(No Model.)

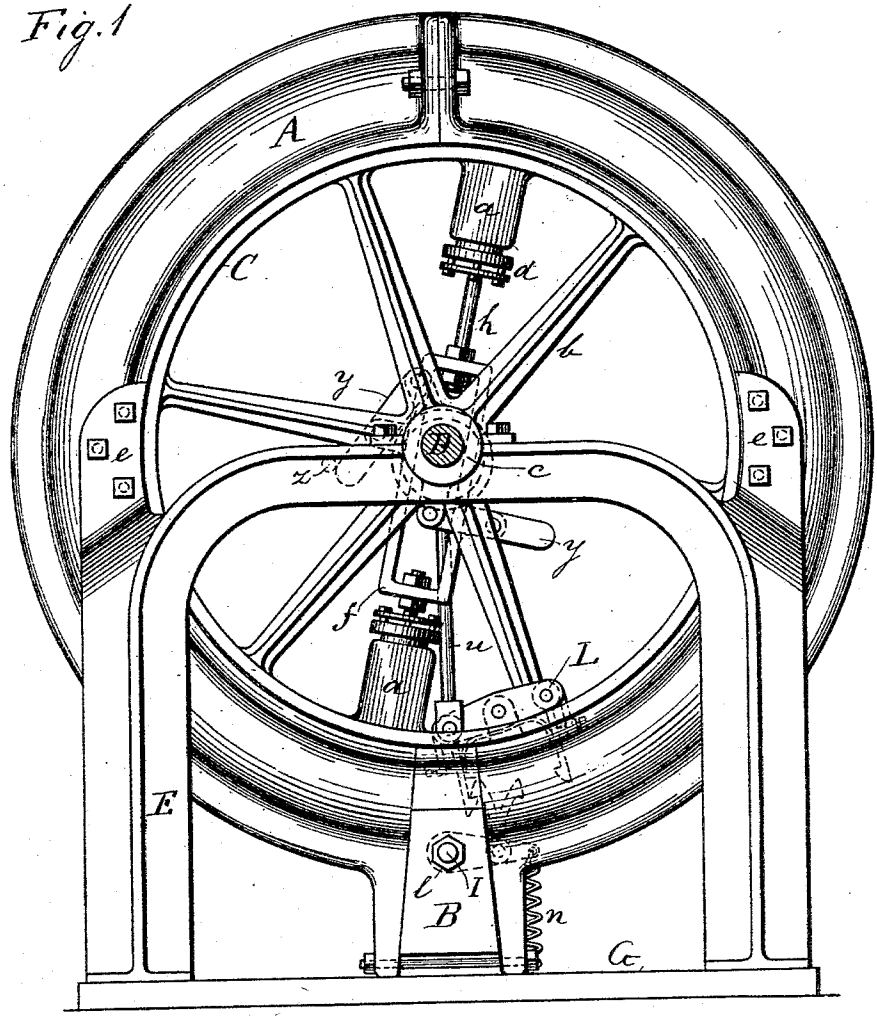
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B. BECK.

ROTARY ENGINE.

No. 425,562. Patented Apr. 15, 1890.

