

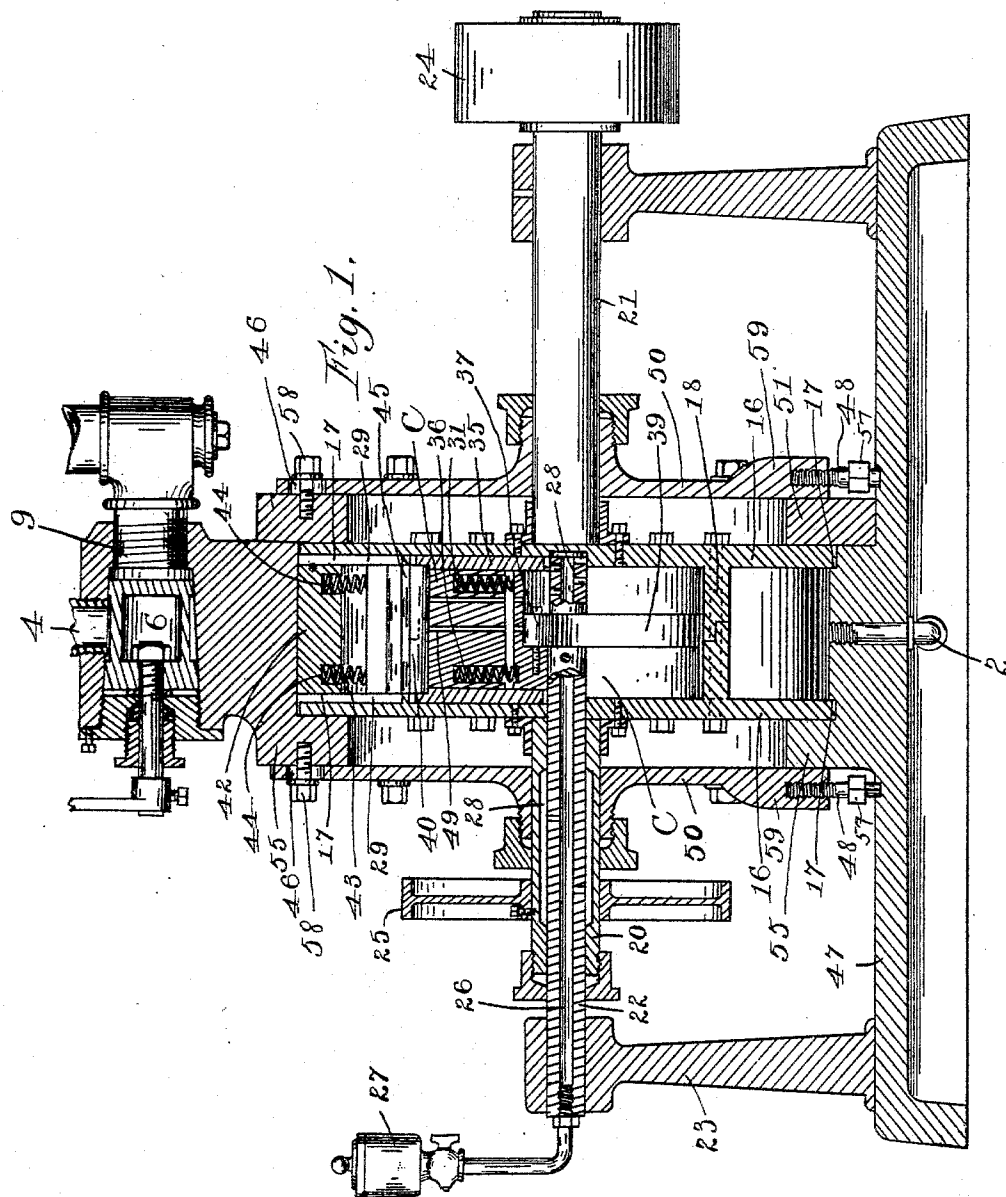
(No Model.)

3 Sheets—Sheet 1.

M. P. ELGEN.
ROTARY ENGINE.

No. 583,897.

Patented June 8, 1897.



Witnesses:

H. S. Goodbury.
W. C. Johnson.

Inventor:

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per: *T. D. Winn*
Attorney.

