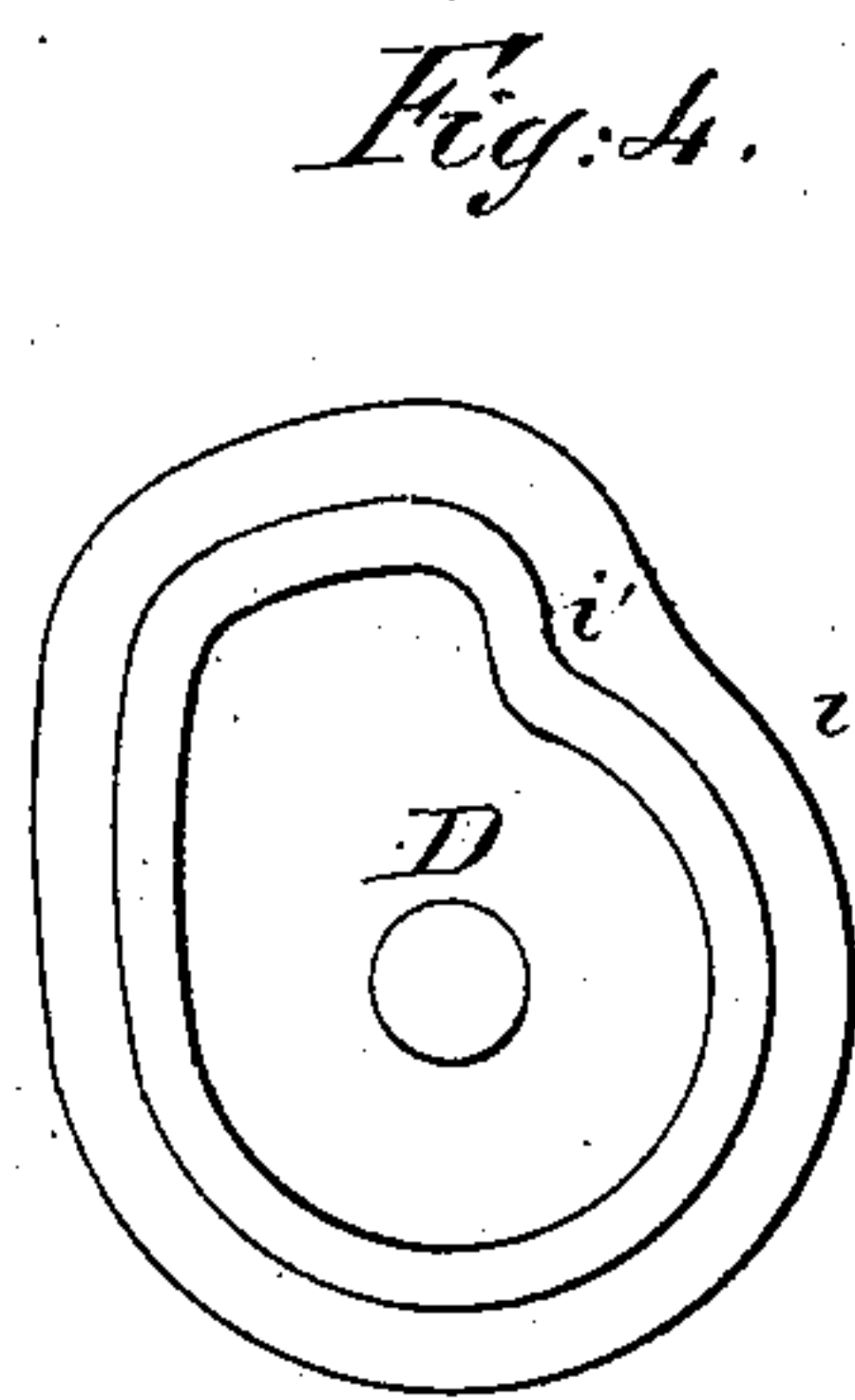
