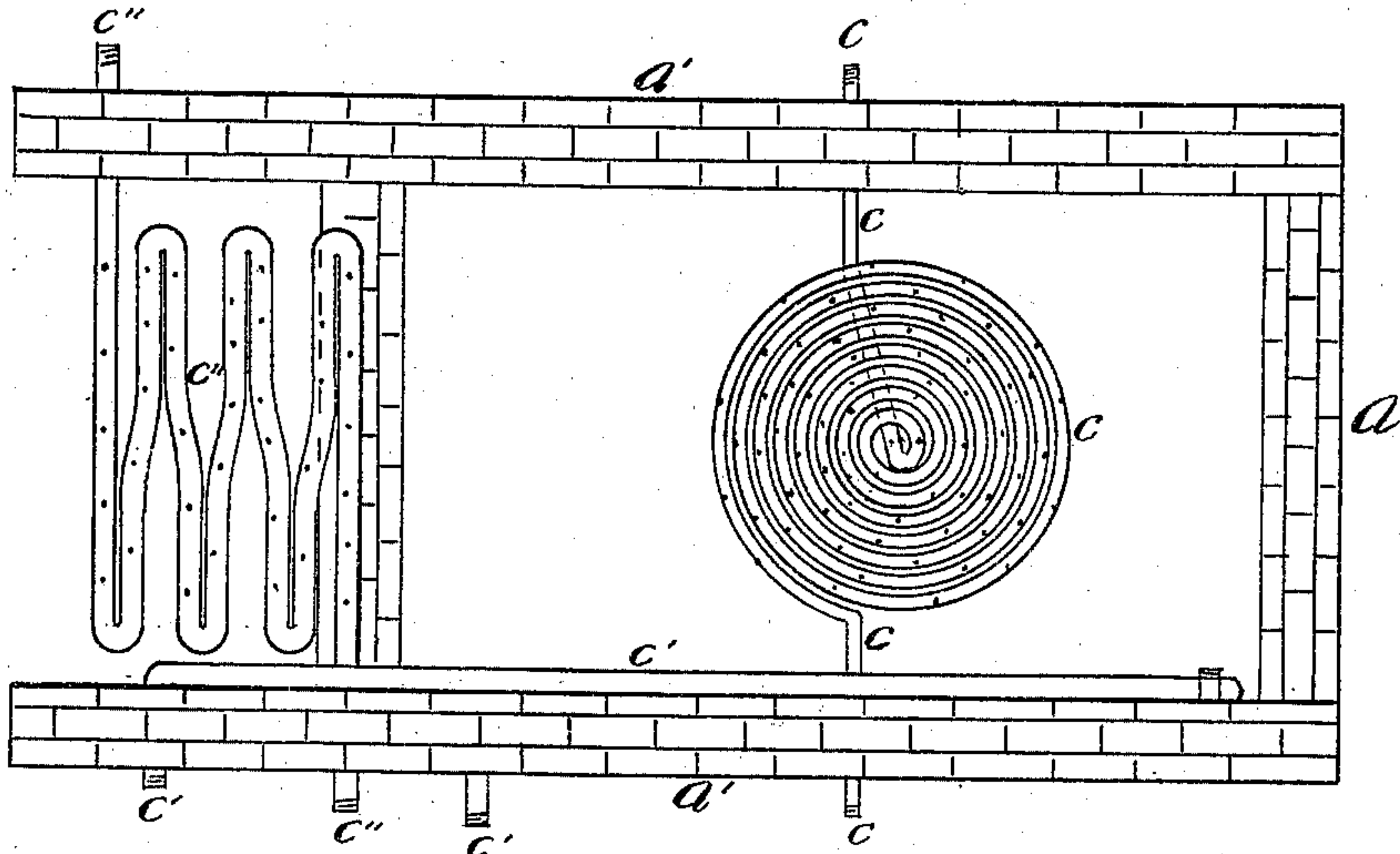


Fig. 1