(No Model.)

3 Sheets—Sheet 2.

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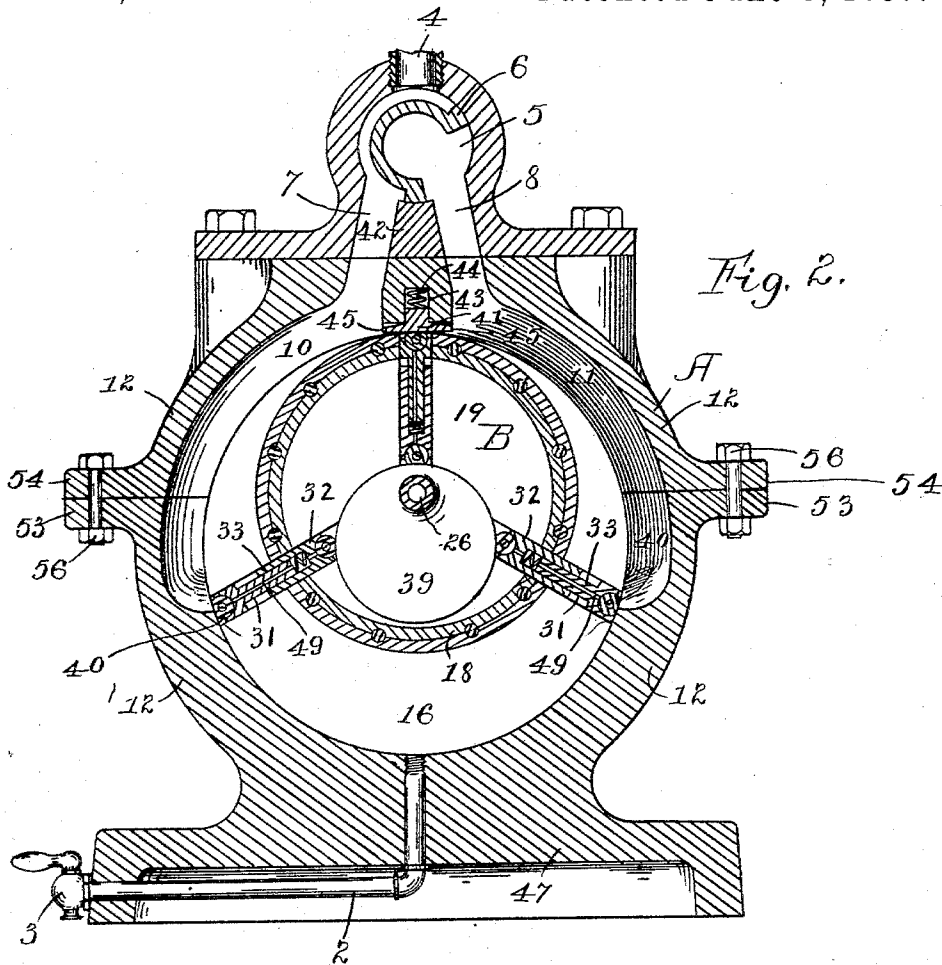


Fig. 2.

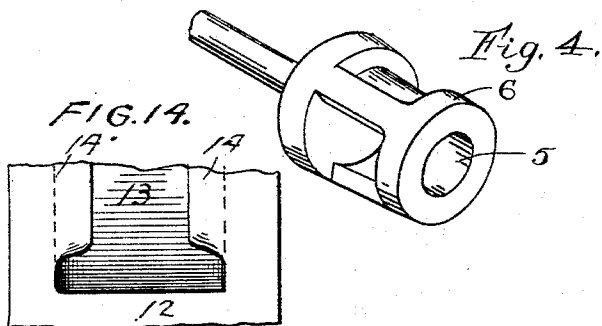


Fig. 4.

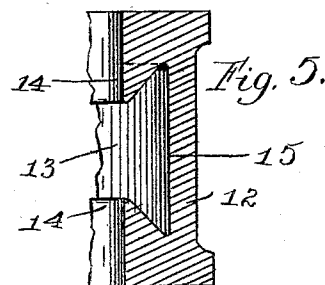


Fig. 5.