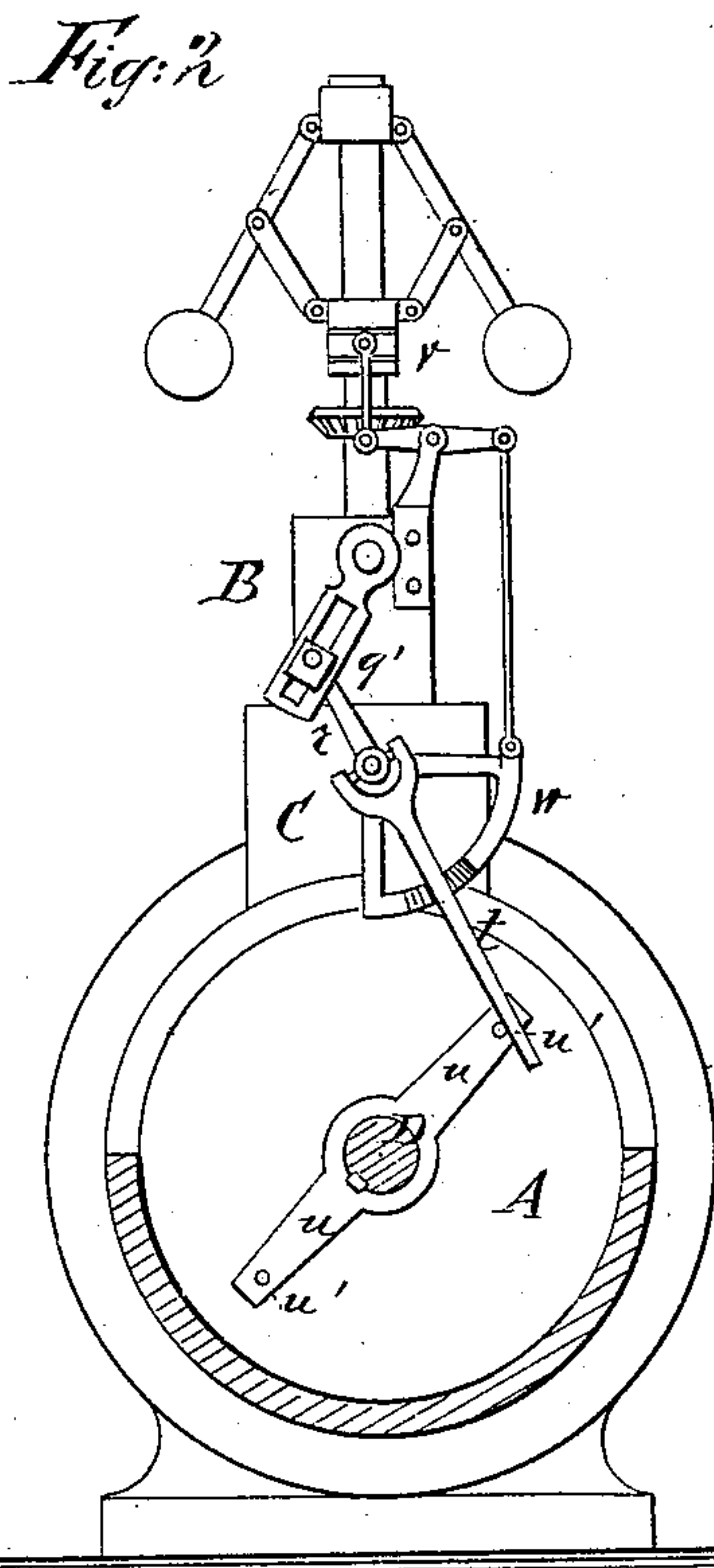
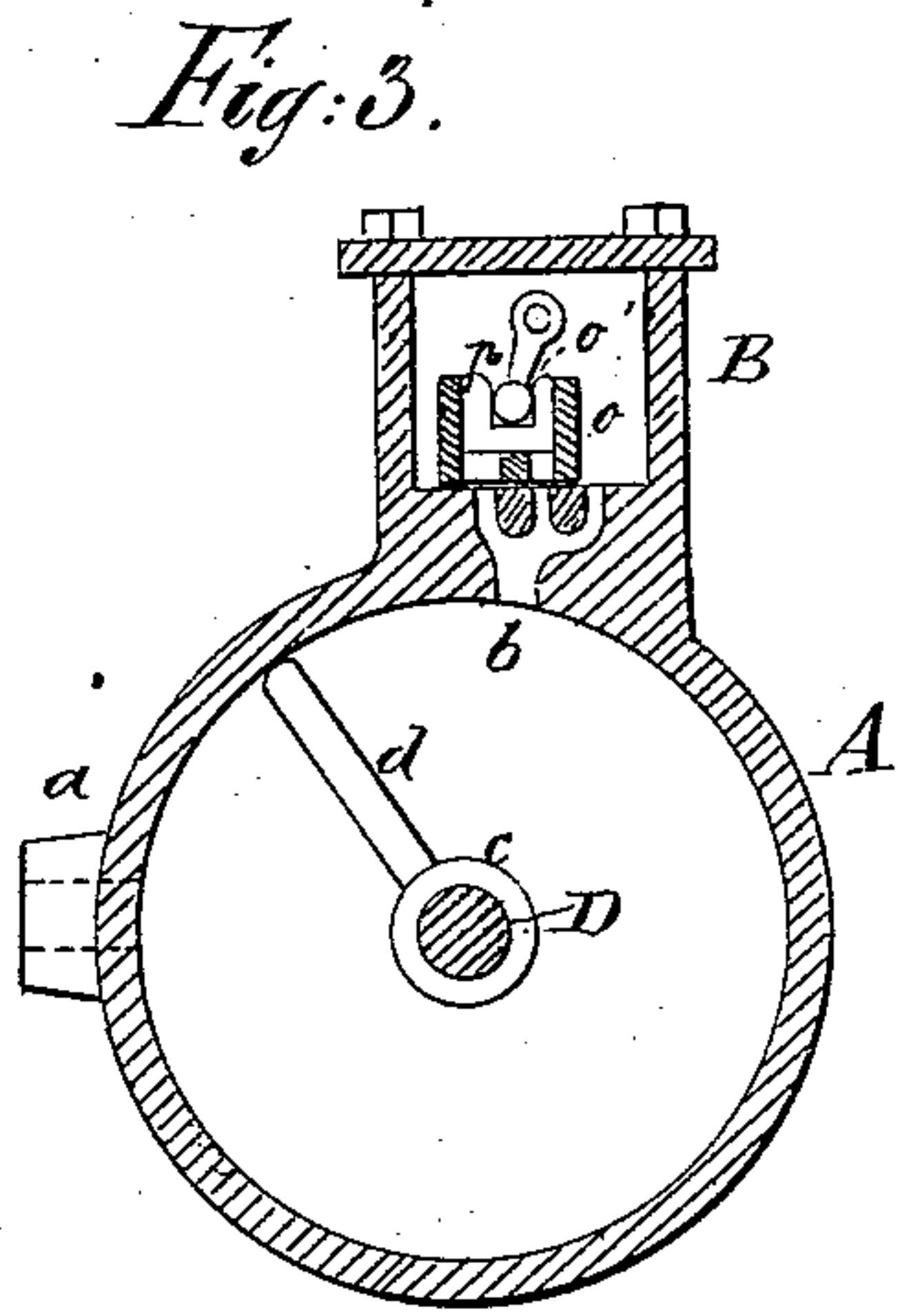
