

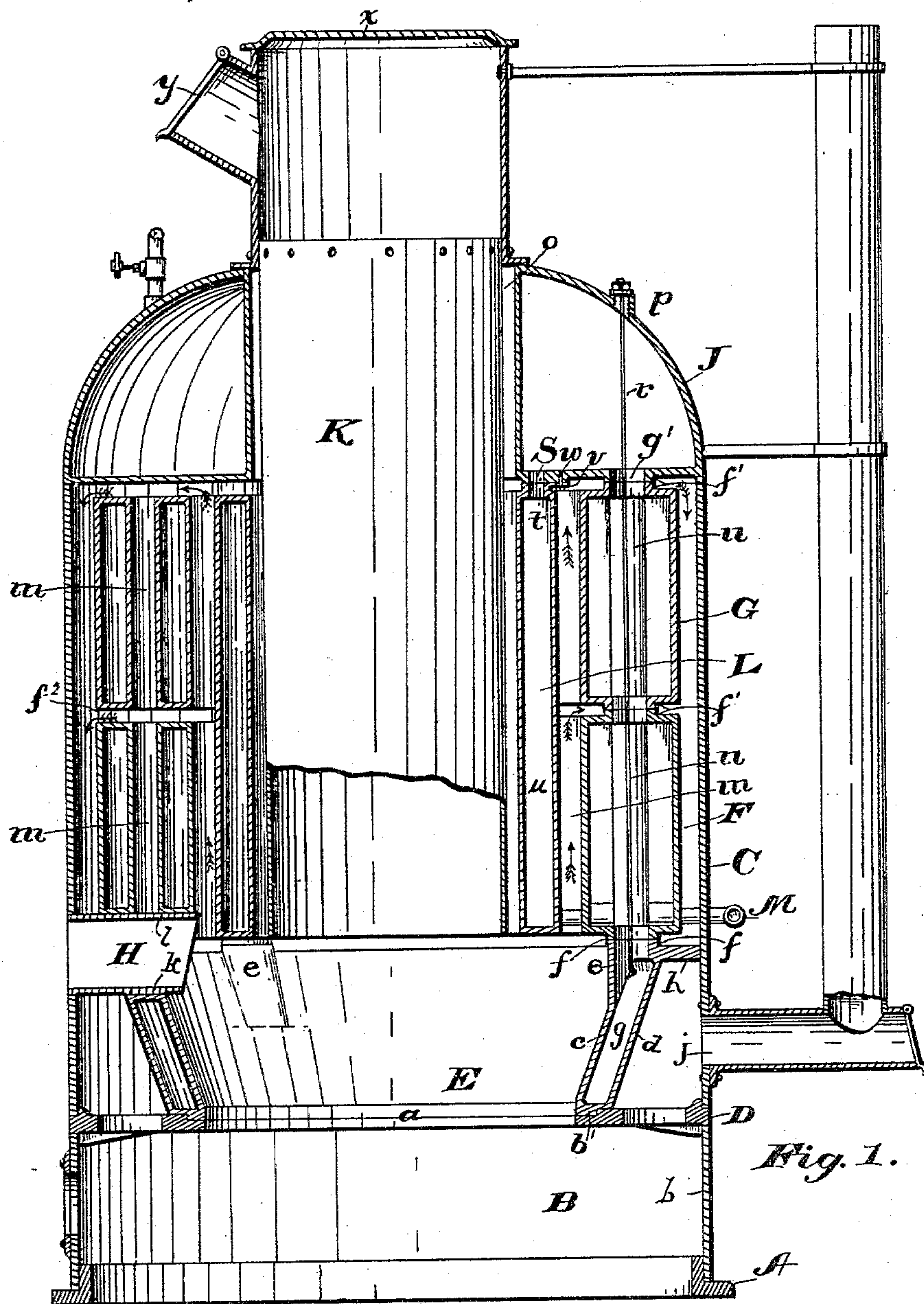
(No Model.)

2 Sheets—Sheet 1.

E. W. POORMAN.  
BOILER.

No. 401,369.

Patented Apr. 16, 1889.



Witnesses:

*E. L. Lang*  
*Chas. R. Miller*

Inventor.