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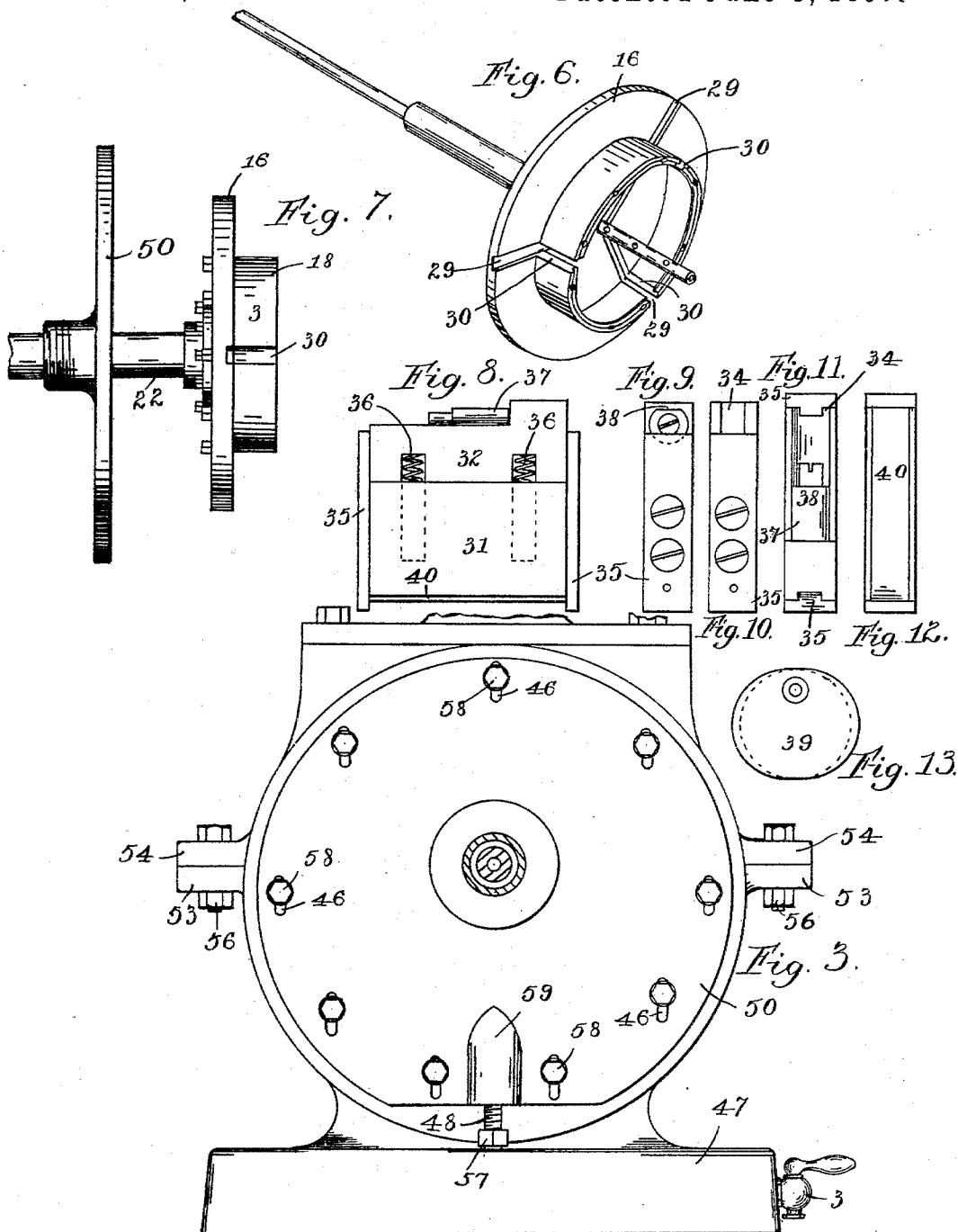
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ROTARY ENGINE.

No. 583,897.

Patented June 8, 1897.



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UNITED STATES PATENT OFFICE.