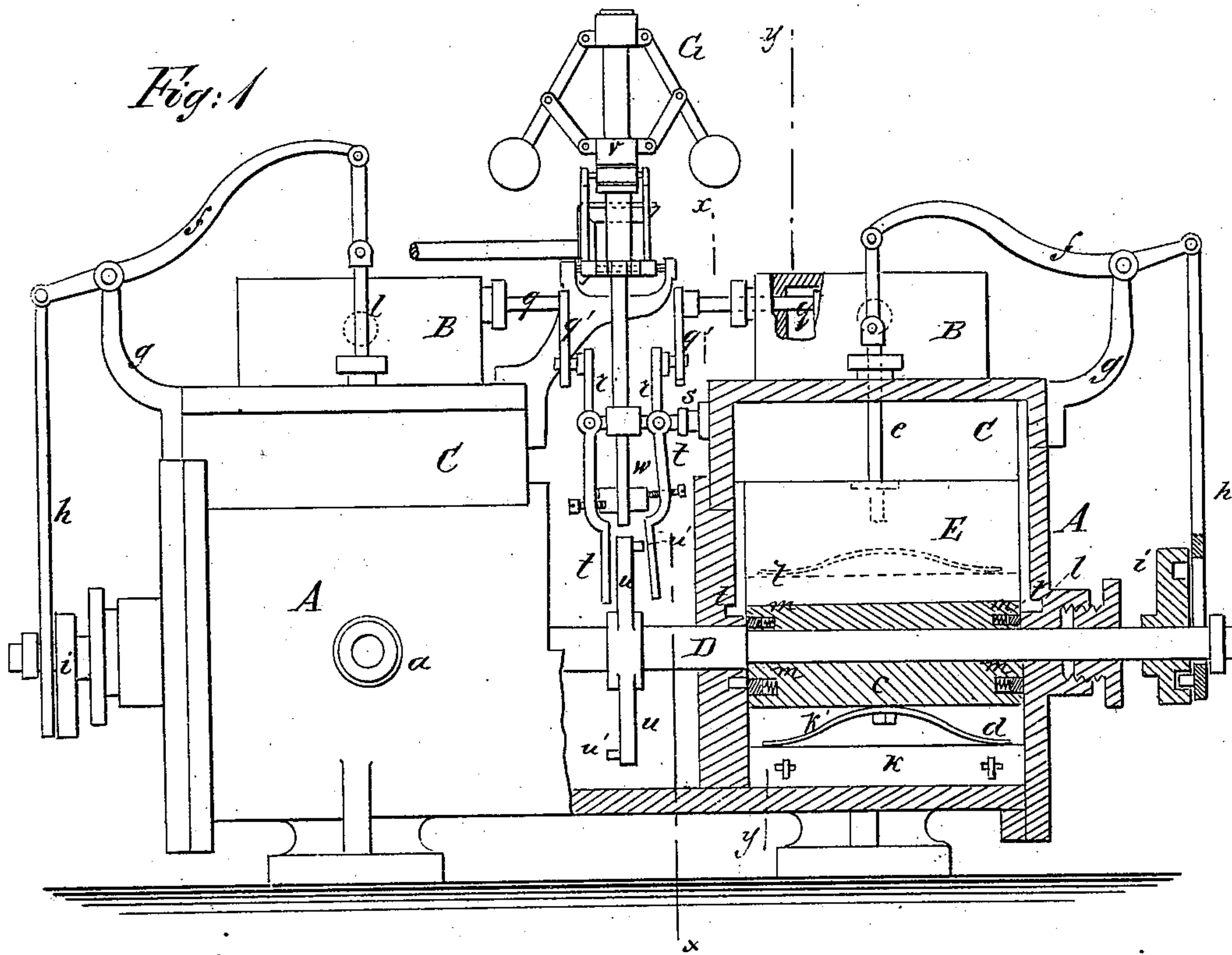


