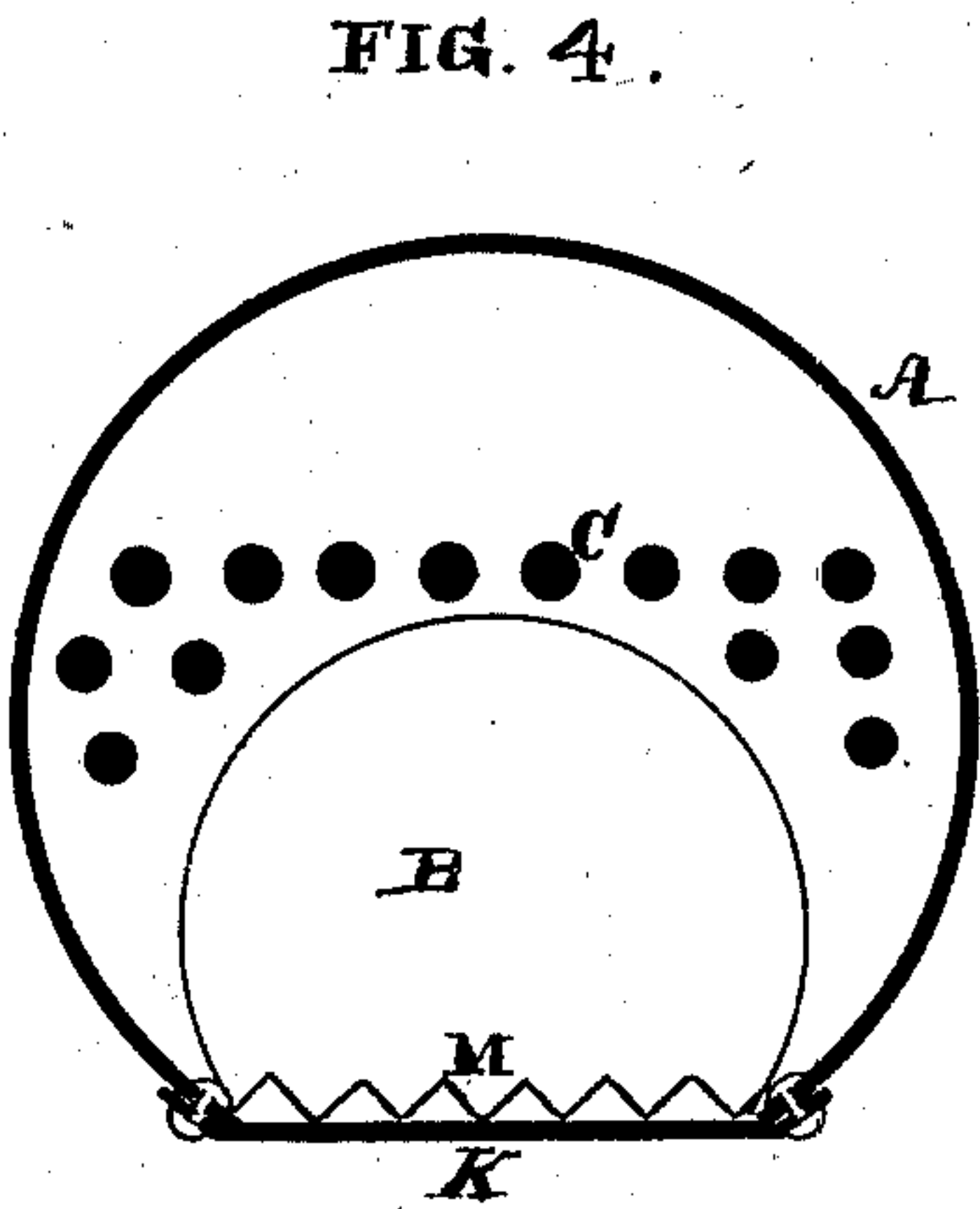
