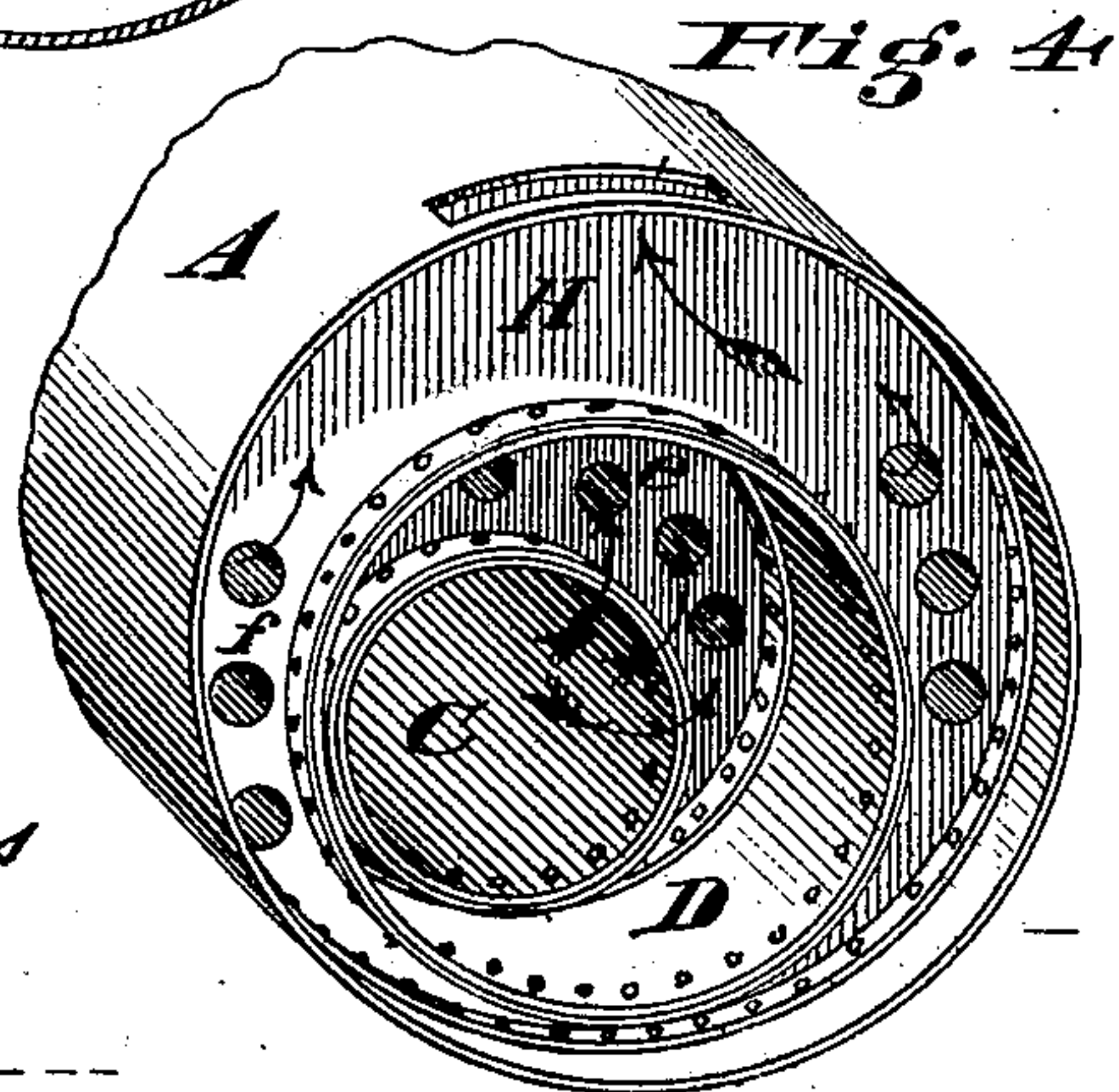