MAGNUS P. ELGEN, OF ST. PAUL, MINNESOTA, ASSIGNOR TO ELIAS CRONSTEDT, OF SAME PLACE.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 583,897, dated June 8, 1897.

Application filed June 26, 1896. Serial No. 597,050. (No model.)

To all whom it may concern:

Be it known that I, MAGNUS P. ELGEN, of St. Paul, Ramsey county, Minnesota, have invented certain Improvements in Rotary Engines, of which the following is a specification.

My invention relates to improvements in rotary engines; and it consists in the improved features of construction hereinafter particularly described and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 is a central longitudinal section of my invention. Fig. 2 is a vertical cross-section of the same. Fig. 3 is an end elevation with journal-bearing removed. Fig. 4 is a detail isometric projection of the three-way valve. Fig. 5 is a sectional detail of the steam passage or conduit into the cylinder. Fig. 6 is a detail isometric projection of the piston-head. Fig. 7 is a detail side elevation of the same with the cylinder-head in place. Figs. 8, 9, 10, 11, and 12 are details of the sliding abutments. Fig. 13 is a detail of the flattened or elliptical eccentric, by means of which the sliding abutments are actuated; and Fig. 14 is a detail of the cut-away end of the steam passage or conduit.

In the drawings, A represents the cylinder, and B the piston rotating therein. The cylinder is mounted upon suitable supports and provided with a drainage outlet-pipe 2, controlled by a valve 3, for drawing off the water of condensation from its interior. Live-steam is admitted to the cylinder through the pipe 4 into the valve-chamber 5, in which is arranged the three-way valve 6.

With the valve set as shown in Fig. 2 the passage 7 is shown as the inlet and the passage 8 as the outlet port of the cylinder. The outlet-port communicates with the interior of the valve and the connecting-pipe 9, which is preferably of larger capacity than the inlet or live-steam pipe, in order to furnish a free exhaust without back pressure.

Connected with the ports 7 and 8 are partial circumferential grooves 10 and 11, formed in the side walls 12 of the cylinder. These grooves form steam passages or conduits and are preferably of dovetail form, as shown best

in Fig. 5, the opening 13 being approximately half the width of the passage at the bottom. Each of the passages in length is slightly more than one-third the inner circumference of the cylinder. At the lower end of each of these passages the overhanging lips 14 are cut away, forming an outlet 15 from the passage to the inside of the cylinder of the full size of the conduit, as shown in detail Fig. 14. The piston 3 is arranged eccentrically in the cylinder and is made up of the circular head 16, overlapping and in bearing contact with the edges 17 of the cylinder, the cylindrical wall 18 connecting the heads 16 and forming a tight inner chamber 19, eccentric with the cylinder-chamber. This piston is fixed upon the sleeve-shafts 20 and 21, connected to its respective heads, which shafts have suitable bearings upon the fixed shaft 22, held in the supports 23. The shafts 20 and 21 are provided with belt-pulleys 24 and 25 for receiving and transmitting power. The shaft 22 has an axial opening 26, communicating with the oil-cup 27, and having the outlets 28, communicating with the interior of the piston, whereby it may be kept filled with oil for lubricating the parts.

The heads 16 are provided with the radial grooves 29, and the cylindrical wall 18 has the slots 30, connecting the grooves from head to head. Fitting tightly in the grooves and slots are the sliding abutments C. These are each made up of the outer section 32, preferably arranged with a tongue 33 working in the groove 34 in the section 31, both being fitted between the removable members 35, which slide in the grooves 29, the springs 36 tending to thrust the sections apart and against the wall of the cylinder. The member 31 is of sufficient width to entirely fill the space between the piston and the wall of the cylinder at the widest point, thus presenting a solid wall for the pressure of the steam. The member 32 has the bearing-block 37 lying in a groove in the edge of the member and having a flattened face 38, adapted to bear against the face of the eccentric 39, fixed upon the piston-shaft and connected with the cylinder A. The member 31 is similarly provided with the bearing-block 40, turning in a cylinder

drical socket in its edge and having a flattened face bearing against the inner wall of the cylinder.

Arranged between the inlet and outlet ports 7 and 8 is the packing 41, fitted into the wall 42 between the ports. This packing is preferably a block sliding in the guide or groove 43 and cushioned upon the spring 44 and provided with lateral flanges 45, the face of the packing being tangential with the wall of the piston, as shown in Fig. 2.