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By *W K Miller*  
Attorney.

(No Model.)

2 Sheets—Sheet 2.

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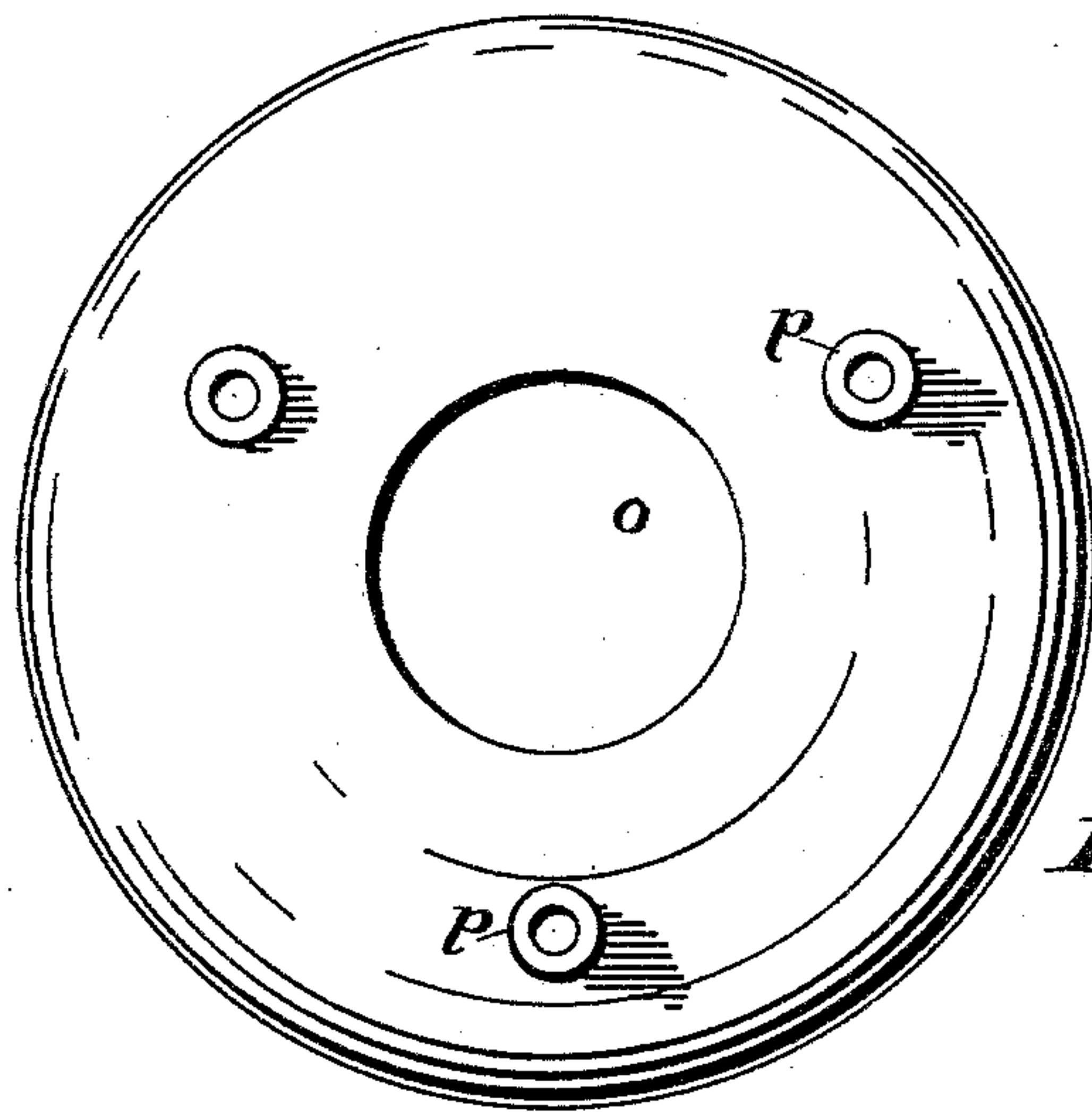


Fig. 7.