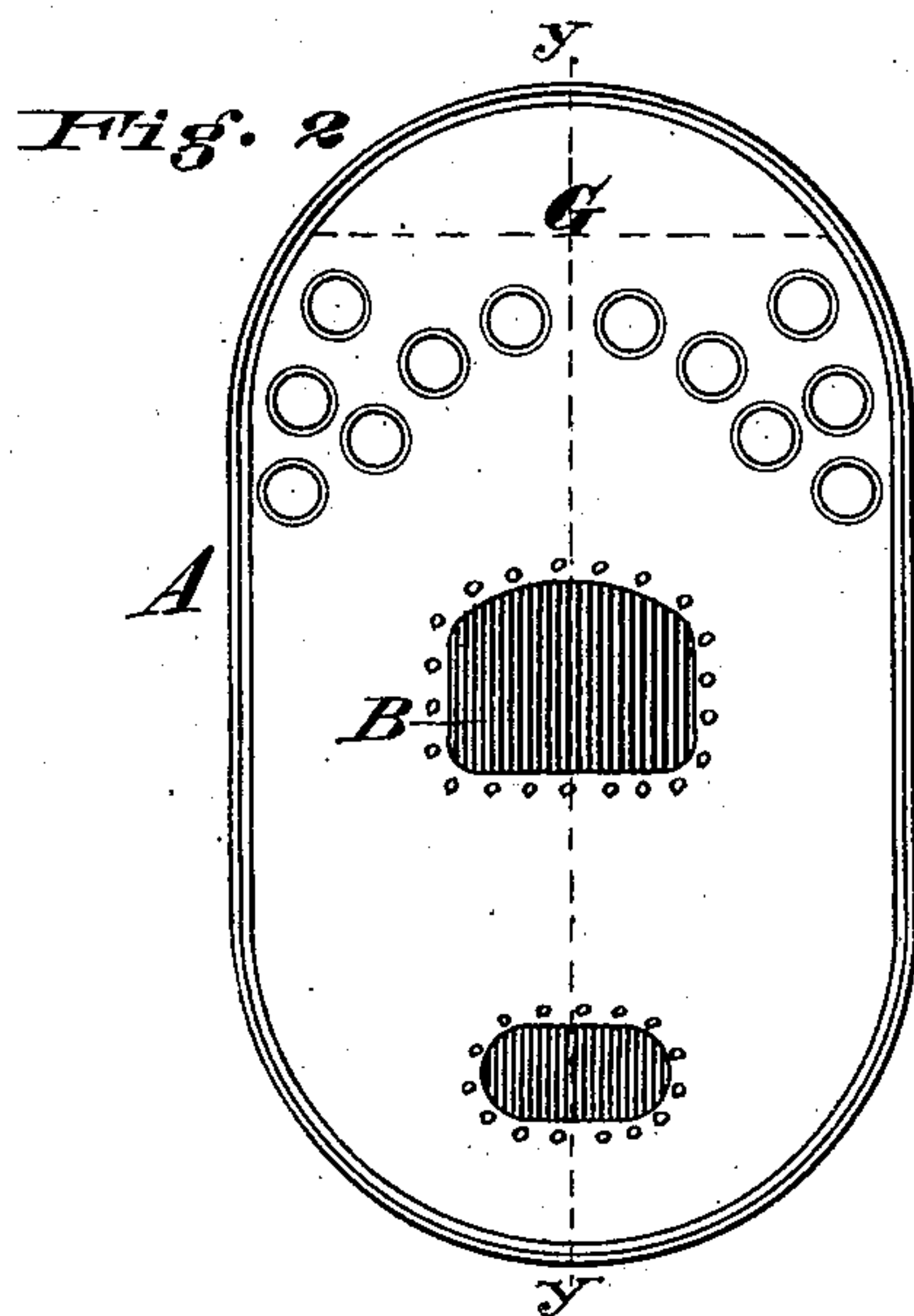
