

G. H. POND.  
 ROTARY STEAM ENGINE.

No. 98,626.

Patented Jan. 4, 1870.

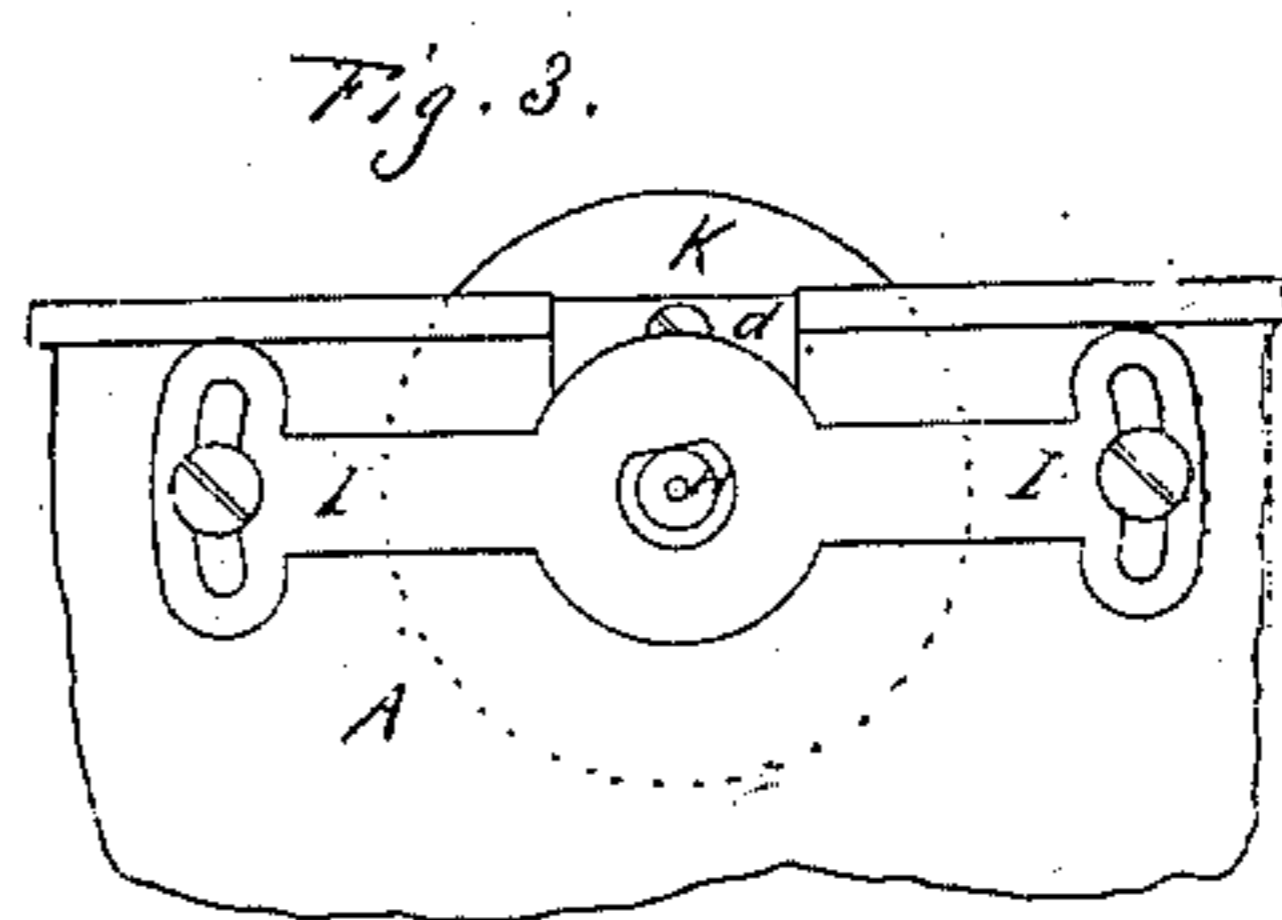
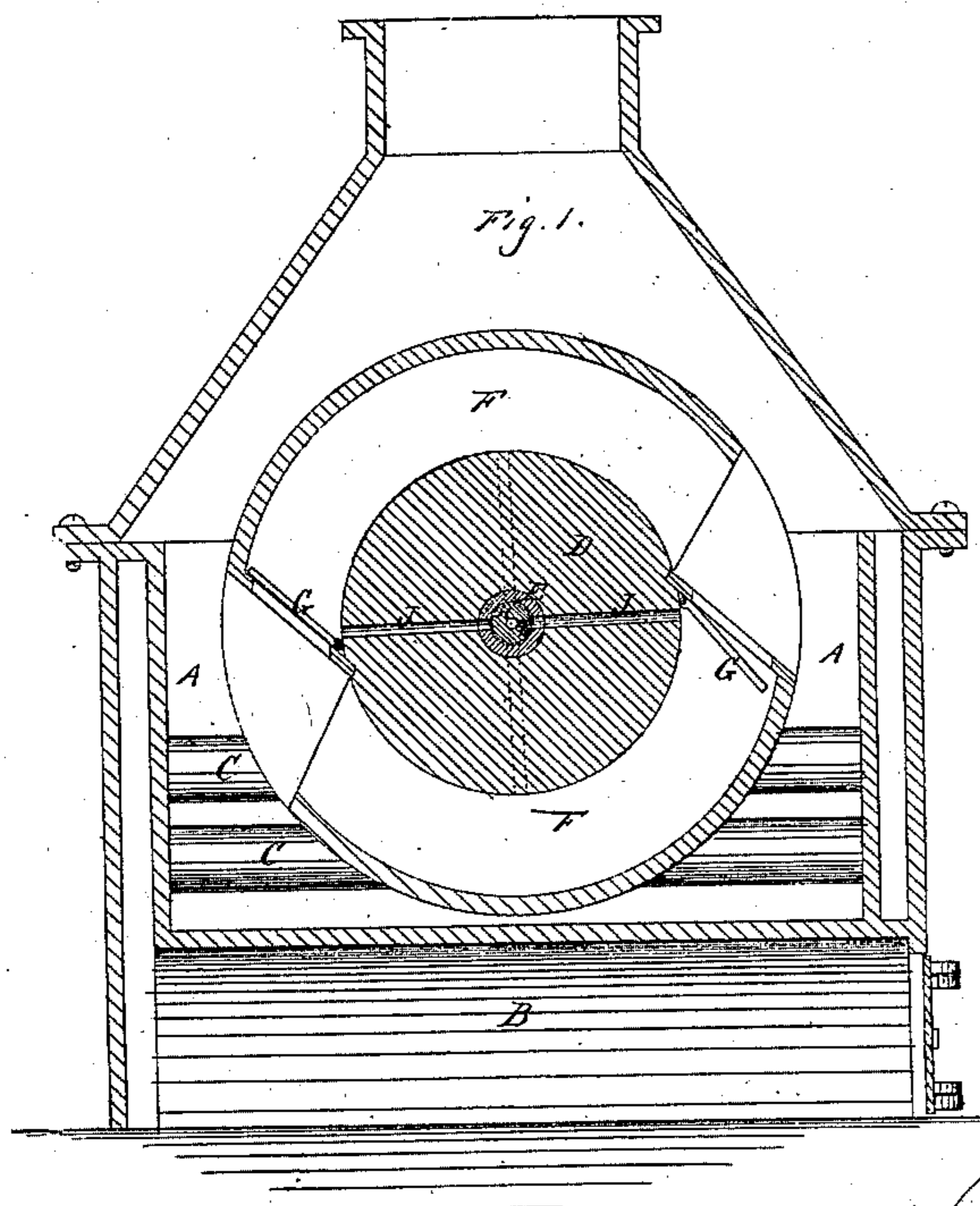


