

S. Stevens,
Rotary Steam Engine.
N^o 13,107. Patented June 19, 1855.

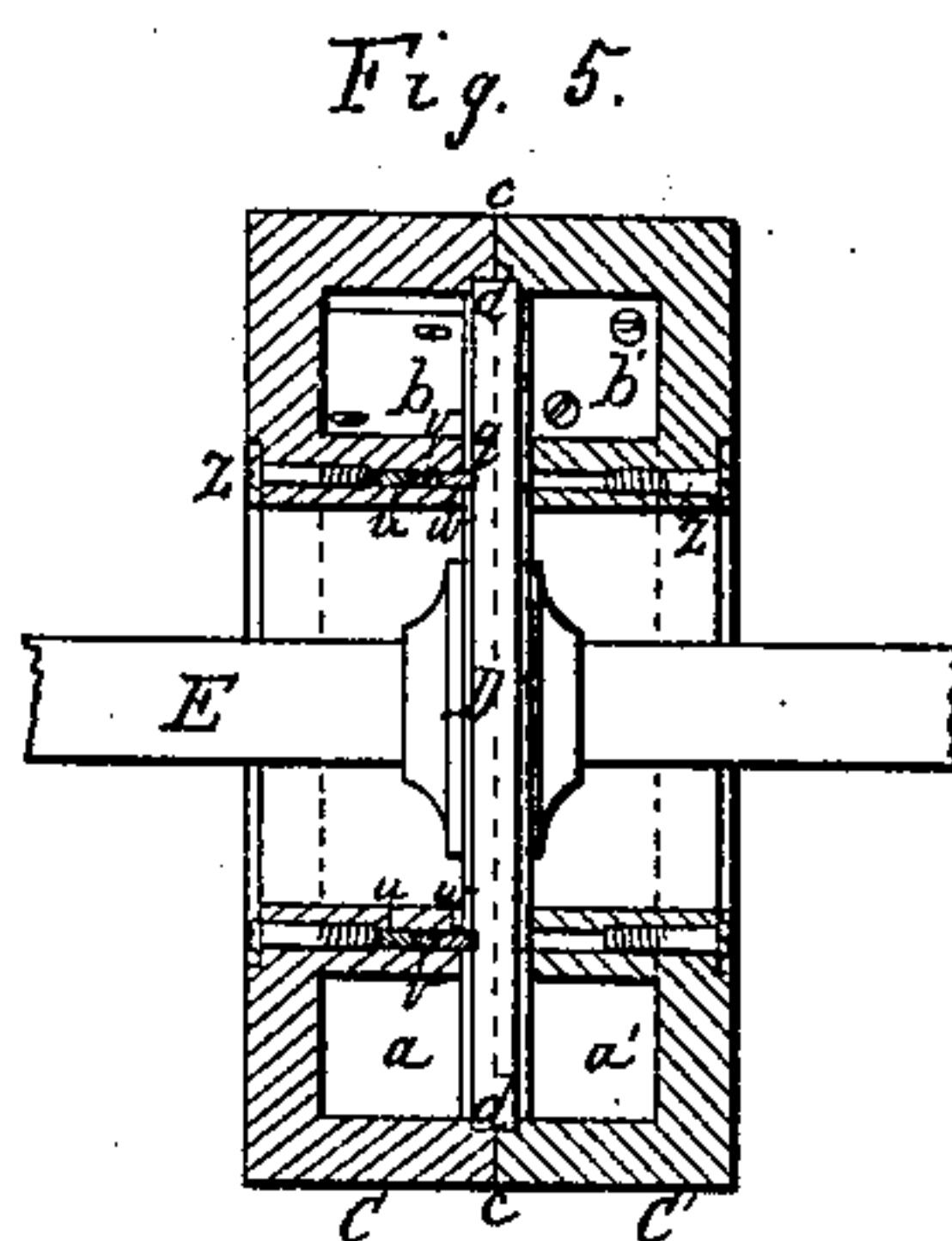
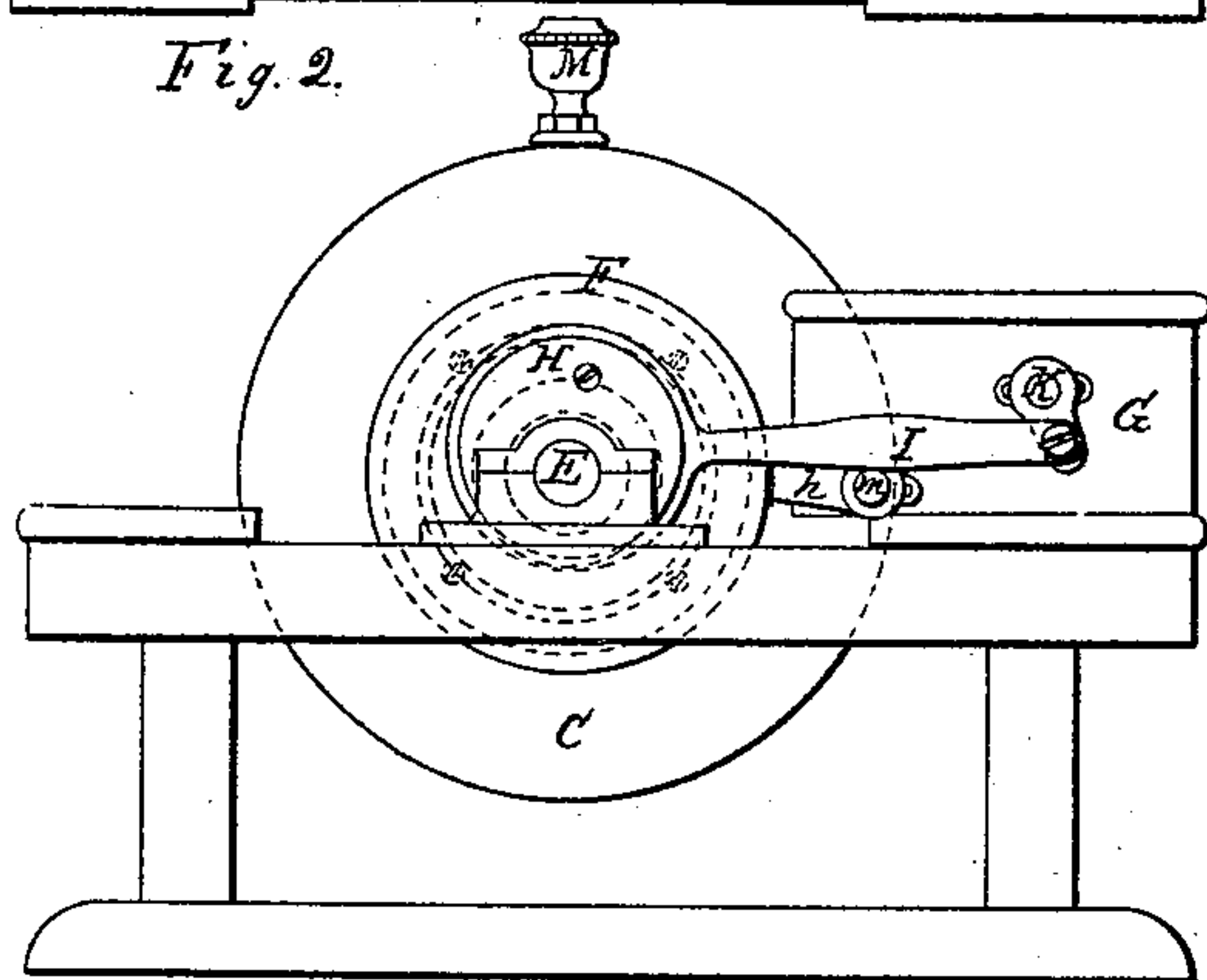