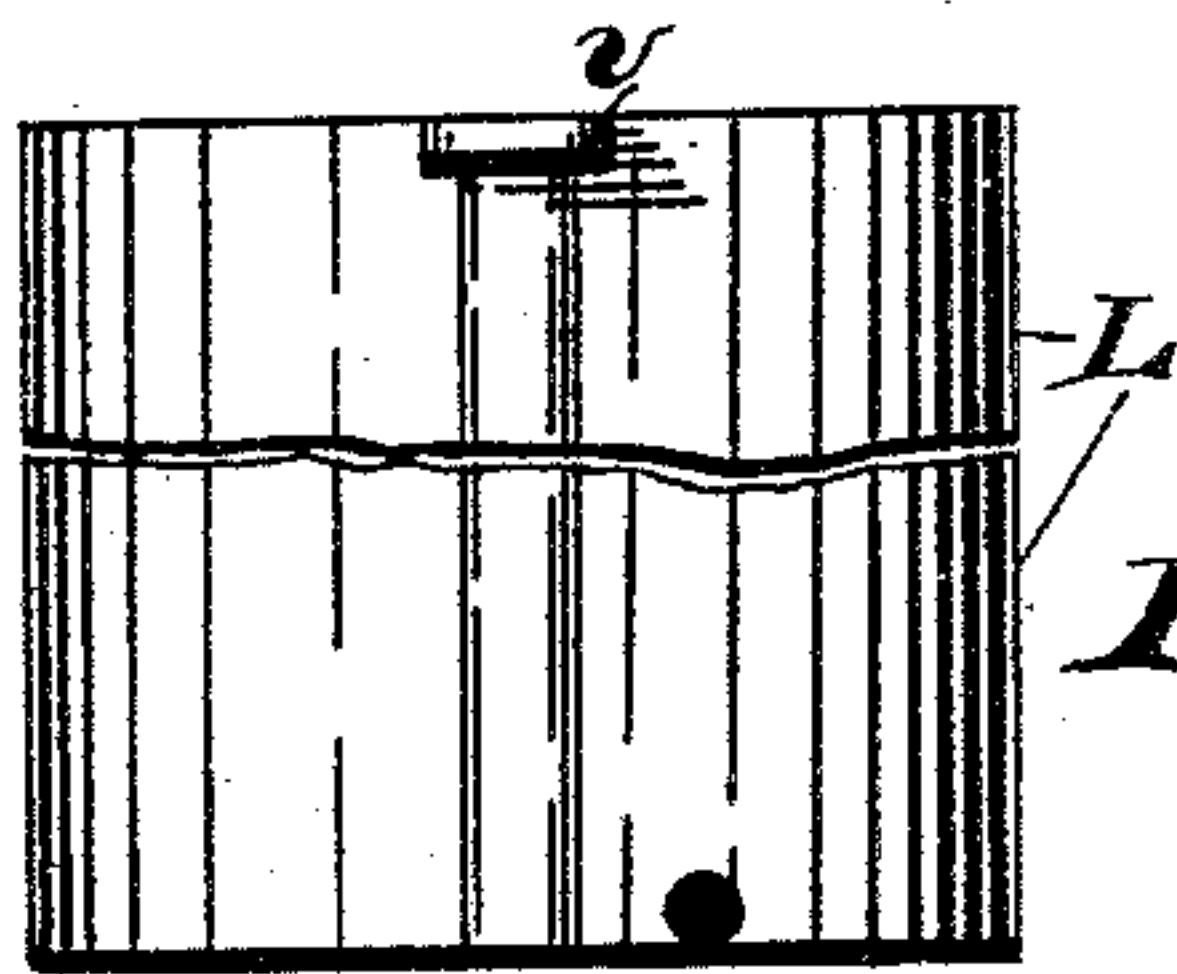


Fig. 3.