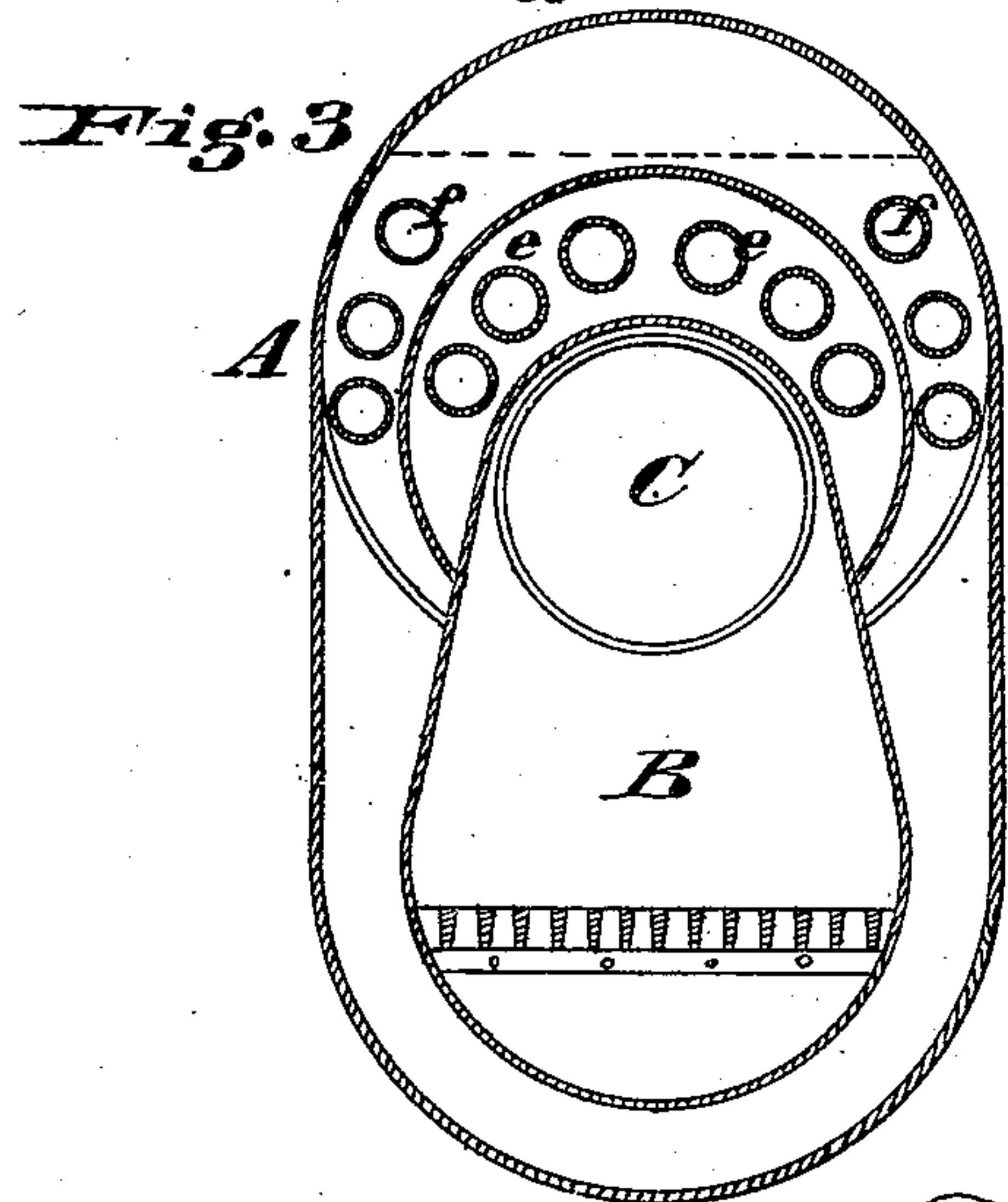