In order to accurately fit the parts together and take up the wear of the piston and shaft, I provide the heads of the cylinder with the vertically-slotted bolt-holes 46, through which pass the securing-bolts 58.

To provide for the raising and lowering of the head 50, I also form the bottom of the head with a lug 59, in which is threaded the screw 48, said screw bearing and being supported upon the base 47 and being formed with a polygonal shoulder to be engaged by a wrench or other tool.

In order to render easier access to the interior of the machine, I construct the cylinder A in two parts, said parts being provided with laterally-projecting flanges 53 and 54, respectively, connected by bolts 56.

Operation: With the parts adjusted as shown in Fig. 2 live steam enters the port 7, passing between the cylinder and piston and into the passage 10 and pressing against the abutment, which is shown standing at the end of the passage, thus causing the piston to turn. As it rotates under the pressure of the steam the abutment, which is shown in vertical position, is carried forward into contact with the steam, which enters the cylinder freely from the passage through the slotted opening, thus exerting pressure upon the abutment. The steam is also carried past the abutment along the passage-way and exerts pressure upon the first abutment, there being, as shown, three abutments arranged equidistant, the lengths of the passage 10 and 11 being each approximately equivalent to one-third the circumference of the cylinder, leaving a solid cylindrical wall for the lower one-third of the cylinder. It is evident that the steam on entering exerts its pressure upon two of the sliding abutments at all times. As the abutments successively pass the opening 15 at the bottom of the passage 11 the steam escapes from the cylinder through the passage, most of the pressure being removed from the abutment. As the abutments reach the packing they strike against the flange 45 and are pressed against the tension of their springs in passing the packing, there being thus at all times a steam-tight joint between the piston and the packing. As the piston is rotating the abutments are carried around upon the face of the elliptical eccentric 39, with the flattened faces of the bearing-blocks in contact with the face of the eccentric, thus diminishing the friction. The eccentric be-

ing arranged concentric with the cylinder and properly positioned as to its ellipticity forces the abutments outward as the piston rotates and holds them at all time in contact with the walls of the cylinder, its ellipticity compensating for the varying angles at which the abutments stand with relation to the eccentric. The flattened faces of the bearing-blocks in the outer edges of the abutments fit closely to the wall of the cylinder. The oil entering from the oil-cup 37 keeps the space between the piston filled and thoroughly lubricates the bearings between the eccentric and the abutments and the abutments and the piston-heads. The conduits 49, extending through the abutments from edge to edge or connecting the antifriction-roll sockets, serve to convey oil from the interior of the piston to the outer roll and keep it thoroughly lubricated.

I claim—

1. In a rotary engine, the combination with the cylinder, of the piston eccentric therewith made up of a pair of heads, and an intermediate cylindrical wall forming therewith a closed chamber, the sliding abutments working in radial grooves in said heads and through slots in said wall, the fixed eccentric 39 within said piston actuating said abutments, an oil-conduit communicating with the interior of said chamber, and oil-conduits extending through the body of said abutments and connecting the interior of the piston with the outer edge of the abutments, whereby the same may be kept filled with oil to lubricate the abutments, and the edges of the abutments bearing on the cylinder are also lubricated, substantially as described.

2. In a rotary engine, the combination with the hollow cylindrical piston and the fixed eccentric 39 arranged therein, of the sliding abutments working through slots in the wall of said piston, and having oil-conduits extending therethrough from edge to edge, and the oil-conduit extending through the shaft of said piston and opening into its interior, substantially as described.

3. In a rotary engine, the combination with its cylinder, of the eccentrically-arranged hollow, cylindrical piston, the oil-conduit communicating with the interior of the piston, the sliding abutments working through slots in the walls of said piston, the fixed eccentric 39 for actuating said abutments, antifriction-rolls journaled in the outer edges of the abutments and oil-conduits extending through the abutments adapted to convey oil through the interior of the piston to the bearings of said antifriction-rolls.

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

MAGNUS P. ELGEN.

Witnesses:

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H. S. JOHNSON.