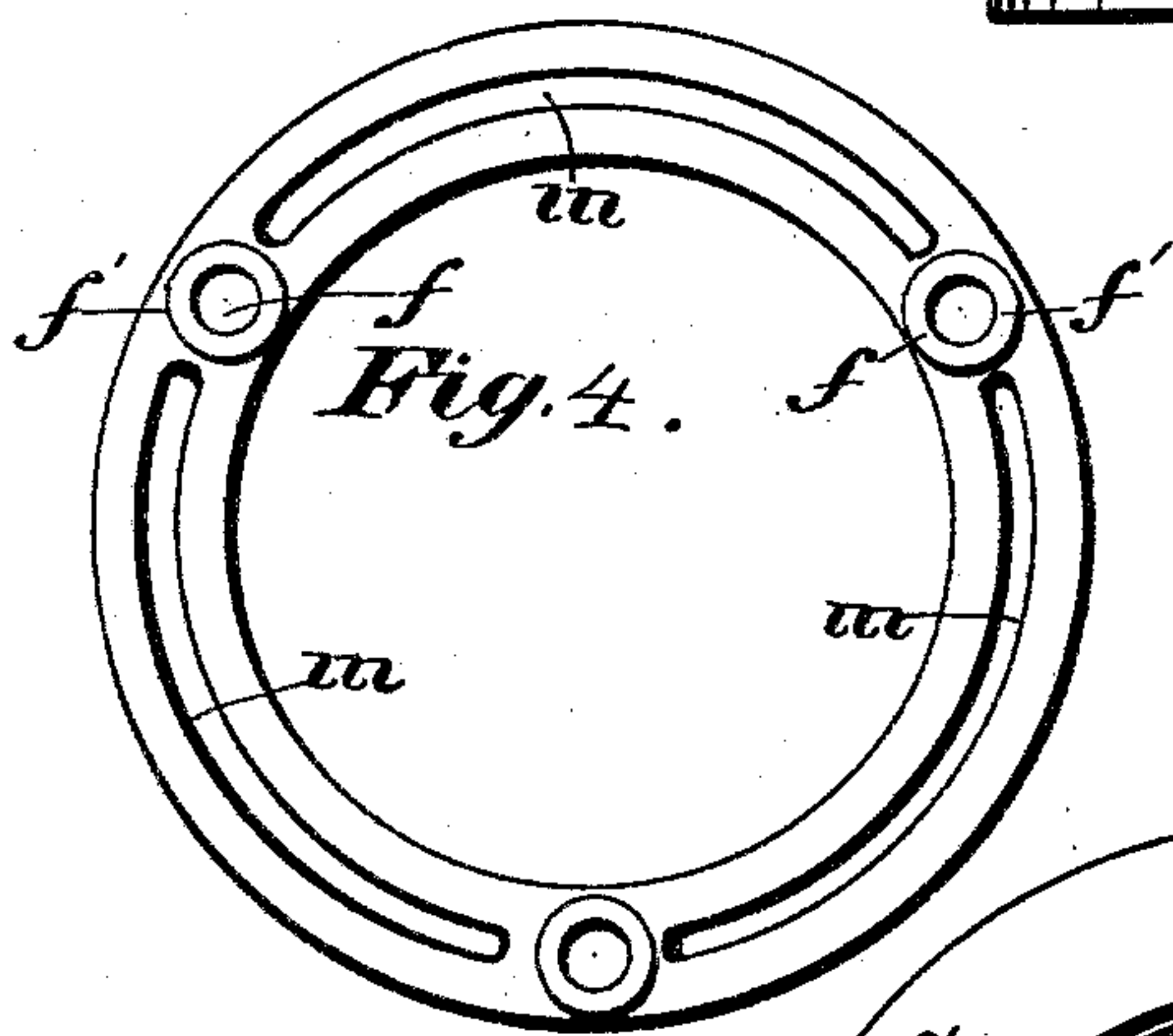


Fig. 4.