Fig. 4.

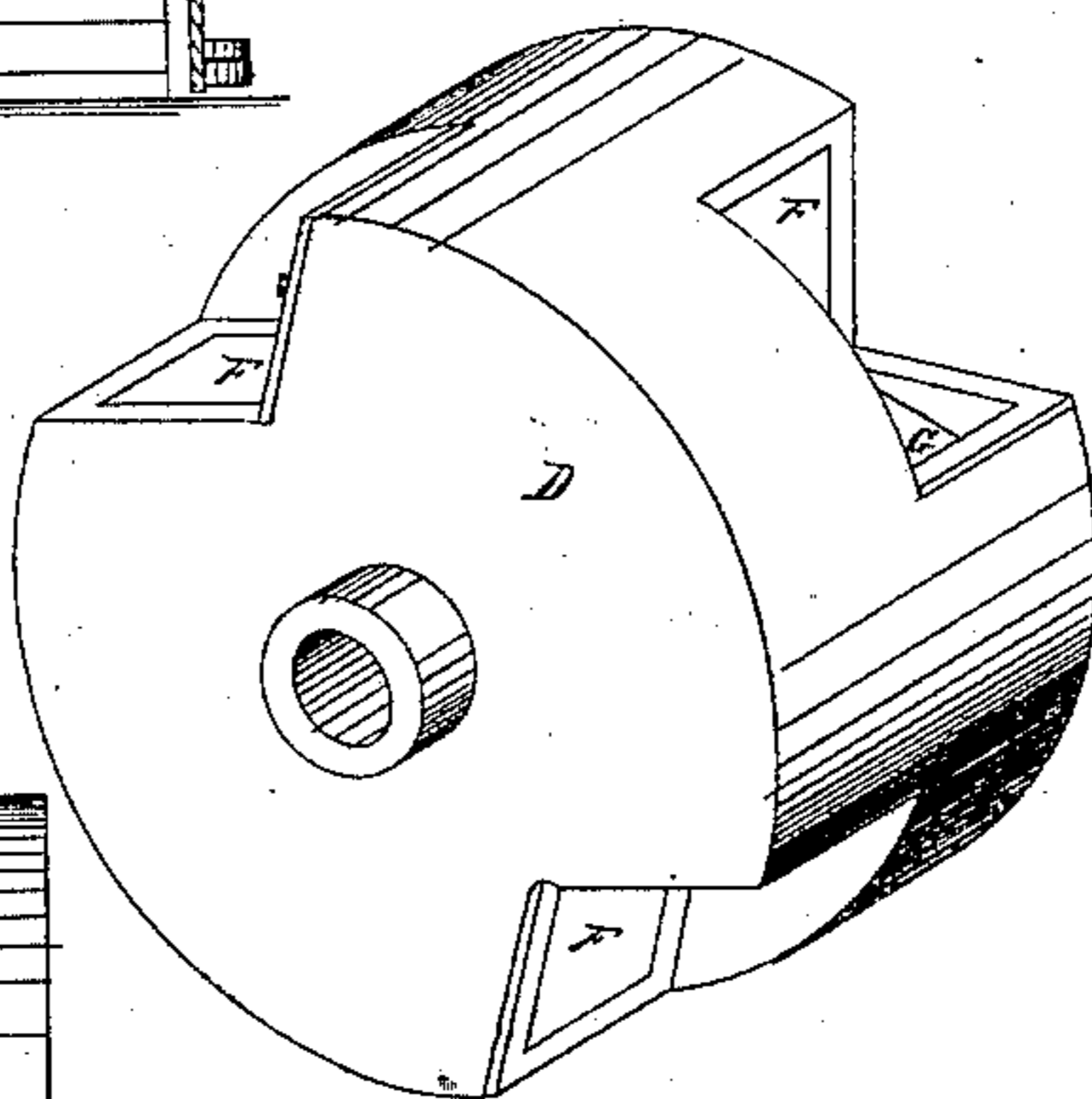