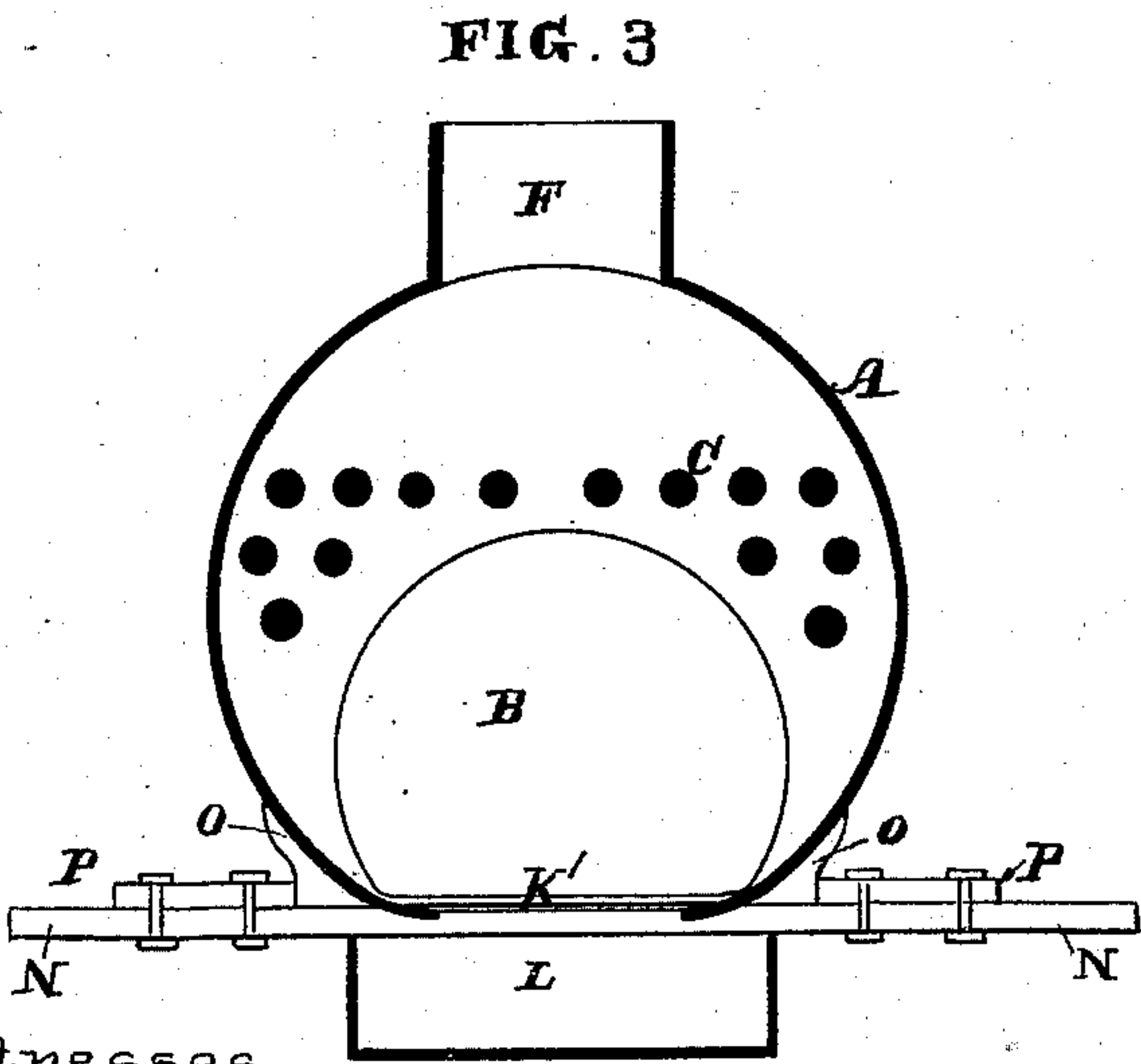