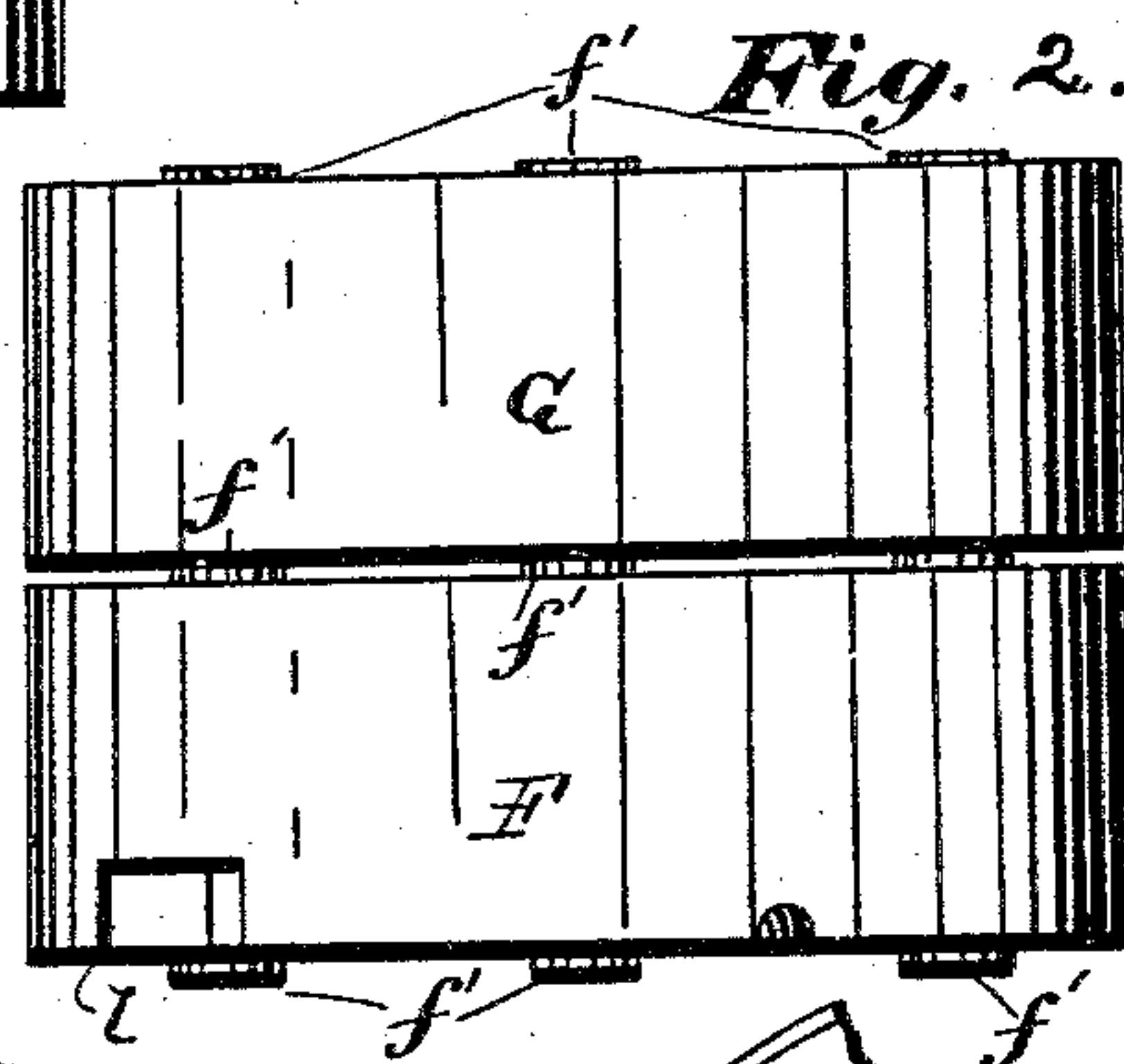


Fig. 2.