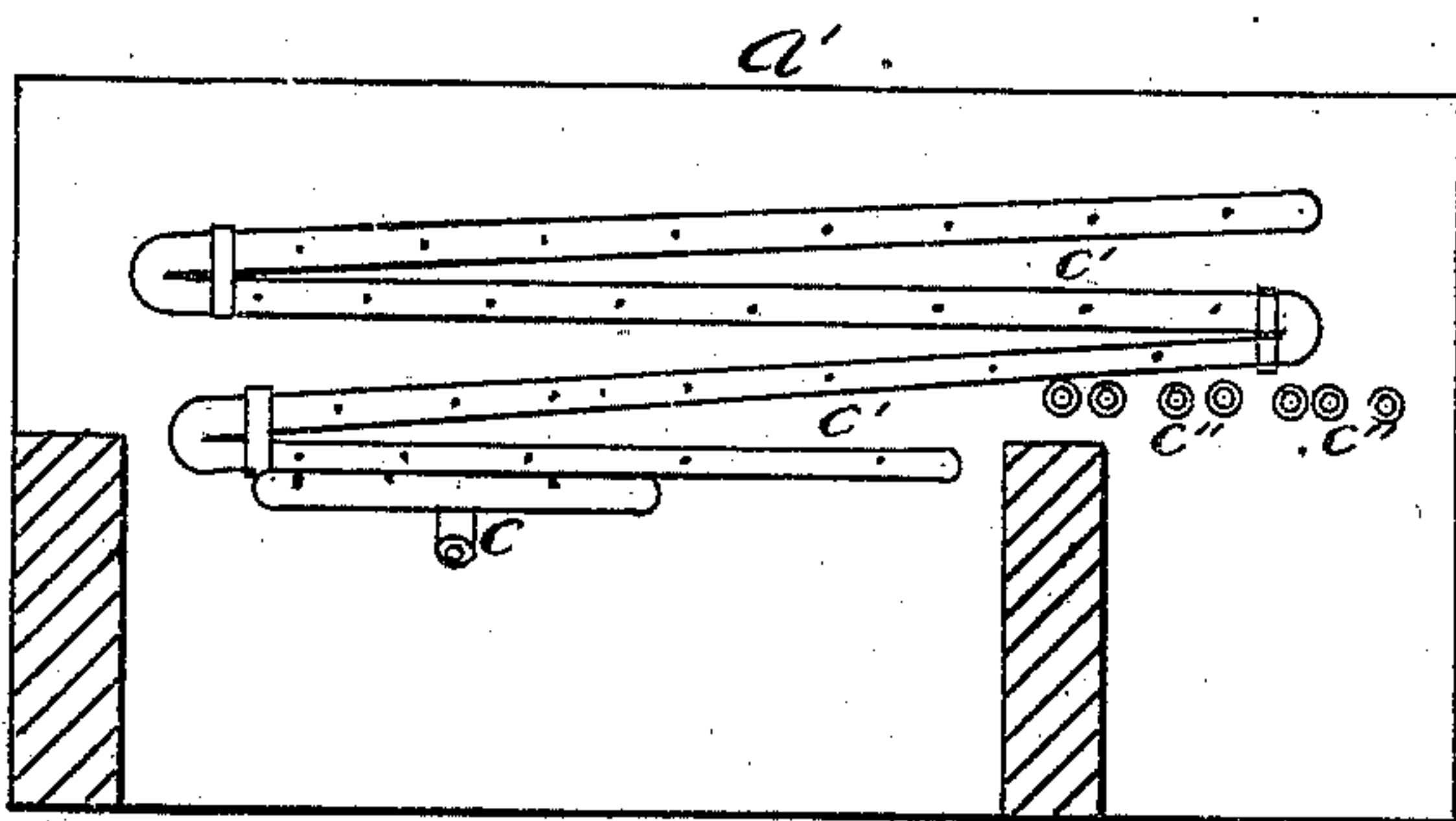


Fig. 2