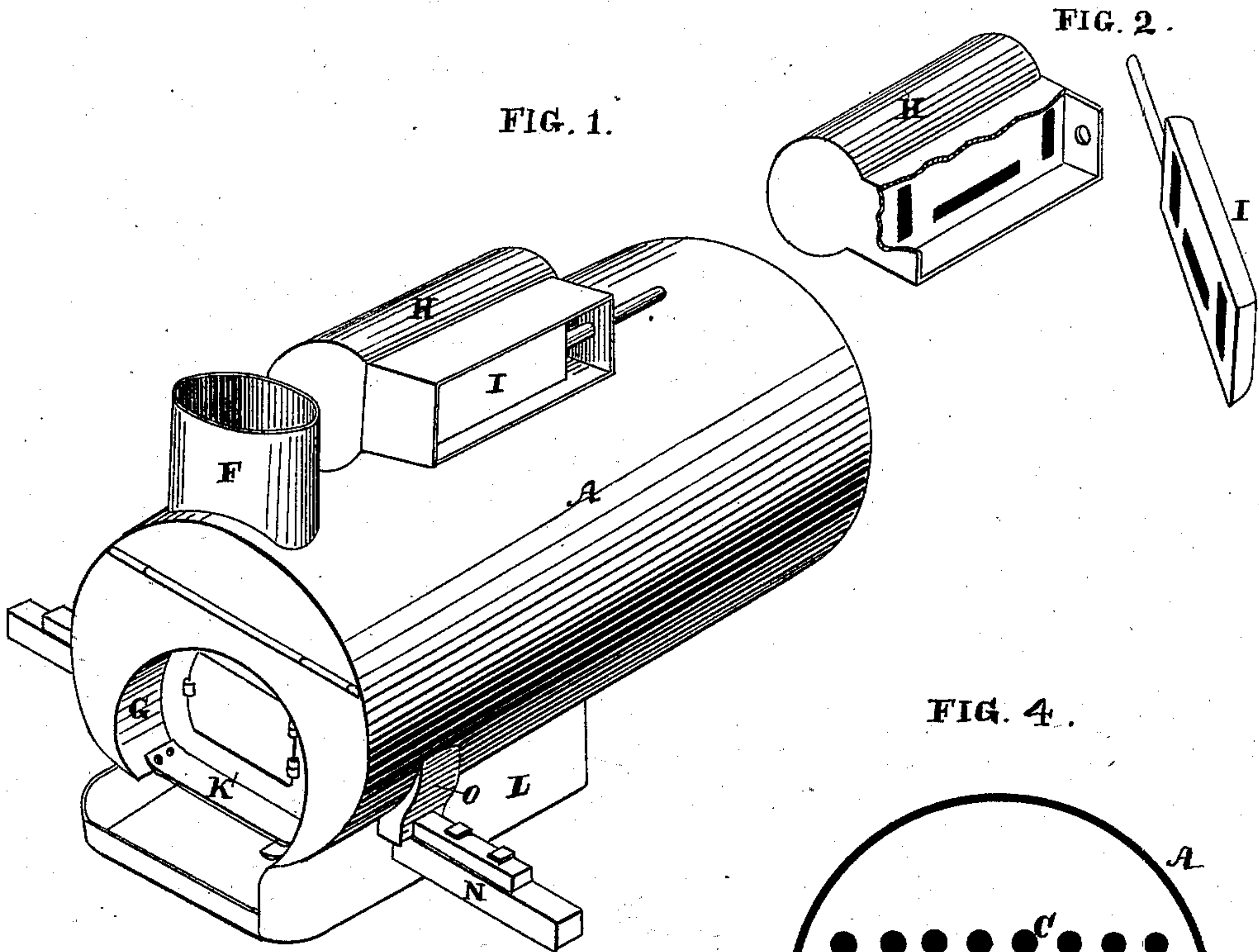