Fig. 2

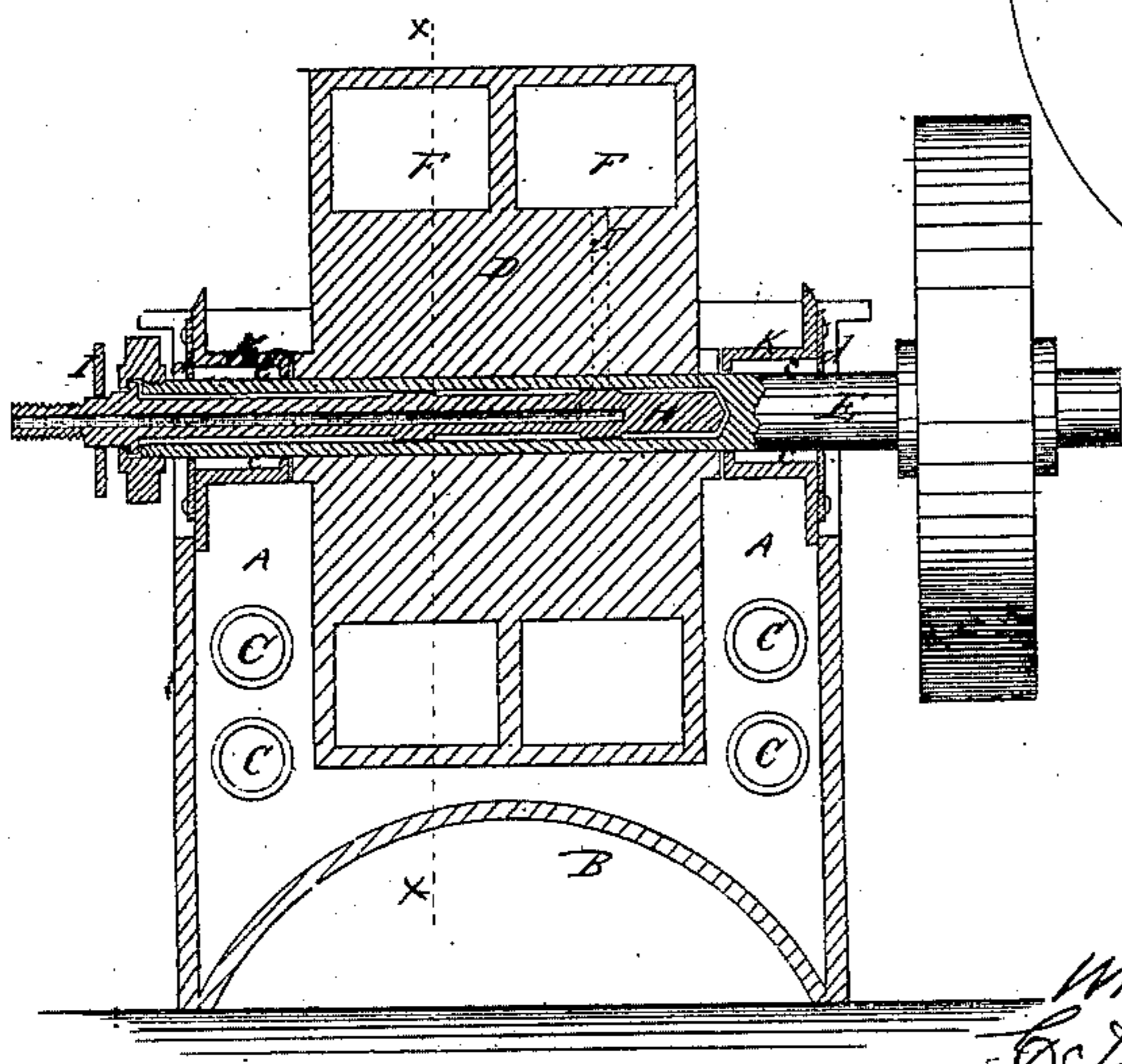