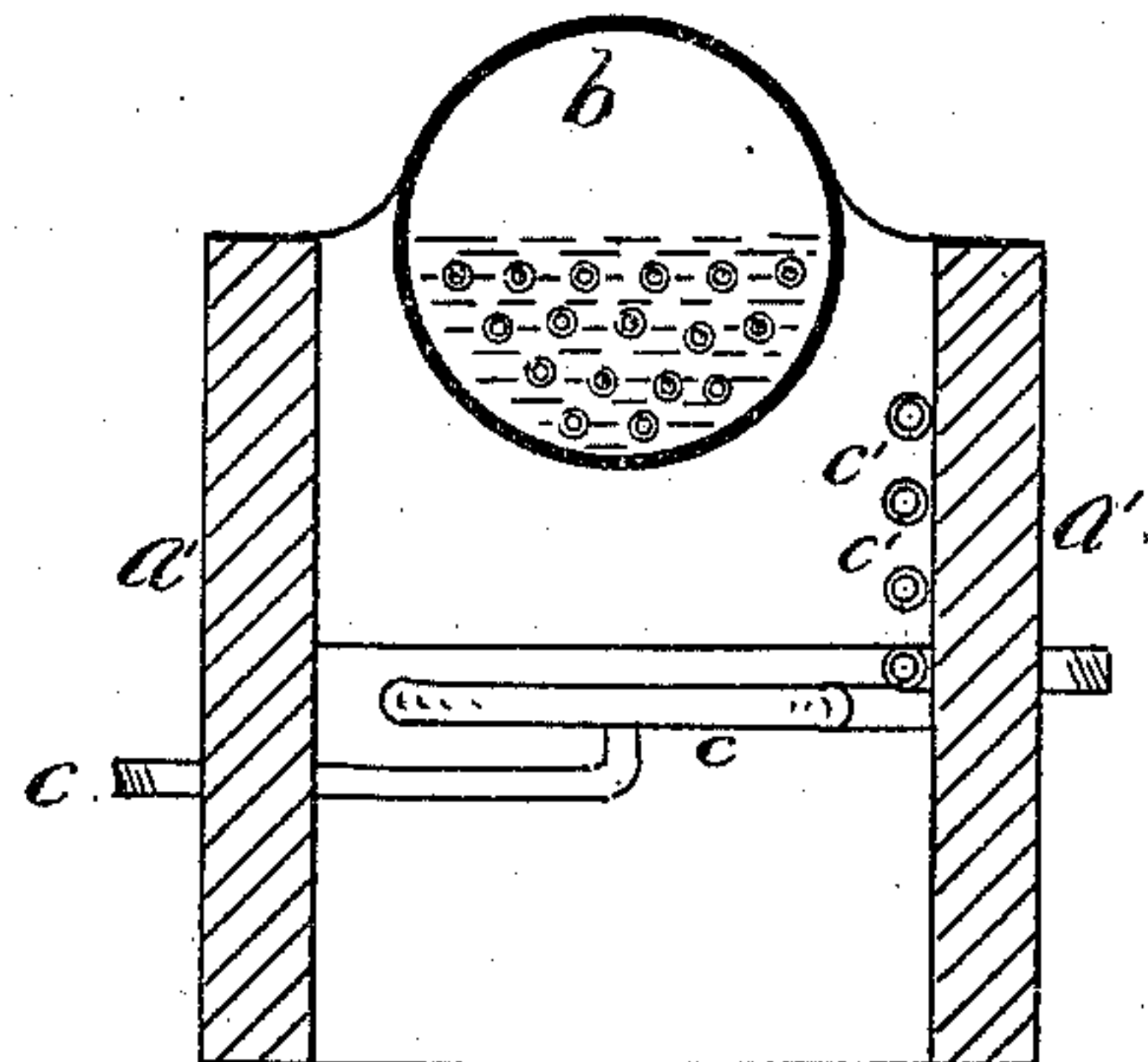


Fig. 3

WITNESSES