H. W. RICE.  
Portable-Engine Boiler.

No. 219,523.

Patented Sept. 9, 1879.



Witnesses

Grant A. Brooks  
Geo. H. Strong

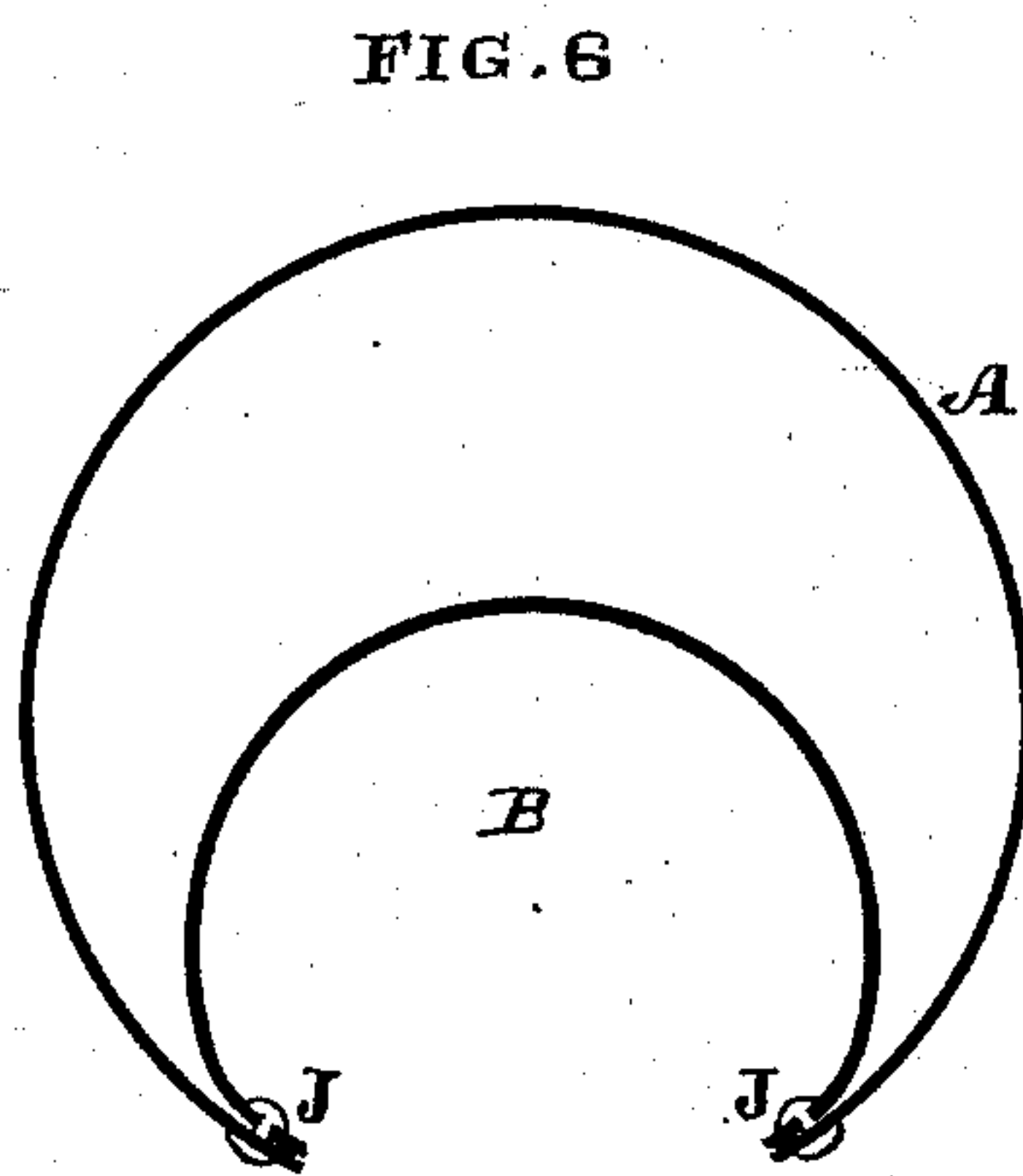
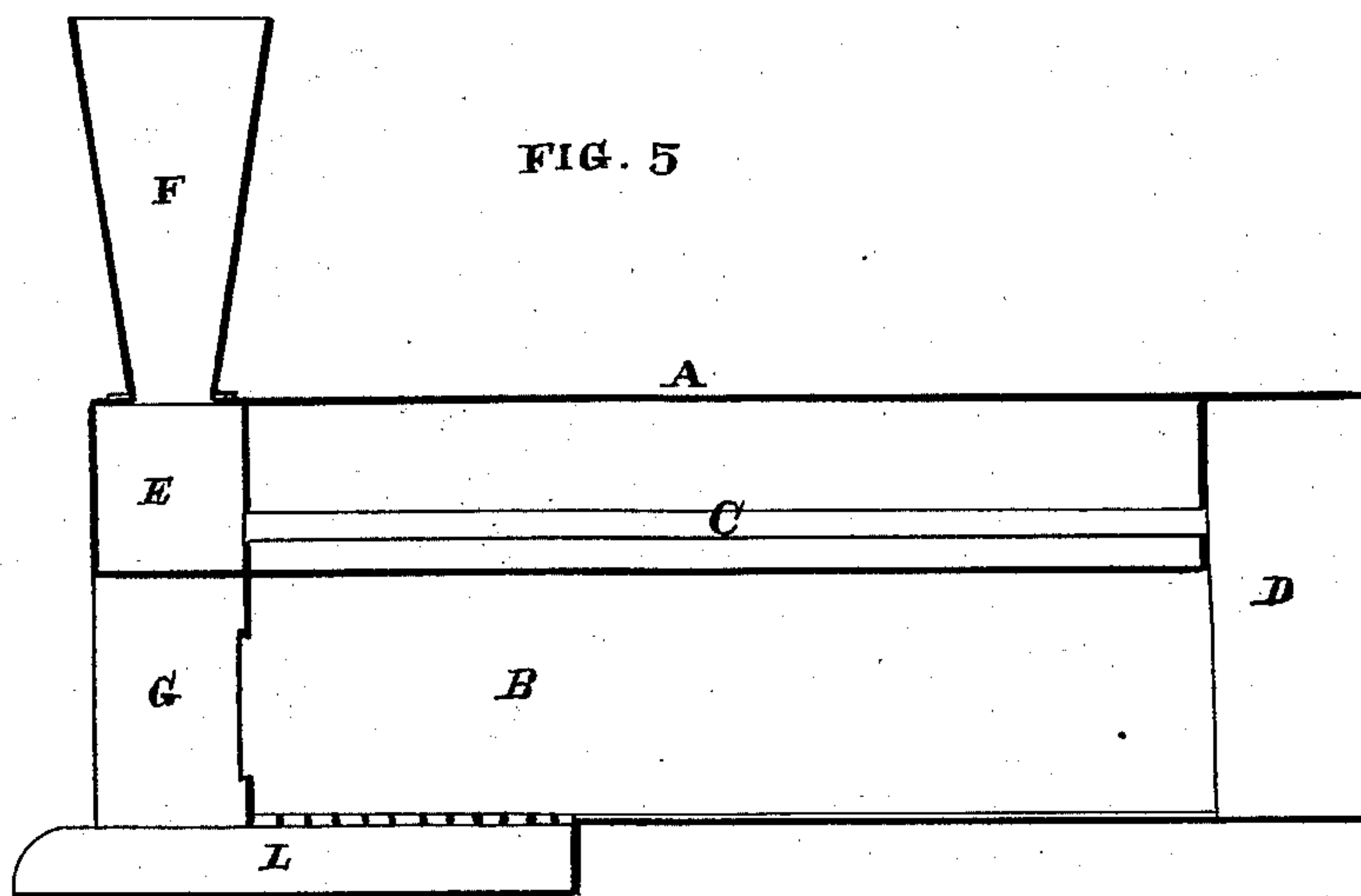
Inventor