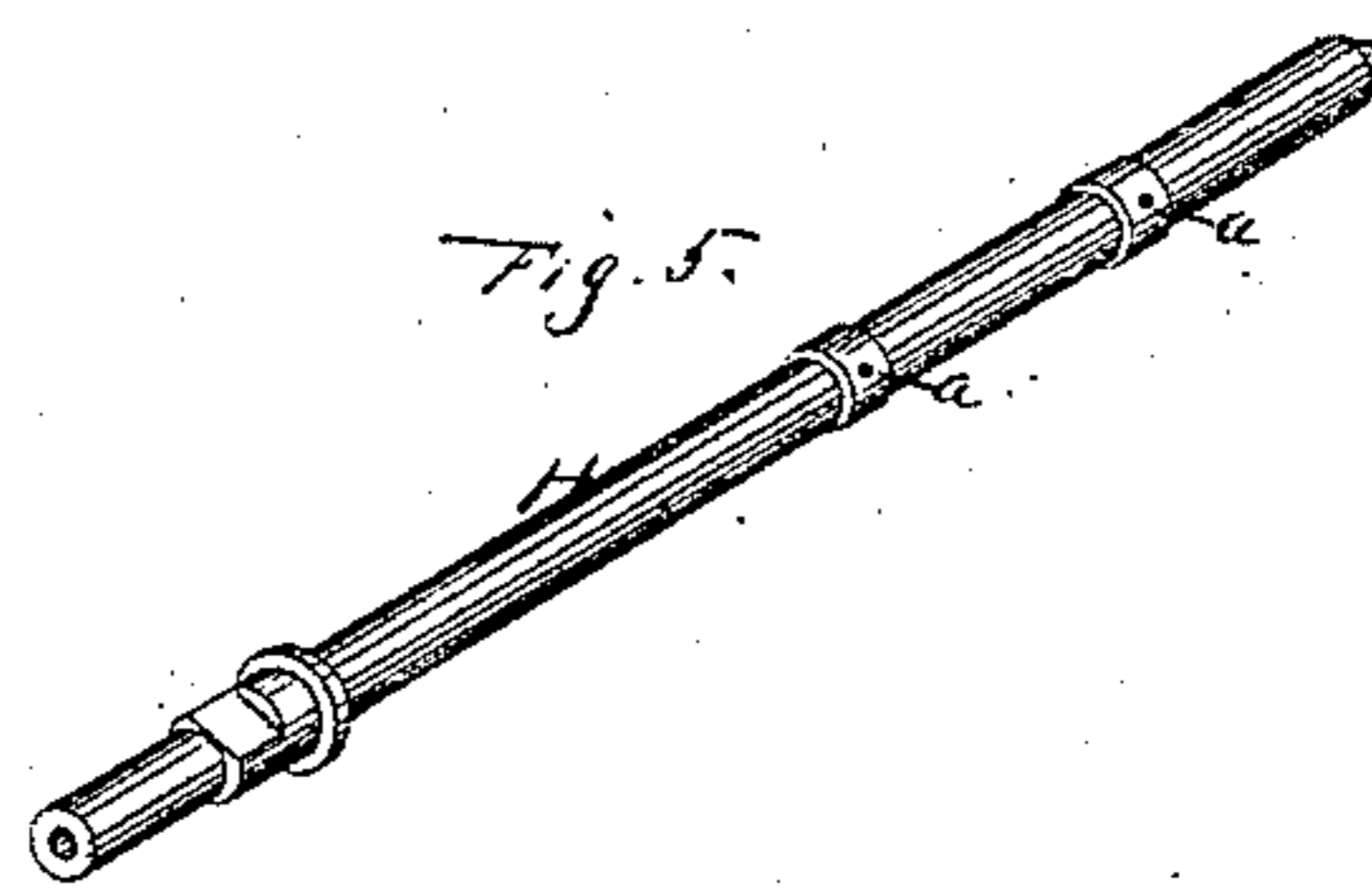