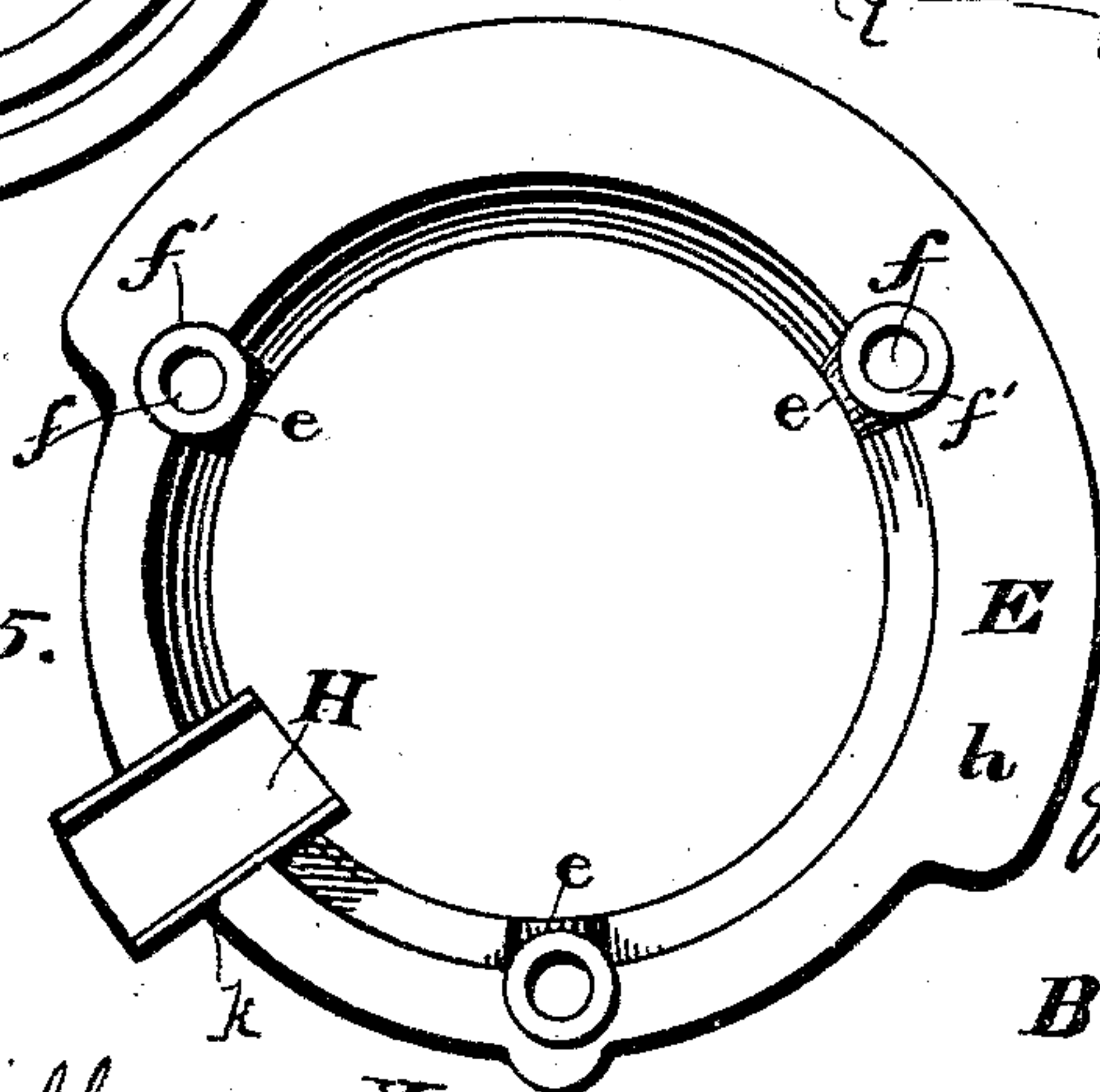


Fig. 5.