Harvey W. Rice  
By Dewey & Co. Attys

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# UNITED STATES PATENT OFFICE

HARVEY W. RICE, OF SAN FRANCISCO, CALIFORNIA.

## IMPROVEMENT IN PORTABLE-ENGINE BOILERS.

Specification forming part of Letters Patent No. **219,523**, dated September 9, 1879; application filed June 21, 1879.

*To all whom it may concern:*

Be it known that I, HARVEY W. RICE, of the city and county of San Francisco, and State of California, have invented an Improved Portable-Engine Boiler; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to certain improvements in portable-engine boilers of that class known as "return-flue" boilers, in which a large flue near the bottom serves at once as a furnace and to convey the products of combustion to a rear combustion-chamber, from which they are returned through small tubes above and at the sides of the main flue to the chimney or uptake at the front.

This class of boiler, with various modifications and improvements, has been extensively employed for thrashing or harvesting engines; and one of these improvements consists in uniting the lower part of the shell of the flue with the shell of the boiler, forming a crescent-section between the two shells, with only the curve of the outer shell to unite them beneath the furnace.

In practice I have found that the strain produced by the pressure of the steam would tend to straighten this curve and alter the shape of the boiler, thus causing it to leak, besides endangering its strength.

My invention is designed to remedy this defect; and it consists in forming the shell of the boiler and the shell of the flue each of a segment of a cylinder, which have their edges united together. I then unite these lower edges by one or more flat plates, which form a bottom for the furnace, and at the same time act as a tie to prevent the shells from spreading.

My invention further consists in a means for securing the shaft, axle, or stay which extends across the ash-pit, as will be more fully described by reference to the accompanying drawings, in which—

Figure 1 is a view of my boiler. Fig. 2 is a view of the valve. Figs. 3 and 4 are transverse sections. Fig. 5 is a longitudinal section. Fig. 6 shows the manner of uniting the shells.

A is the shell of my boiler. B is the large flue, and C are the return-tubes, which bring

the heat and products of combustion from the rear combustion-chamber, D, to the chamber E in front, from which they escape up the chimney F, as shown.

The space G around the door-opening serves as a guide or feeder and a protector against fire, and is used in feeding straw as a fuel, as is more fully described in my patent of January 20, 1874, reissued May 4, 1875.

The engine H is mounted upon the side or top of the boiler, as may be most convenient. I have shown it in the present case mounted upon the top of the boiler and having a slide-valve, I.

The shell of my boiler is made in the form of a large segment of a cylinder, and the flue B is similarly formed. The edges of these two segmental shells are united upon each side at J J by rivets to form a tight joint between them, thus leaving an open space below, which extends the whole length of the boiler. To close this space, and at the same time provide a tie which shall hold these edges in place and prevent them from being separated by the heat and pressure, I employ a perfectly flat plate, K, having its edges turned at such an angle as to admit of its being riveted at each side to the edges J. This holds the two shells rigidly in place, and prevents them from springing, as would be the case if the curve of the outer cylinder were depended upon as a stay. The plate K extends forward to the rear edge of the ash-pan L, which is depressed below the level of the plate, as shown. In order to prevent the edges J from spreading at the sides of this ash-pan, I employ a plate, K'; or the axle N may be allowed to extend across this ash-pan near the front, passing out at the sides just below the meeting edges J.

I fix upon each side of the boiler, at the points where the axle emerges, triangular blocks O, which just rest upon or touch the axle. The axle has holes drilled through it, or is otherwise fitted to receive the blocks P, which are bolted to it with their ends just resting against the blocks O, and they act as a stop which entirely prevents any tendency of the joints J J to spread or separate at this point.

Upon the floor formed by the plate K is the corrugated protector M, which serves to col-

ect and retain ashes and to protect the plate from too much heat.

I am aware of patent to W. R. Michener, dated July 24, 1877, in which the flue was riveted to the outer shell of the boiler, which latter was made in a continuous curve, and also the sides of the boiler and flue united at the points where the shell was cut away to admit of a depressed ash-pan by an axle or stay crossing it.

I do not therefore claim, broadly, these devices; but

What I do claim as new, and desire to secure by Letters Patent, is—

1. The boiler-shell A and the flue B, formed of segments of cylinders united at their lower edges, in combination with the independent flat plate K, secured to the edges of the seg-

ments, so as to form a bottom to the furnace, and a direct rigid tie or brace, all constructed and arranged substantially as herein described.

2. The boiler-shell A and the flue B, formed of the segments united at J, and having the depressed ash-pan L, and the axle N, crossing beneath the edges J, as shown, in combination with the blocks O, secured to the shell A, and the lugs or blocks P, secured to the axle, whereby the shells are prevented from spreading, substantially as herein described.

In witness whereof I have hereunto set my hand.

HARVEY W. RICE.

Witnesses:

S. H. NOURSE,

FRANK A. BROOKS.