Fig. 1



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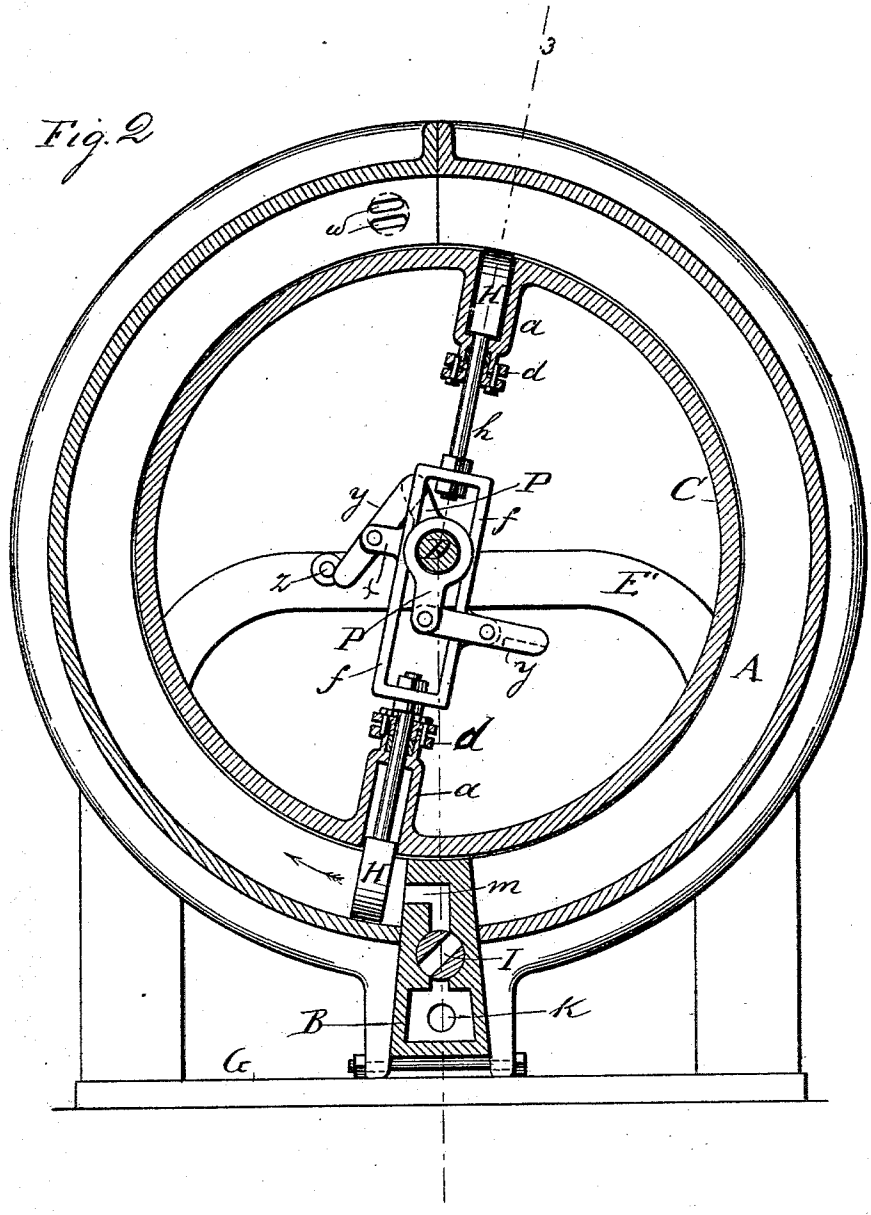
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ROTARY ENGINE.

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Fig. 2



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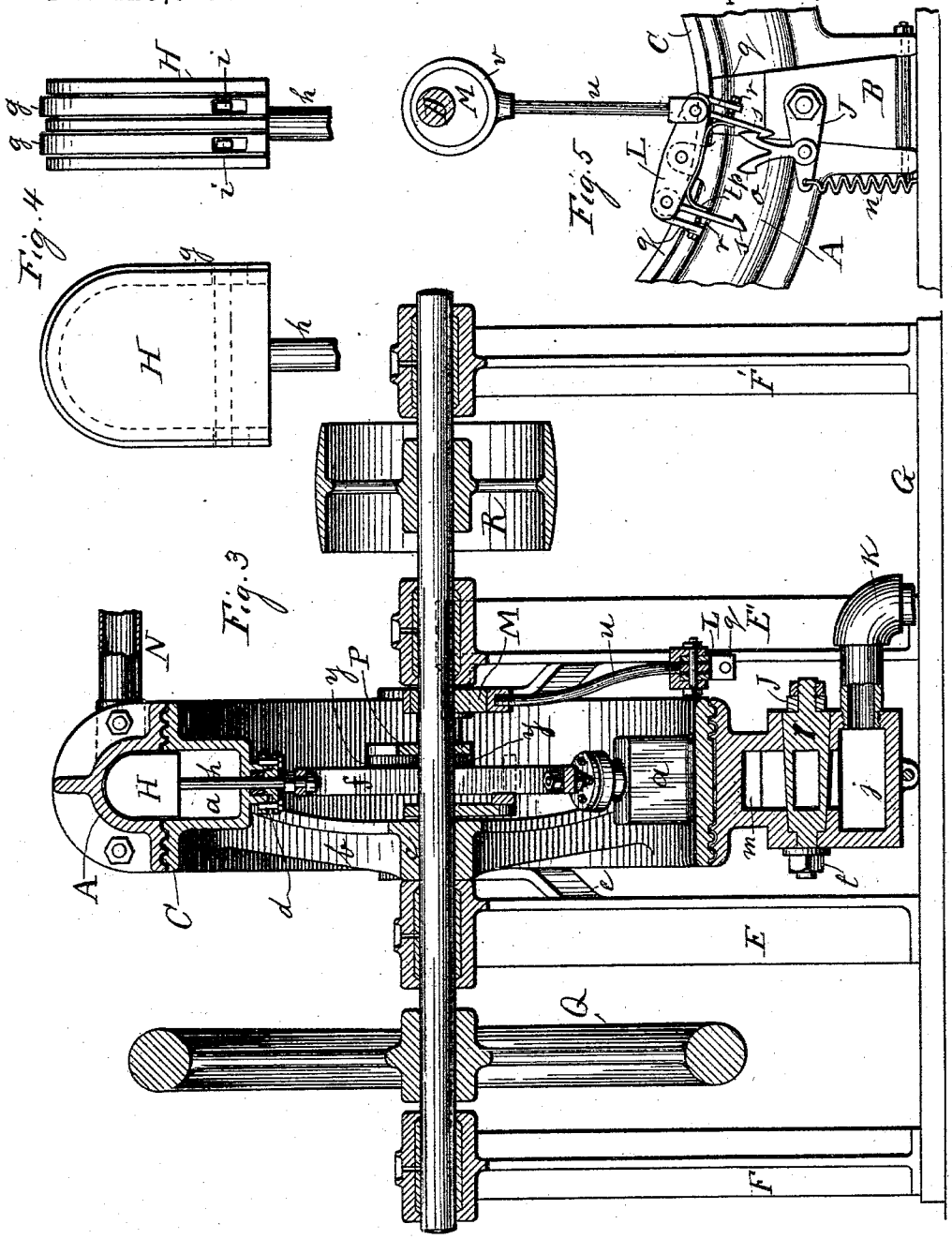
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(No Model.) 3 Sheets—Sheet 3.