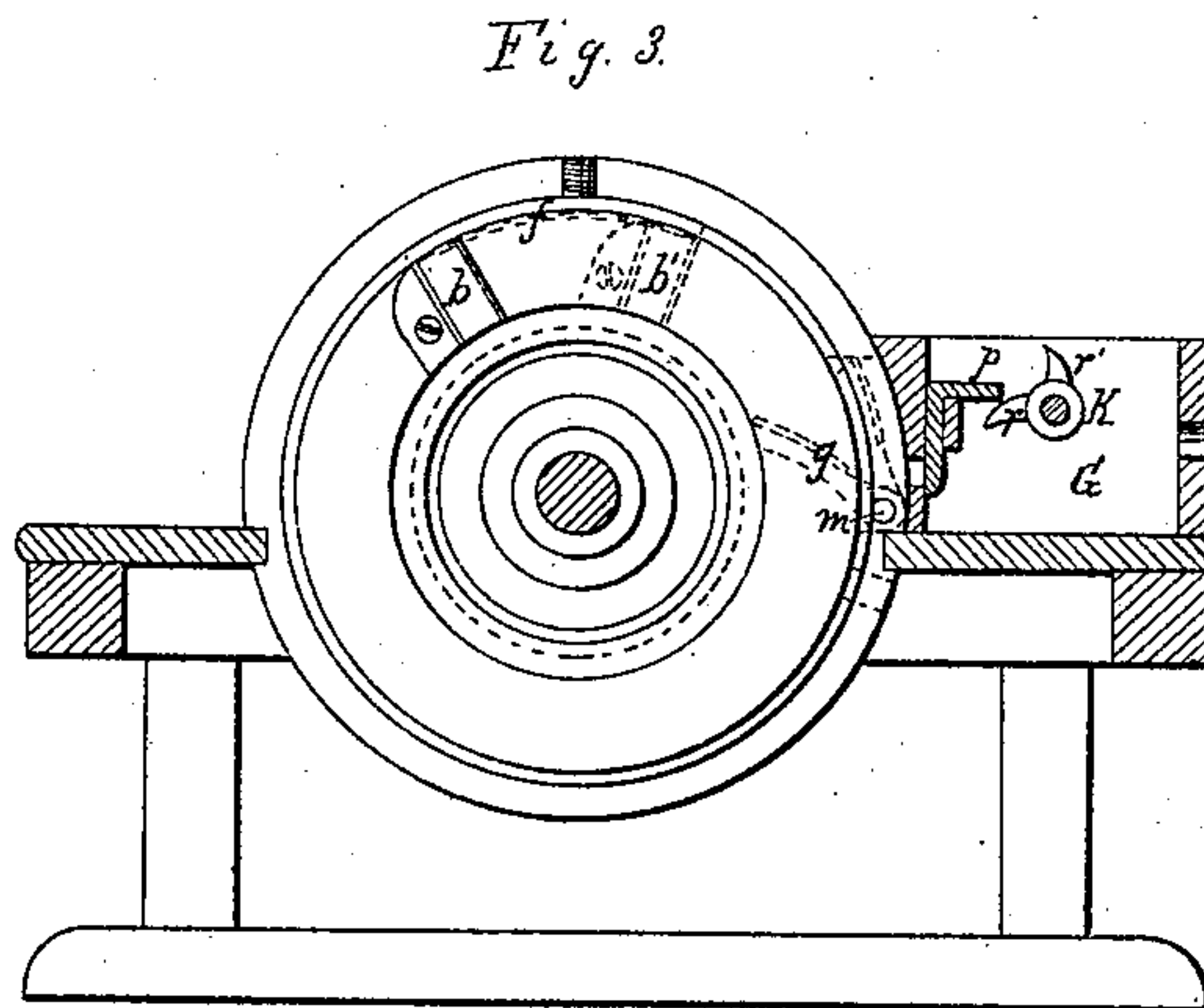
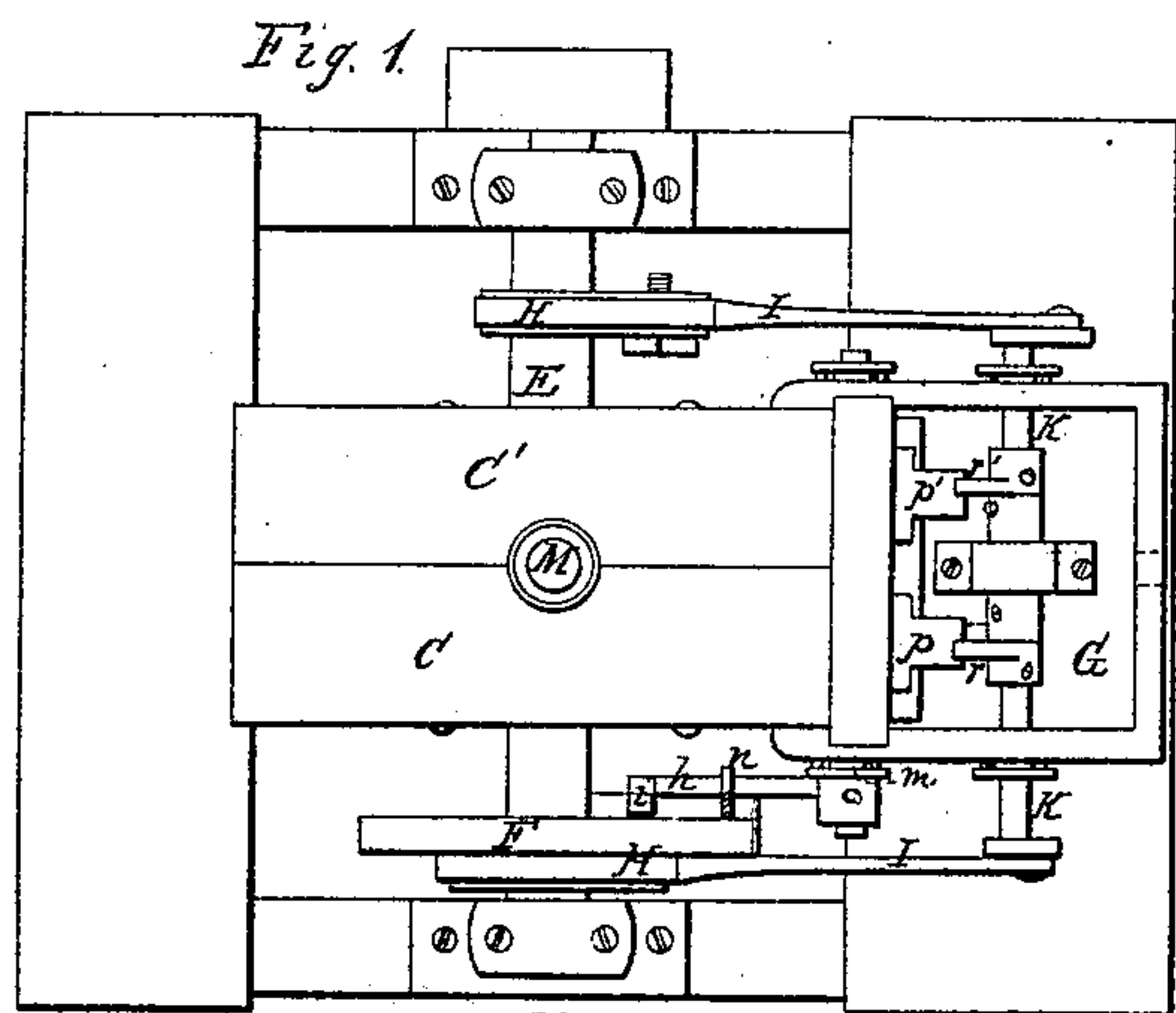