*Henry W. Williams*  
*Chas. T. Thayer.*

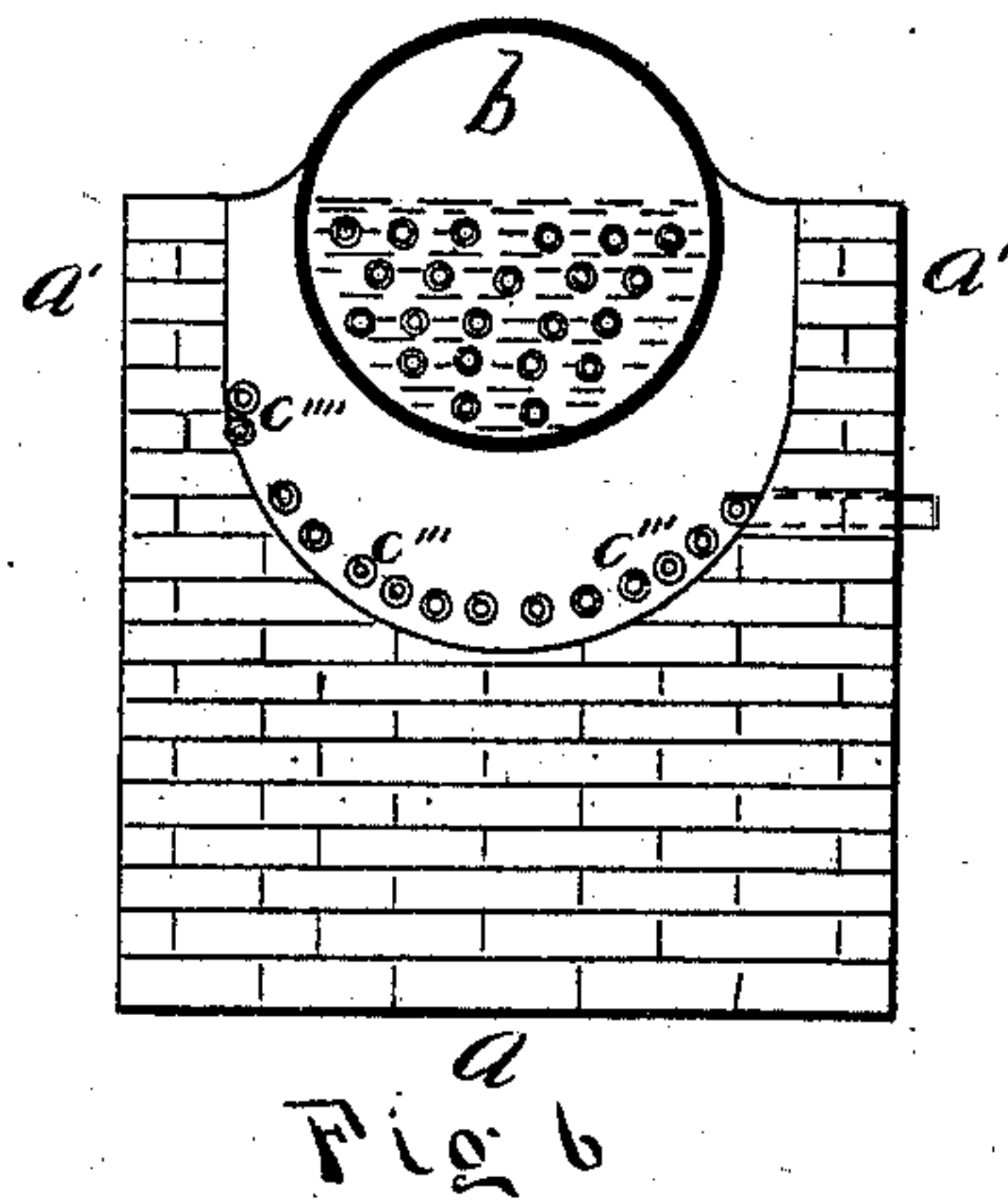
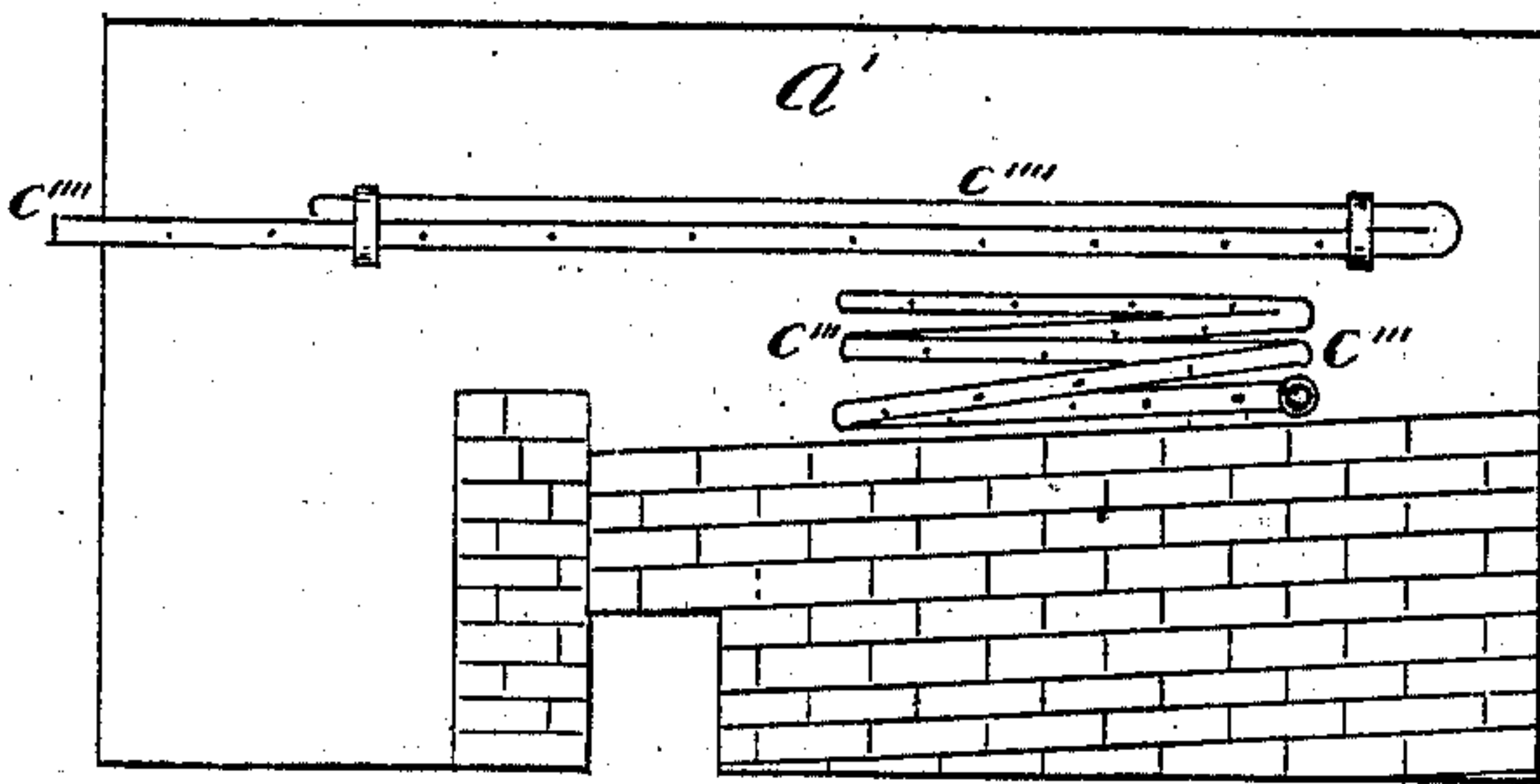