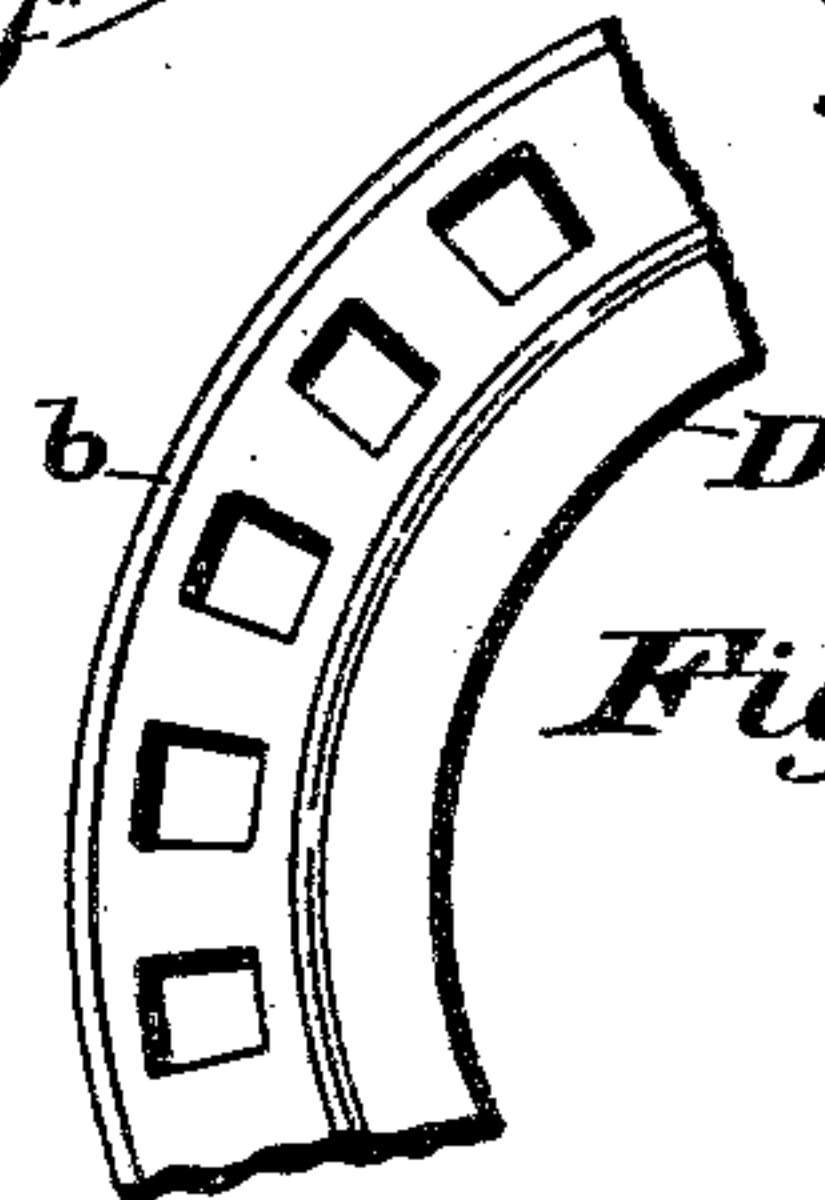


Fig. 6.

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# UNITED STATES PATENT OFFICE.

EMANUEL W. POORMAN, OF CANTON, OHIO.

## BOILER.

SPECIFICATION forming part of Letters Patent No. 401,369, dated April 16, 1889.

Application filed July 16, 1888. Serial No. 280,030. (No model.)

### *To all whom it may concern:*

Be it known that I, EMANUEL W. POORMAN, a citizen of the United States, and a resident of Canton, county of Stark, State of Ohio, have invented a new and useful Improvement in Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to improvements in boilers. The object sought in the invention is an increase of heating-surface, simplicity of construction, durability, and economy.

With these ends in view my invention relates to the construction of detail and combination of parts, as hereinafter described, and set forth in the claims.

Figure 1 is a vertical sectional view of a steam-generator illustrating my invention. Fig. 2 is an elevation of tubular ring-sections. Fig. 3 is an elevation of inside heating-cylinder. Fig. 4 is a plan view of tubular ring or section. Fig. 5 is a plan view of the bottom tubular ring-section; and Fig. 6 is a fragment of the top ring of the supporting-base.

Similar letters of reference indicate corresponding parts in all the figures of the drawings.

A represents the bottom plate of the base B, which is composed of the plate A, casing *b*, and plate D, the said plate D having a central perforation, *a*, and a shoulder-recess, *b'*. In the perforation there may be placed any of the well-known and approved forms of grate, and in the recess *b'* is placed a tubular ring, E, the bottom one of a series of tubular rings.

For the purpose of this application there have been shown rings E F G, which will be referred to as such; but any desired number may be used. The bottom ring, E, is conical in form, the small end resting in the recess *b'*, as hereinbefore stated, the side walls, *c d*, flaring outwardly and upwardly, as shown in Fig. 1. The inner wall, *c*, at its upper portion has a series of inwardly-projected circles, as *e*, terminating in and forming the inside wall of aperture *f* in the top portion of the ring E, and communicating with tube *g* there is a series of said apertures placed at desired intervals about the top of the ring E, and they

are adapted to a corresponding series of apertures *f* in the rings F and G. At the upper portion of the ring E is provided a laterally-projected flange, *h*, to close the space between the ring and the case C. The said flange is cut away a portion, as shown in Fig. 5, opposite the draft-flue *j*. There is also provided in the upper portion of the ring E a depression, *k*, forming a spout or opening, H, extending from the outside of the case C to the fire-chambers inside of the ring E. A groove, *l*, in the lower portion of the ring F, corresponding with the depression *k*, completes the opening aforesaid, to the outer end of which a closing door may be secured. The object of said spout or opening is to form an opening to the fire-box.