Fig. 4.

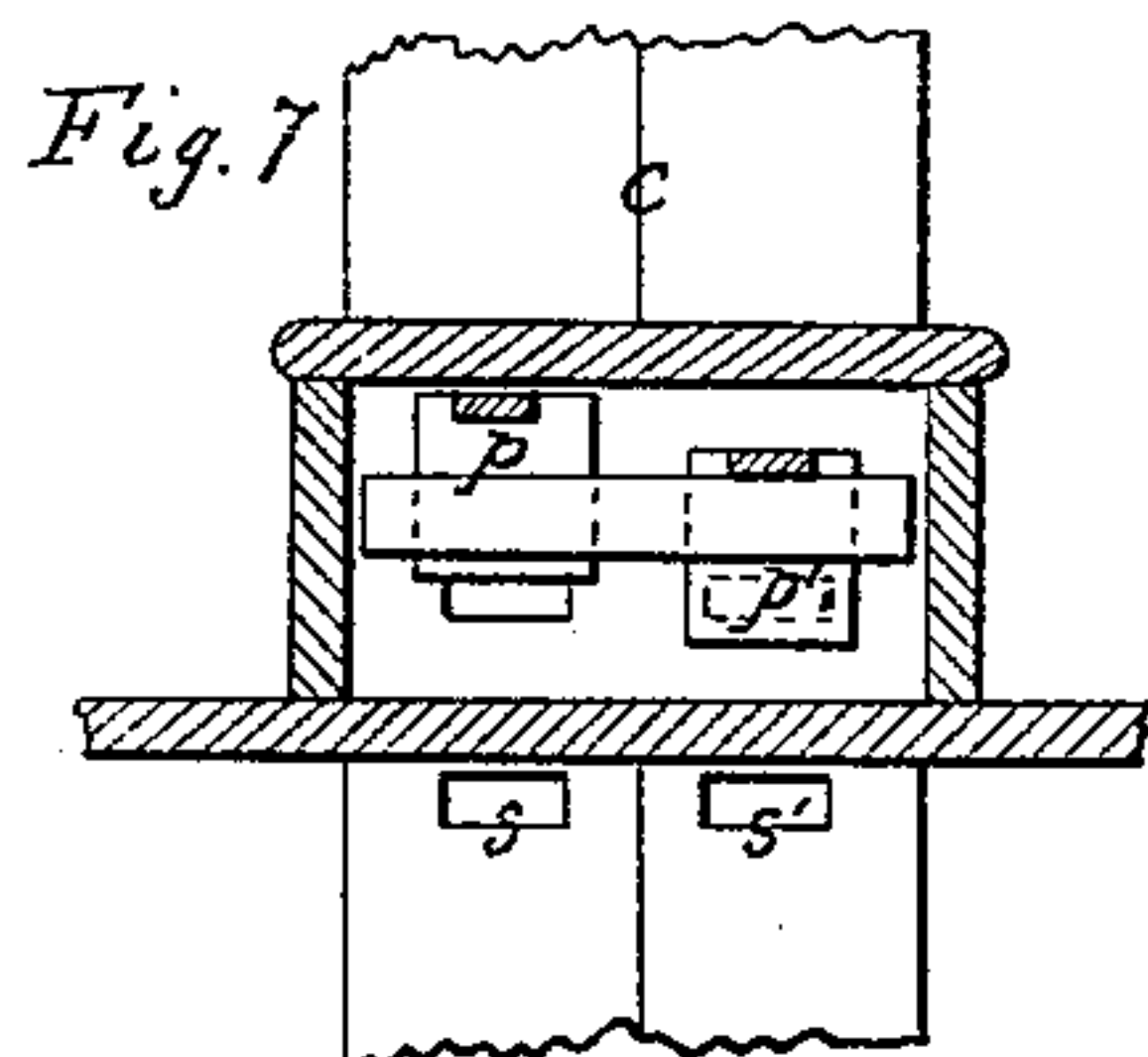