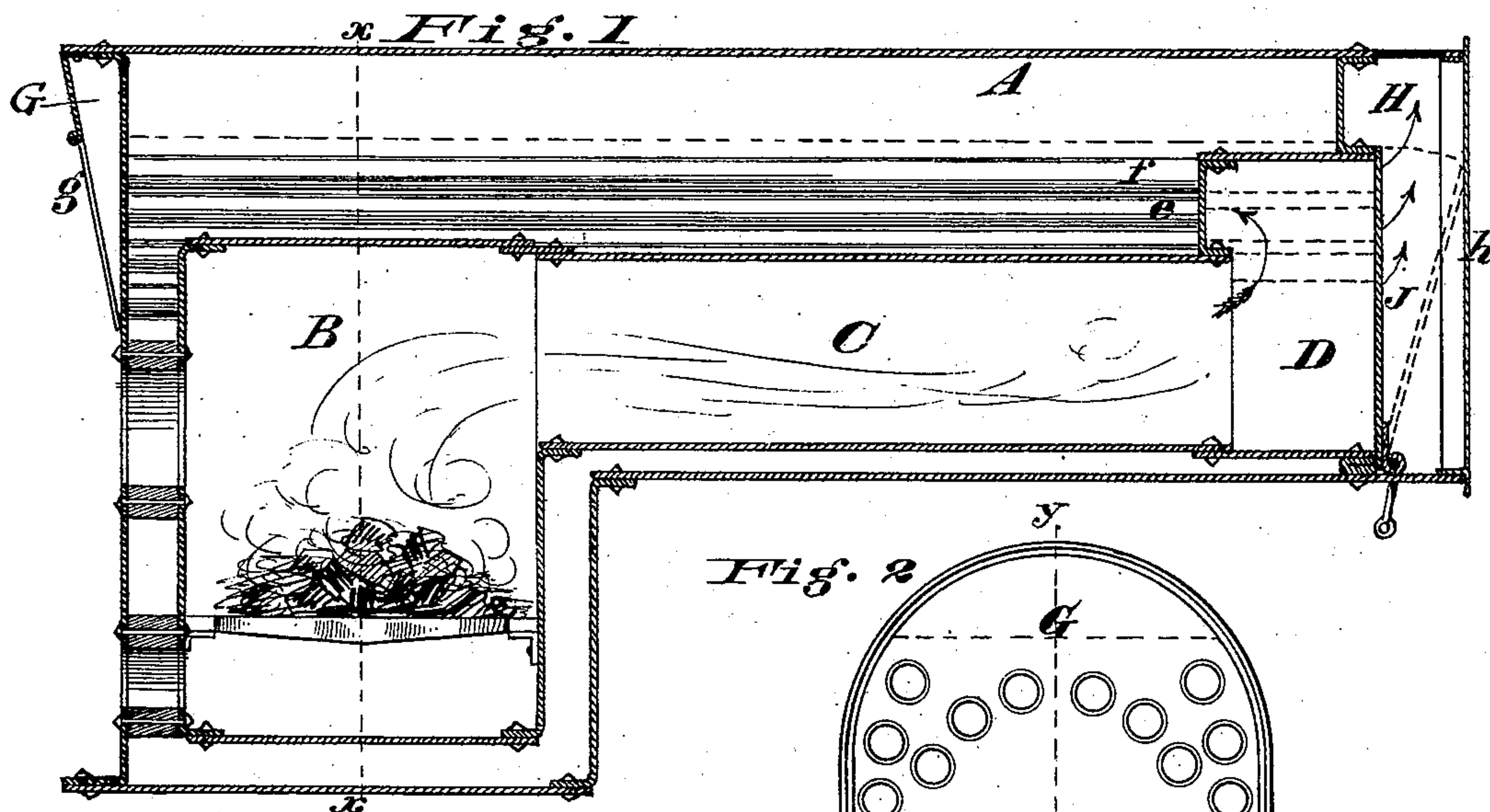