Fig. 5.



Witnesses.  
*G. H. Pond*  
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 Inventor.  
*G. H. Pond*

# UNITED STATES PATENT OFFICE.

G. H. POND, OF SAN FRANCISCO, CALIFORNIA.

## ROTARY STEAM-ENGINE.

Specification forming part of Letters Patent No. 98,626, dated January 4, 1870.

*To all whom it may concern:*

Be it known that I, G. H. POND, of the city and county of San Francisco, State of California, have invented an Improved Steam-Generating Engine and Fluid-Metal Packing; and I do hereby declare that the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvements without further invention or experiment.

The nature and object of my invention are the construction of an improved steam-engine, the novelty of which consists, first, in so constructing it that water is introduced to the cylinders and there converted into vapor; secondly, in placing the cylinders at the point where the power is needed—namely, at the circumference of the circle in which they travel; and, lastly, in causing the cylinders to revolve into a bath of fluid metal, which serves as a packing and renders the engine perfectly steam-tight. The cylinders are formed within a drum and near its periphery, this drum revolving in a case which is filled with hot fluid metal to near the height of the journals of the drum. Water is admitted to the cylinders through a central hollow shaft, and immediately flashes into vapor just as one end of the cylinder emerges from the metal. This end has a valve which is instantly closed by the pressure of the steam, while the other end, being entirely open and the cylinder being free of metal, it is forced around till the open end rises above the surface, when the steam is free to exhaust.

To more fully illustrate my invention, reference is made to the accompanying drawings, forming part of this specification.

Figure 1 is a vertical longitudinal section taken through *xx*, Fig. 2. Fig. 2 is a vertical transverse section. Fig. 3 is a view of the device for regulating the cut-off. Figs. 4 and 5 are perspective views of the cylinder-drum and the supply-shaft.

A is a case of metal, made with a fire-chamber, B, beneath, and having flues C or other known device for producing the necessary heat. Within this case the cylinder-drum D rotates upon its axle E. In the construction here shown I have employed four cylinders, two in

each side of the drum, and placed at right angles to each other. The drum may be cast, and the cylinders or driving-chambers F F are simply formed by a core, so as to leave them as curved chambers, close to the periphery of the drum and open at each end. At one end of each chamber I place a valve, G, the one here shown being simply hinged, although I do not wish to confine myself to this particular valve. The outer face of the drum D is turned perfectly smooth, so that it will rotate freely and not carry the metal with it.

The axle E is made hollow for a part of its length, and the smaller hollow shaft H is placed in the opening, extending far enough to allow the supply-ports *a*, Fig. 5, to stand opposite the two sides of the drum D. The shaft H is held in place by the adjustable strap I, the ends of which may be raised and lowered, so as to rotate the shaft a little, and thus determine the point at which the water shall be admitted to the chamber.

Various other modifications of the valve may be used, as a cap fitting against the end of the shaft E, having two holes, through which water passes alternately to one side and the other of the drum to supply steam to the chambers F, and in either form the cut-off may be regulated so as to increase or diminish the size of the port.

The ports or passages J extend through the axle E and the drum to a point in the chambers F near the valve, and as the drum rotates and one of these passages is brought opposite the port *a* a small quantity of water will be introduced, and will be instantly changed into steam by the heat of the cylinder or drum turning in the hot liquid metal. This metal fills the case A to a point near the journals of the drum E, and as the end of the chamber emerges from it the pressure of the steam closes the valve and forces the drum to revolve. The liquid metal stands at the same level within and without the drum, and thus makes the chambers perfectly tight till the end opposite the valve emerges, when the steam exhausts. A similar operation takes place in all the chambers, which gives the drum a continuous rotary motion. The amount of effective pressure per square inch at the periphery of the drum will depend upon the specific gravity of

the metal used and the size of the drum, and consequent depth to which the chambers are immersed.

As the journals are subjected to a considerable degree of heat, it would be impossible to use ordinary lubricants. I therefore construct a box, K, which is bolted to the side of the case, and is counterbored so as to leave a space, c, around the shaft. This space is filled with plumbago, pressed or tamped in so as to be perfectly solid, and a cap, d, is then screwed on from the outside to keep it in place. The refractory nature of the plumbago preserves it against the heat, and its consistency is such that it will not heat by friction, even in ordinary journals.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. Vaporizing the liquid within the engine at the moment of its use by the continuous concentric chambers F F, substantially as herein described.

2. The use of a fluid-metal packing for steam, air, or gas engines, substantially as described.

3. The drum D, rotating partly out of and partly in the fluid metal, and having the chambers or cylinders F at the periphery, substantially as herein described.

4. Filling the cylinders or chambers of the engine by the revolution of the drum, thereby forming the pistons or resisting-surfaces, substantially as described.

5. The box K for the shaft, with its plumbago lining, substantially as and for the purpose described.

In witness whereof I have affixed my hand and seal.

G. H. POND. [L. S.]

Witnesses:

G. H. STRONG,  
J. L. BOONE.