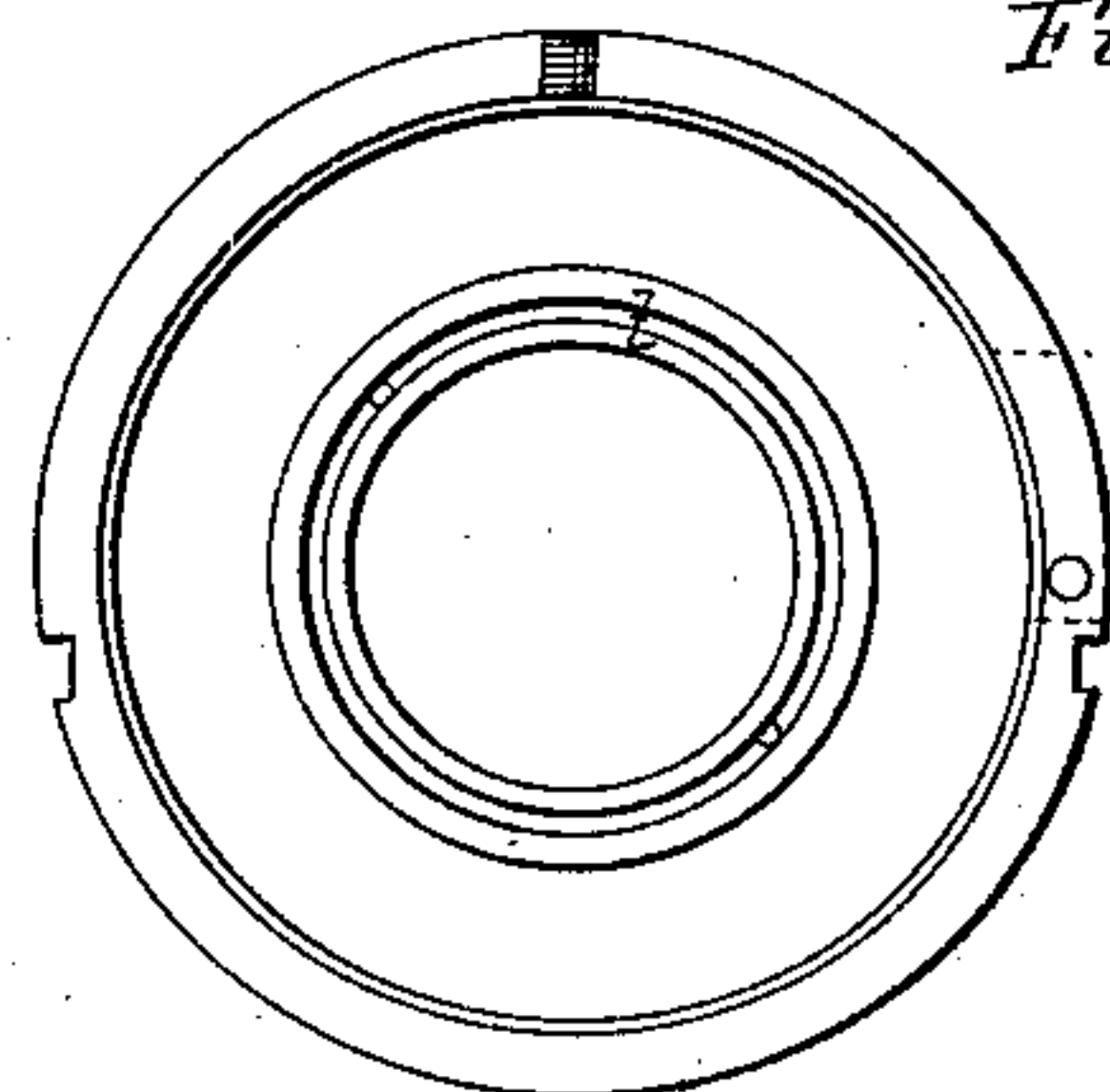