The rings F and G may be made of any desired form both in outline and cross-section, preferably rectangular in cross-section, each having a series of corresponding apertures, *f*, as shown, on the top and bottom portions, and are divided by flues *m*. (Shown open in cross-section on the left-hand side of Fig. 1, and the closed ends *n* on the right hand, the figure representing a cut through the aperture *f* on the right and through the body of the ring on the left hand.)

The rings are placed one upon the other vertically, resting on the neck or collars *f'* about the aperture *f*, by which the rings are spaced apart by the projected neck or collar *f'*, forming flues *f''* between the rings, by which the heating-surface is greatly increased. On the upper or ring G is placed a hollow dome, J, having a central aperture, *o*, to receive the fuel-magazine K, a series of apertures, *p*, about the upper portion of said dome, a series of apertures, *q*, in the bottom portion, all of which correspond with the apertures *f* in the rings E F G, and through which bolts *r* are passed to secure the parts in position, and a further series of apertures, *S*, in the bottom portion of said dome, about the central aperture, said apertures corresponding with a series of apertures, *t*, in the upper portion of a depending tubular cylinder, L, the tube *u*, surrounding the cylinder, closed at its upper and lower ends, excepting the portion embraced in the apertures *t*, before mentioned.



About the upper portions of said cylinder there is provided a flange, *v*, by which the cylinder is secured to the bottom of the dome by bolts *w*.

5 The fuel-magazine K is supported on the top of the dome J substantially as shown, is cylindrical in form, having a top lid, as *x*, a side fuel-door, *y*, and is projected down through or to the bottom of the cylinder L.

10 The water-supply is admitted through the feed-pipe M to the tube *u* of the cylinder L, passes up through the aperture S into the dome and down through the apertures *g'* and *f'* into the rings G, F, and E, thus establishing a communication between the cylinder

15 and the rings.  
The fuel-supply is placed in the magazine K, filling the fire-box formed by the ring E. The heat from the fire passes through the flues *m m* up between the cylinder and the rings, down between the case C and the rings, and about the rings to opening X, formed by cutting away of a portion of flange *h* on bottom ring, E, and about said ring to the chimney-flue *j*.

It will be noticed that by the spacing apart of the rings, the addition of the central cylinder, L, and the conical form of the ring E the heating-surface is largely increased.

30 Having thus fully described the nature and object of my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a heating apparatus, a series of annular hollow water-sections placed one upon another, spaced apart and having a series of communicating apertures, a cylinder, L, and a passage for the water between the said an-

nular water-sections and the cylinder L, substantially as set forth.

2. In a heating apparatus, a series of annular tubular water-sections placed one upon another and spaced apart by spacing-necks formed about a series of communicating apertures, and a bottom section, as E, having outwardly and upwardly inclined walls *c d*, a flange, *h*, and a series of perforations forming a communication between the tube *g* and the inner portion of the adjacent section, substantially as described, and for the purpose set forth.

3. The combination, in a heating apparatus, of the tubular conical fire-box E, a series of annular tubular sections placed in vertical order and spaced apart to form flues between said sections, a series of vertical corresponding flues centrally located in said sections, a dome supported by and having apertures communicating with said sections, and a depending hollow cylinder communicating with said dome, substantially as described, and for the purpose set forth.

4. The combination, in a heating apparatus, of the tubular section E, having the outwardly and upwardly inclined walls *c d*, sections F and G, dome J, depending cylinder L, and fuel-magazine K, substantially as described, and for the purpose set forth.

In testimony whereof I have hereunto set my hand this 13th day of June, A. D. 1888.

EMANUEL W. POORMAN.

Witnesses:

W. K. MILLER,

CHAS. N. MILLER.