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UNITED STATES PATENT OFFICE.

BRUNO BECK, OF CHICAGO, ILLINOIS.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 425,562, dated April 15, 1890.

Application filed August 20, 1889. Serial No. 321,428. (No model.)

To all whom it may concern:

Be it known that I, BRUNO BECK, a subject of the Emperor of Germany, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to rotary steam-engines; and it has for its object to provide such an engine with two sliding pistons at diametrically-opposite sides of the piston-wheel, both connected together for one at the time to be in action during one-half of a revolution, and to provide in combination therewith an oscillating valve with a cut-off mechanism for using the steam expansively; and with these objects in view my invention consists of the novel devices and combinations of devices hereinafter described and specifically claimed.

In the accompanying drawings, Figure 1 represents a side elevation; Fig. 2, a transverse vertical section through the center of the engine, and Fig. 3 a longitudinal vertical section on line 3 3 in Fig. 2. Fig. 4 is a side and edge view of one of the pistons, and Fig. 5 an elevation of the valve-operating mechanism detached.

Corresponding letters of reference in the several figures of the drawings designate like parts.

A denotes an annular chamber having the function of a cylinder, and being made in two semicircular sections bolted together on top, and having bolted between its bottom end a keystone-shaped body B, that forms the abutment for the steam-pressure, and at the same time provides the steam-chest and steam-inlet-valve chamber. This annular chamber is U-shaped in section, and its interior flanges have a series of semicircular grooves that engage and snugly fit corresponding projections of the rim of piston-wheel C, the hub *c* of which being connected with such rim C by arms *b*. The hub of this wheel C is mounted upon a shaft D, journaled in standard-bearings E E′ and F F′, all rigidly bolted upon a bed-plate G. The standards E E′ are also provided with flanges *e*, for securing between the annular chamber A, to be rigid therewith.

At diametrically-opposite positions the rim of wheel C is provided with interiorly-projecting pockets *a*, each having a stuffing-box *d*, and into these pockets *a* are fitted the pistons H, radially to reciprocate therein, the rods *h* of which pistons, after being passed through the stuffing-boxes *d*, are secured with their screw-threaded ends to the opposing ends of an open rectangular frame *f* by screw-nuts, so as to be adjustable. The shaft D is passed through this frame *f*, clearing the same while being reciprocated. The pistons H are U-shaped, snugly fitting the annular chamber, and the pistons H are so connected by frame *f* that one of these pistons only reaches into such annular chamber, while the other one is withdrawn into its pocket *a*.

For insuring a steam-tight joint with annular chamber A, each piston H is grooved in its U-face for U-shaped straps *g*, fitted into these grooves to provide a packing for the piston, and for the purpose of preventing these U-bars from disengaging they are slotted in their ends to engage the ends of gibs *i*, projected through holes in the pistons H.

The abutment B is fitted between the flanged ends of the two sections of the annular chamber, so that its upper end will butt against the piston-wheel C and form a close joint therewith. This abutment B is cast hollow to provide a steam-chest *j*, into which leads the steam-pipe *k* from the boiler, and a port from this steam-chest leads to the oscillating valve I, turned a little conical and snugly fitted into its socket in abutment B, and is secured by a nut *l* upon the reduced screw-threaded end of such valve projected through the end of wall of the abutment B. This valve is diametrically slotted to provide a communicating channel between the steam-chest and an L-port *m* in the abutment directing the steam through one side into the annular chamber. This valve I has secured upon its end a crank J, to which is pivoted the lower hub of a Y-shaped arm *o*, having hooks *p* to both its arms.