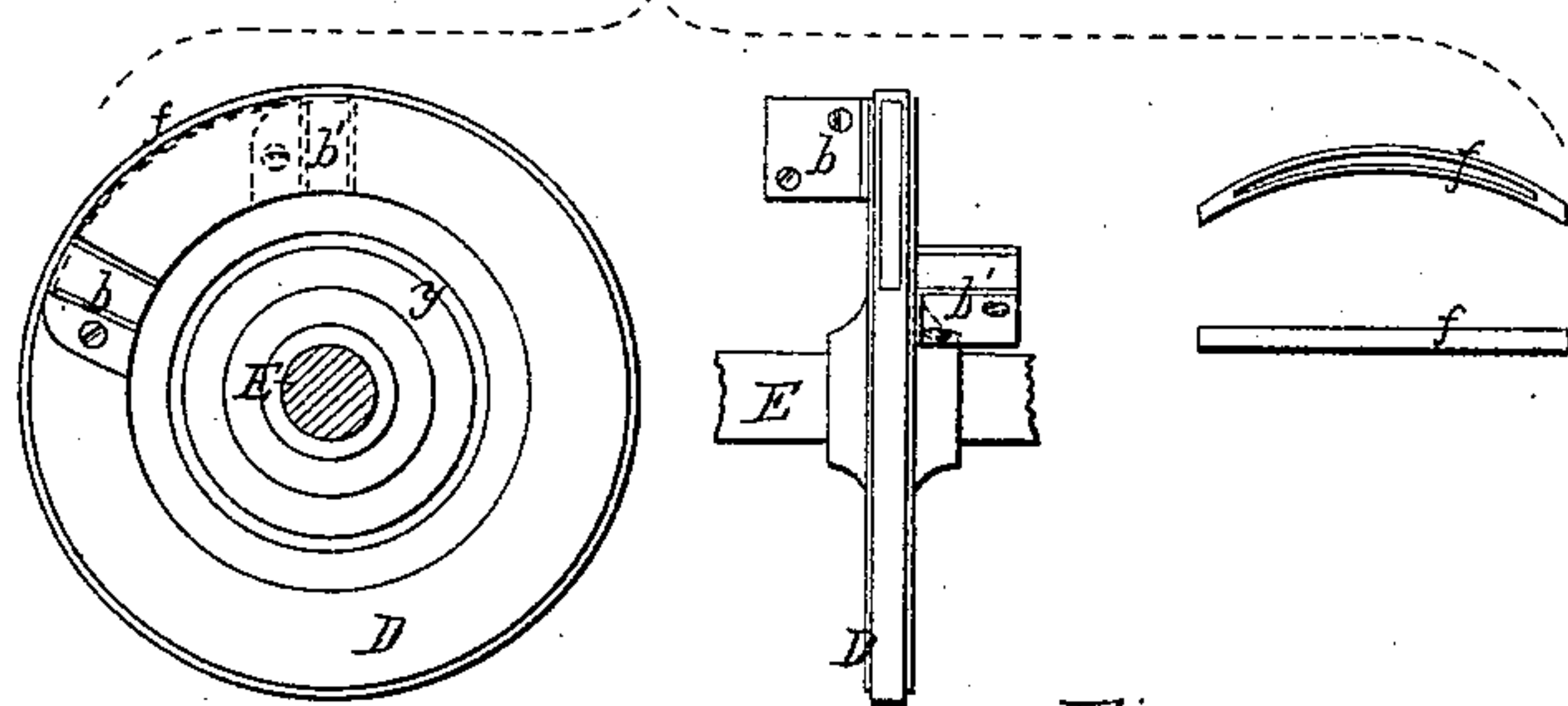