(No Model.)

J. H. NEWELL.  
Rotary Engine.

No. 235,003.

Patented Nov. 30, 1880.



WITNESSES:

*Chas. Nida*  
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INVENTOR:

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BY *Munn & Co*  
ATTORNEYS.



# UNITED STATES PATENT OFFICE.

JOHN H. NEWELL, OF SCOTTVILLE, ILLINOIS, ASSIGNOR TO HIMSELF AND  
JAMES WALKER, OF SAME PLACE.

## ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 235,003, dated November 30, 1880.

Application filed August 16, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. NEWELL, of Scottville, in the county of Macoupin and State of Illinois, have invented a new and useful Improvement in Rotary Engines, of which the following is a specification.

My improvements relate to the class of rotary engines having stationary cylinders and revolving pistons.

10 The invention consists in mechanism for operating the valve, and the combination thereof of a variable cut-off, all of which features are shown in the accompanying drawings, and will be described hereinafter with  
15 reference thereto.

In the drawings, Figure 1 is a sectional side elevation of a rotary engine embodying my improvements. Fig. 2 is a vertical transverse section on line *x x* of Fig. 1. Fig. 3 is a vertical transverse section on line *y y* of Fig. 1; and Fig. 4 is a face view of the cam for operating the sliding gates.

Similar letters of reference indicate corresponding parts.

25 The engine shown is in compound form. A A are the two cylinders, placed end to end, a short distance apart, and each formed with a steam-chest, B, and radial gate-chamber C, at the upper side.

30 In the side of each cylinder is an exhaust-port, *a*, and each cylinder connects with its steam-chest by a port, *b*, having three contiguous passages in the valve-seat.

A horizontal shaft, D, passes through both  
35 cylinders and through stuffing-boxes in the heads. Within each cylinder the shaft is provided with a fixed hub, *c*, from which a wing, *d*, projects, that fits snugly to the inner surfaces of the cylinder. Within each radial  
40 chamber C is fitted a gate, E, that is suspended from a rod, *e*, passing through a stuffing-box at the top of the chamber, and the heads of the cylinders are grooved to form slideways for the gates E to move in, so that they may  
45 slide down in contact with hubs *c*, and thus form abutments in the steamway.