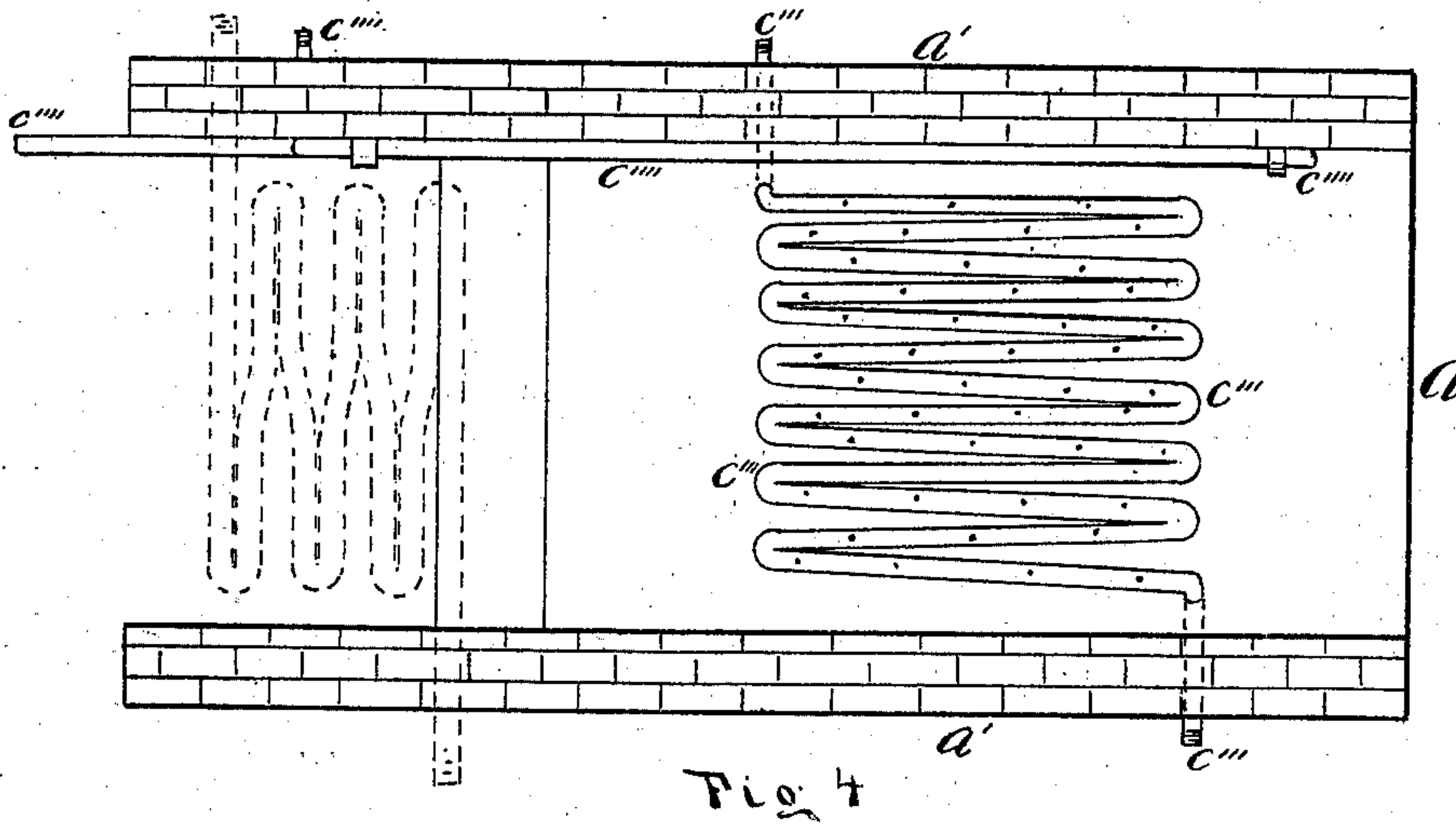
INVENTOR