Against a bracket *q*, forming part of annular chamber A, is pivoted a small beam L, provided with rigid pendent arms *q*, each with a set-screw *r*, and having pivoted near its ends pendent hooks *s*, held against the set-screws *r* by a leaf-spring *t*, and in position so

that with swinging such beam J alternately one of the hooks *s* will engage a hook *p* for swinging crank J upward, which crank, after being released, will be pulled downward again by a spring *n*, connecting such crank with the bed-plate G. One end of beam L is also pivotally coupled with the end of rod *u*, forming part of strap *v* of an eccentric M, mounted upon shaft D, in a manner that the rotation of such shaft D will impart an oscillating movement to beam L, whereby the hooks *s* will alternately engage hooks *p*, and after turning the crank J and the valve I, connected therewith, so as to admit steam between the abutment B and one of the pistons H to a certain amount, the swinging movement of such beam L will discharge the hooks, when spring *n* will instantly shut the valve J again, whereby the steam admitted will continue to exert its power by its expansion. After the piston H, thus pushed to follow the circle of chamber A, has reached near the top, it is released of the pressure by the steam escaping through ports *w* into the exhaust-pipe N. Each time after the piston H, extended into the annular chamber A and exposed to the pressure of steam, has passed the exhaust-ports, the diametrically-opposite piston H, retracted into its pocket *a*, will have passed the abutment B, and is now to be radially pushed into the annular chamber A, to be exposed to the steam-pressure, whereby the other piston will be removed into its pocket *a*. This reciprocating movement is governed by two cranks P, sleeved with their hubs upon shaft D at opposite sides of oblong frame *f*, and to projecting arms *x*, rigid with and to opposite sides, edges of frame *f* are pivoted with their center portion levers *y*, one end of each lever *y* being pivotally connected with one of the cranks P, while the opposite ends of these levers *y* will alternately be brought in contact with a stud *z*, rigid with the frame-standard E′, so as to swing such lever *y* to clear such stud *z*, and thereby shifting the pistons H radially to the desired positions.

Upon shaft D is mounted at one side of the engine a fly-wheel Q and at the opposite side a pulley R, for transmitting the power from the engine by a belt.

I claim—

1. The combination of annular chamber A, of abutment B, having steam-chest *j* and oscillating steam-valve I, and of wheel C, provided with diametrically-opposite pistons H, radially sliding into and out of chamber A and connected together for simultaneous movement, substantially as set forth.

2. The combination, with annular chamber A, abutment B, having steam-chest *j*, and steam-valve I, with crank J, of wheel C, mounted upon shaft D and provided with radially-sliding pistons H, connected together for simultaneous movement, and of eccentric M, also mounted upon shaft D, with eccentric strap and rod for operating such valve, as set forth.

3. The combination, with wheel C, mounted upon shaft D and provided with diametrically-opposite radially-sliding pistons H, connected together for simultaneous movement, of annular chamber A and abutment B, arranged with steam-chest and valve I, having crank J, with Y-shaped hook-arm *o*, and connected to the bed-plate by spring *n*, of beam L, provided with pendent hooks *s*, alternately to engage arm *o*, and of eccentric M, mounted upon shaft D and provided with strap and rod for connecting with one end of beam L, for oscillating such beam, all substantially as set forth, to operate as specified.

4. The combination, with a double-piston rotating engine, of oscillating steam-valve I, having crank J, with arm *o*, having hooks *p*, and with spring *n*, of beam L, having pendent rigid arms *q*, with set-screws *r* and pivotal hook-arms *i*, yieldingly held to the set-screws *r* by spring *t*, and of eccentric M, mounted upon the engine-shaft and provided with strap *v* and rod *u*, pivotally coupled to one end of beam L, all substantially as described, to operate as specified.

5. The combination, with annular chamber A, having abutment B, of wheel C, mounted upon shaft D and provided with diametrically-opposite pistons H, radially sliding into and out of chamber A and connected together for simultaneous movement by a frame *f*, of cranks P, sleeved upon shaft D, and of levers *y*, pivoted to frame *f*, of cranks P, and of stationary stud *z*, swinging such levers by their contact therewith for reciprocating the pistons H during their rotation, all substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

BRUNO BECK.

Witnesses:
WM. H. LOTZ,
OTTO LUEBKERT.