Fig. 8.

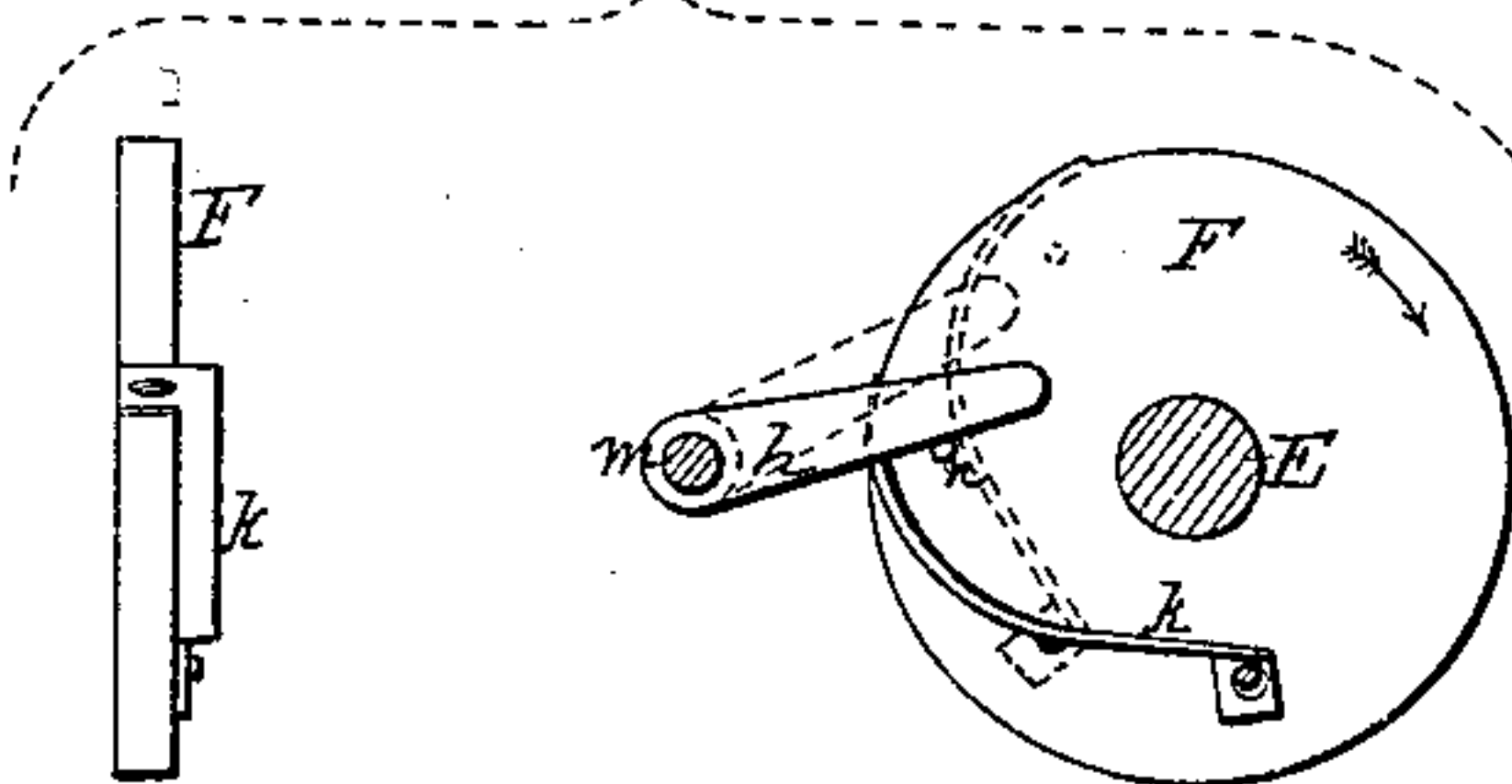
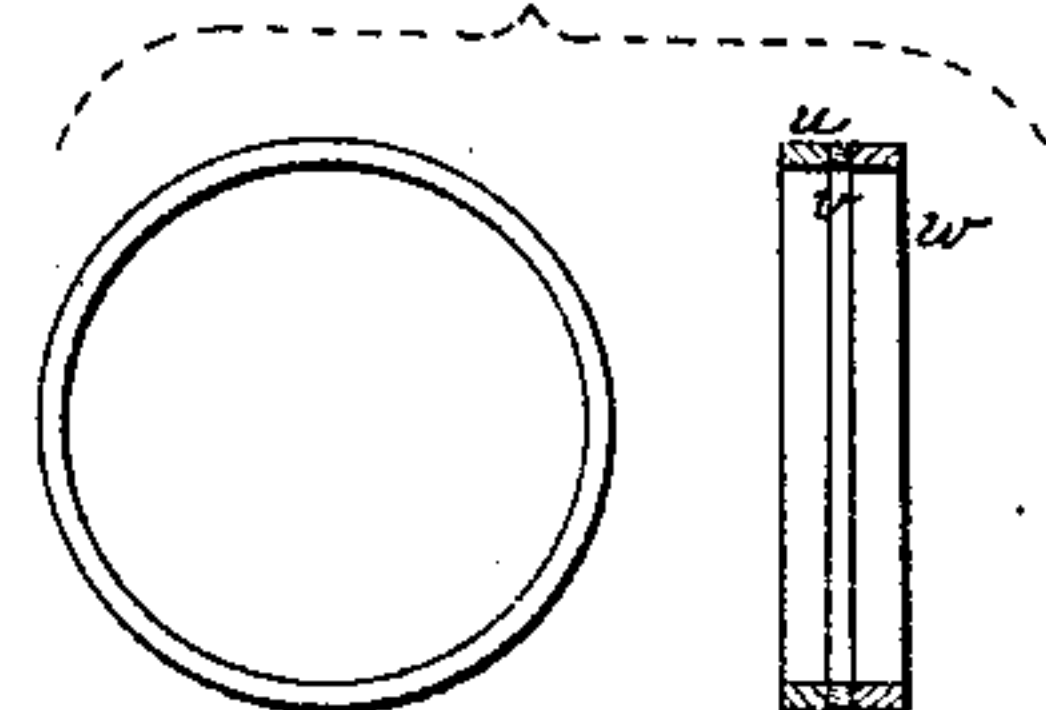