*Chas. D. Smith*

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# UNITED STATES PATENT OFFICE.

CHARLES D. SMITH, OF CHICAGO, ILLINOIS.

## IMPROVEMENT IN BOILER-FURNACES.

Specification forming part of Letters Patent No. **143,305**, dated September 30, 1873; application filed June 13, 1873.

*To all whom it may concern:*

Be it known that I, CHARLES D. SMITH, of Chicago, in the county of Cook and State of Illinois, have invented a certain new and improved apparatus for consuming gases, foul air, vapors, and all other properties arising in consequence of rendering animal matters, and from other causes, of which the following is a specification:

This invention relates to an improvement in devices for consuming, in a steam-boiler, the offensive vapors or gases and foul air generated in soap and lard manufactories, oil-refineries, and other places. The invention consists in the arrangement, in proper respect to a steam-boiler furnace or analogous apparatus, of a coil or convolute series of pipes, connected at both ends with the source from which the foul air and vapors are derived, and provided with perforations, through which the vapors pass to be consumed in the furnace.

In the accompanying drawings, Figure 1 is a plan view of a steam-boiler, showing the form and disposition of the perforated pipes in the combustion-chamber; Fig. 2, a longitudinal central section of the same. Fig. 3 is a transverse vertical section of the same, and shows also the position of the boiler. Fig. 4 is a plan of a furnace constructed slightly different, and showing an arrangement of perforated pipes for a like purpose; the dotted lines also represent the position of pipes, also perforated and connecting with the outside. Fig. 5 is a longitudinal vertical section of the same; and Fig. 6 is a transverse vertical section, showing the position of the boiler.

Similar letters of reference indicate like parts in the several figures.

The furnace *a*, with its side walls *a' a'*, and boiler *b* are of any suitable construction adapted for accomplishing the results I have in view. Within the combustion-chamber of the furnace I locate a coil-pipe, marked *c*, the ends of which extend through the opposite walls of the furnace, as shown, and may be con-

nected with a blower, so as to force into the pipe or pipes the foul air or vapor. The pipe is perforated at the desired intervals apart at that portion which will be most exposed to the heat and flame, so that the foul vapors or air, which are forced by a fan or otherwise caused to enter the same, can escape into the combustion-chamber to be there superheated and consumed.

The perforated pipe may be either of the form designated by letter *c*—that is, bent to form a circular coil, which is arranged in, around, or at the bottom of the combustion-chamber—or it may be in the form of a convolute or serpentine series of pipe, marked *c'' c'''*.

The advantages attained by arranging the perforated pipes, in the manner described, beneath the boiler instead of at the sides of the furnace, as shown by letters *c' c'''* in the drawing, are a greater capacity for conducting the vapors, and a more thorough distribution of the same in the combustion-chamber, and further admits of the flame enveloping the pipe or pipes, thus causing the foul air or vapors to be consumed with certainty and rapidity, and in an expeditious manner.

I propose to introduce my invention in slaughter-houses, oil-refineries, soap and lard manufactories, and all other places where offensive air and vapors can be consumed under a steam-boiler, and in such it will be found beneficial and useful.

Having thus described my invention, what I claim is—

The circular coil or serpentine series of perforated pipes located in the combustion-chamber beneath the steam-boiler, each end of said pipes communicating with the external air for conducting and distributing therein the vapors to be consumed, substantially as herein shown and described.

Witnesses: CHAS. D. SMITH.

CHAS. V. THAYER,  
HENRY W. WILLIAMS.