J. COWHIG.  
Steam-Boiler.

No. 226,443.

Patented April 13, 1880.



Attest  
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Attorney.



# UNITED STATES PATENT OFFICE.

JERRY COWHIG, OF RICHMOND, INDIANA.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 226,443, dated April 13, 1880.

Application filed November 21, 1879.

*To all whom it may concern:*

Be it known that I, JERRY COWHIG, of Richmond, Wayne county, Indiana, have invented a new and useful Improvement in Steam-Boilers, of which the following is a specification, reference being had to the drawings accompanying the same, and the letters of reference marked thereon, in which—

Figure 1 is a side sectional elevation of my improved boiler. Fig. 2 is a rear elevation of the same. Fig. 3 is a rear sectional elevation on the plane of  $x x$ , Fig. 1; and Fig. 4 is a perspective front view of the boiler, omitting the front head and smoke-valve.

My invention is more especially applicable to horizontal boilers for portable engines which are used in farm-work, and is designed to promote their efficiency, safety, and convenience of operation.

The invention consists in the combination, in a horizontal portable boiler, of a fire-box and flue or single fire-box flue, a rear combustion-chamber, smoke-chambers at opposite ends of the boiler, and return-flues communicating with the combustion-chamber and the smoke-chambers with a swinging valve forming a partition between the combustion and the front smoke chamber, and adapted to be opened to permit the waste products of combustion to pass directly into the stack from the main flue, or be closed to cause the same to traverse the return-flues through the smoke-chambers to the stack, as will be more fully hereinafter described.

I have selected to illustrate my invention a fire-box boiler, A; but my invention is equally applicable to a boiler of the Cornish type having a fire-box flue. A single large flue, C, leads from the fire-box B forward into the combustion-chamber D; but instead of the large flue C, which is desirable where straw and other light fuel is used, a number of small tubes may be used. A number of small flues,  $e$ , lead back again from the combustion-chamber D to a smoke-box, G, at the rear end of the boiler, and from thence a number of similar flues,  $f$ , lead forward to the ordinary smoke-arch H and the uptake in front. This description of the parts also indicates the course of the products of combustion—that is to say, from the fire-box B, through the flue or flues C, into com-

bustion-chamber D, thence back through tubes  $e$  into smoke-box G, and again forward, through flues  $f$ , to the smoke-arch H and stack.

The front wall of the combustion-chamber D, by which it is partitioned from the smoke-arch H, is a damper or valve, J, hinged below in such manner that it may be thrown forward into the position shown by dotted lines in Fig. 1. In this case the products of combustion, on emerging from the flue C, pass at once into the smoke-arch H and into the stack without entering the flues  $e f$  or the rear smoke-box, G.

Suitable means being provided for operating the damper J, it will be found a great convenience, when wet or poor fuel is used, to open this direct communication with the stack to aid the combustion by a strong and direct draft. It is a convenience also to open the damper when starting the fire until it has attained full headway. Otherwise, when the damper is closed the heat and flame are compelled to return through flues  $e$  and  $f$ , and thus traverse the boiler from end to end three times beneath the water-line. The effect of this, as may be readily understood, is not only to break up and pulverize the sparks by attrition, but to cool down all waste products of combustion, so as to be harmless when discharged from the stack. It also conduces to economy in fuel by thoroughly utilizing the heat produced in its combustion for making steam.

A convenient mode of construction and arrangement of the parts is shown in the drawings, in which, as clearly shown in Figs. 3 and 4, the main flue C, combustion-chamber D, and smoke-arch H are arranged eccentrically to each other, the flues  $e$  being arranged in an arc above the main flue C, and the flues  $f$  arranged upon each side of the boiler. This arrangement of the parts forms a very compact and easily-constructed boiler.

The rear wall,  $g$ , of the smoke-box G and the front head of the boiler  $h$  are both removable, or set on hinges, so as to open and permit a free access to the flue at both ends of the boiler for the purpose of cleaning the flues, &c.

Having fully described my invention, I claim and desire to secure by Letters Patent—

The combination, in a horizontal portable boiler, of the fire-box and flue B C, or a single

fire-box flue, the rear combustion-chamber, D,  
the smoke-chambers G and H, and return-flues  
e and f, communicating with the combustion-  
chamber and the smoke-chambers, as de-  
5 scribed, with a pivoted valve, J, forming a par-  
tition between the combustion-chamber and  
smoke-chamber H, and constructed to be  
opened to permit the waste products of com-  
bustion to pass directly into the stack from  
10 the main flue, or closed to cause the same to

traverse the return-flues through the smoke-  
chambers to the stack, substantially as de-  
scribed.

In testimony whereof I have hereunto set  
my hand this 30th day of October, 1879.

JERRY COWHIG.

Witnesses:

L. M. HOSEA,  
C. T. HESSER.