Fig. 9.



UNITED STATES PATENT OFFICE.

SYLVESTER STEVENS, OF BOSTON, MASSACHUSETTS.

ROTARY ENGINE.

Specification of Letters Patent No. 13,107, dated June 19, 1855.

To all whom it may concern:

Be it known that I, SYLVESTER STEVENS, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and Improved Double-Action Disk Engine, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a plan; Fig. 2, an elevation; Fig. 3, a sectional elevation; Figs. 4, 5, 6, 7, 8, 9, details which will be referred to hereafter.

The nature of my invention consists in dividing the cylinder into two separate and distinct chambers or cylinders, which are separated from each other by a revolving disk, to which are attached the two pistons, one for each cylinder. These pistons in lieu of being placed opposite to each other are set a short distance apart so as not to receive their steam at the same instant, whereby the single disk with its two pistons is enabled to pass the dead center as surely as where two cylinders with cranks set quartering are employed. To enable others skilled in the art to understand my invention I will proceed to describe the manner in which I have carried it out.

In the accompanying drawings C, C', is an annular cylinder which is divided by the circular disk D into two separate cylinders *a a'* (Fig. 5) in each of which plays a piston *b, b'*. These pistons are attached to the disk D, and revolve with it. In lieu of being set opposite to each other they are so placed that one shall lead the other a certain distance, that it may take steam before the other commences to exhaust, by which means the two pistons assist each other past their dead points. The revolving disk is secured to the driving shaft E through which the power is transmitted from the machine. For convenience of construction the cylinder is cast in two portions C, C', which are united at the joint *c*, and suitably secured together by bolts or otherwise. The pistons may be packed by triangular metallic plates, separated from each other by springs or otherwise. This however forms no part of my present invention and need not be further described.

That there may be no unnecessary leakage from one of the cylinders *a, a'*, to the other, the disk D is caused to revolve in a circular groove *d*. When the two cylinders

are filled with steam there is no leakage that can result in loss of power or of steam. To prevent leakage from one cylinder to the other at the instant of the exhaust, the portion of the periphery of the disk between the two valves is packed with a metallic or other packing *f* (Fig. 4).

I will now explain the manner in which the abutment valves are operated. Each cylinder is furnished with its abutment valve, one only of which is represented at *g*, Fig. 3, the other being precisely similar to it; this valve is attached to the short shaft *m*, to which is secured the arm *h*, which carries at its outer extremity the pin *i*.

F is a disk secured to the driving shaft E, and revolving therewith; the pin *n* projecting from the face of this disk strikes upon the arm *h*, and raises the abutment valve out of the way of the pistons; when this has been accomplished the pin *n* passes from beneath the arm *h*, and the latter falls; to prevent the sudden fall of the abutment valve upon its seat the pin *i* upon the arm *h*, strikes upon the pin *k*—which relieves its fall, and the next instant the pin passes from off the end of this spring and the valve closes. The arrangements for operating the other abutment valve are similar to those just described, though but one of them is shown in the drawings.

The steam valves and the method in which they are operated will now be described.

G is the steam chest—*p, p'* the valves.

H are eccentrics which through the arms I communicate a vibratory motion to the shafts K, K'; these shafts carry the fingers *r, r'*, that operate the valves (Fig. 3) they being raised by the finger *r*, and depressed by *r'*; by altering the position of the fingers *r'* they may be made to close the valves at any point of the stroke, and thus the steam may be worked expansively. The exhaust ports *s, s'*, are seen in Fig. 7.

It now remains only to explain the manner in which the joint *g* between the inner wall of the cylinder and the revolving disk is packed.

t is a groove into which is dropped first a metallic ring *u*, next an india rubber ring *v*, and lastly a metallic packing ring *w*. There is a corresponding groove in the disk D into which the packing ring *w* projects, the inner ring *u* is set up for the purpose of tightening the packing by means of the

screws *z*. The joint between the disk D and the cylinder is oiled by means of the oil cup M. It is evident that the above described engine may be used as a water engine, a suitable enlargement of the size of the ports only being required. The engine may be made reversible by a double set of valves, or otherwise, and may be worked upon the low pressure principle by the addition of the suitable attachments.

What I claim as my invention and desire to secure by Letters Patent is—

The revolving disk D with its valves *b*, *b'*, operating in the manner substantially as herein set forth.

SYLVESTER STEVENS.

Witnesses:

SAM. COOPER,

JOHN S. CLOWS.