The rods *e* are hung from levers *f*, that are sustained on arms *g*, attached to the outer heads of the cylinders, and the outer ends of  
50 levers *f* are connected with rods *h*, that hang

downward and are looped at their lower ends to pass at each side of shaft D. The looped ends of rods *h* are formed with pins that enter the cam-slots of disks *i*, that are fixed on shaft D. The cams are arranged to raise the gate E of one cylinder while the gate of the other cylinder is being lowered. The cam-slots are formed, as shown in Fig. 4, so as to lower the gates rapidly until near the end of the movement, and then slowly, by the inclined portion *i'*, to prevent jar on hubs *c*. 55 60

The wings *d* are slotted at their outer ends to receive packing-plates *k*, that are forced outward by springs *k'* beneath them, so that they form a tight packing against the inner periphery of the cylinders. There are similar packings in the ends of the wings, that are forced outward in contact with the cylinder-heads by springs. 65

In recesses formed in the cylinder-heads packing-blocks *l* are fitted, to compensate for wear on the ends of hubs *c*, and in the ends of hubs *c* annular grooves are formed, that receive packing-rings *m*. The lower ends of gates E are also fitted with packing-plates, forced outward by springs similar to those in wings *d*, so as to be self-adjusting, to compensate for wear on the hubs. 70 75

The steam-chests B are fitted with slide-valves *o*, that are recessed, as shown in Fig. 4, to receive slide-blocks *p*, with which crank-arms *o'* of rock-shafts *q* connect. This construction permits vertical movement of blocks *p* to conform to the curved movement of the crank while the valve continues to hug the seat. The valves *o* are formed with two ports, which, in connection with the three-way port *b* in the valve-seat, give ample space for steam, while but a short movement is required to open and close the ports. 80 85 90

The valve-shafts *q* extend over the space between the cylinders A, and carry slotted arms *q'*. To the arms *q'* are connected the upper ends of arms *r*, that are hung on a fixed stud or bracket, *s*, so that said arms may swing in the plane of rotation of shaft D. To the hubs of arms *r* arms *t* are hung by gimbal-joints, so as to swing with arms *r*, and also be capable of independent movement in the direction of the axis of shaft D. Upon the shaft D is fixed 95 100



a collar having two opposite arms, *u*, positioned to pass between the lower ends of arms *t*. To the arms *u*, at opposite sides, pins *u'* are fixed for contact with arms *t*, whereby the arms *r* and valve-shafts *q* are rocked.

Above the parts just described is fitted a centrifugal governor, *G*, rotated by suitable connections, and having its sliding sleeve *v* connected as shown in Fig. 2, or in any other suitable manner, with a segment, *w*, that is hung on bracket *s*, to swing between the arms *t*. The segment *w* is beveled at opposite sides, so that when swung upward the beveled surfaces shall swing arms *t* outward or away from the revolving arms *u*. The parts are to be adjusted so that when the balls of the governor are down steam shall be cut off at about one-quarter revolution of shaft *D*. In operation, by the contact of the pin *u'* of one arm, *u*, with one pendent arm, *t*, the valve *q* is moved and steam is admitted until the pin *u'* clears the arm, when the arm returns, by means of a suitable spring or weight, and closes the steam-valve. The same operation takes place in connection with both cylinders and steam-valves, but at different periods in the revolution of shaft *D*, so that steam is being used expansively in one cylinder

while fresh steam is entering the other. As soon as shaft *D* commences to revolve the governor-balls rise and the beveled segment *w* carries the arms *t* outward, so the pins *u'* clear said arms sooner, and thus the time during which steam is admitted is shortened at every revolution until the normal speed is obtained. By these means the engine is rendered automatic in action, and a continuous application of steam is obtained.

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

1. In rotary engines, the combination of the governor *G*, beveled segment *w*, pendent arms *t* of the valve mechanism, and the revolving cut-off arms *u*, as and for the purpose set forth.

2. In rotary engines, the combination of valve-shafts *q*, having slotted arms *q'*, swinging arms *r*, jointed pendent arms *t*, and arms *u*, provided with pins *u'*, and revolved by the engine-shaft, substantially as shown and described, for operation as specified.

JOHN HARLAN NEWELL.

Witnesses:

WILLIAM GROVES,  
NEWMAN EADS.