No. 613,587. Patented Nov. 1, 1898.

# N. J. MOEHN.

## ROTARY ENGINE.

(Application filed Nov. 12, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

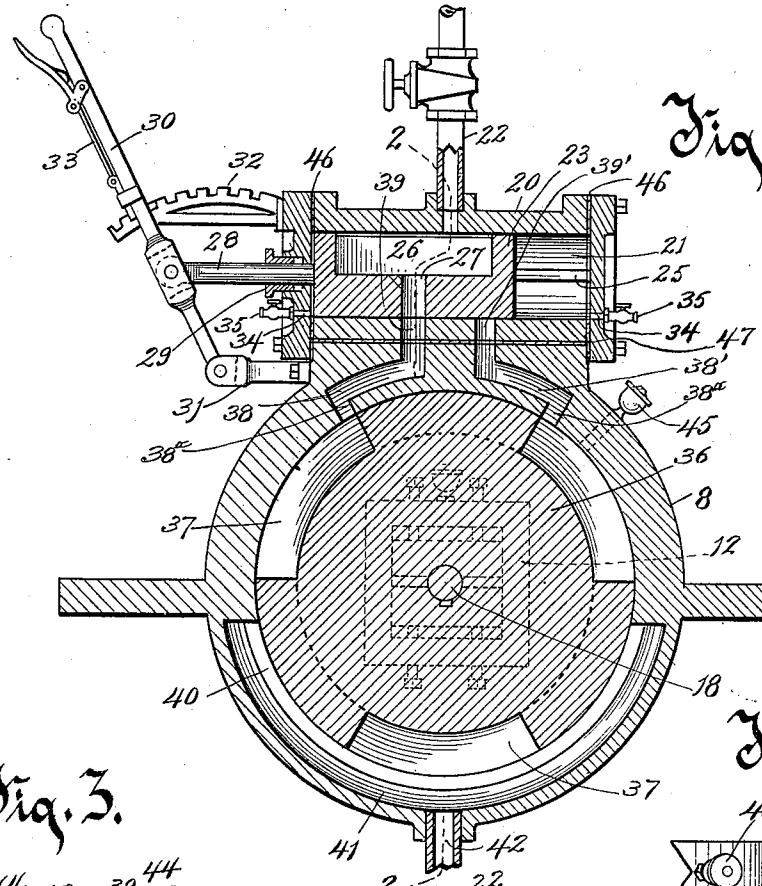



Fig. 4.

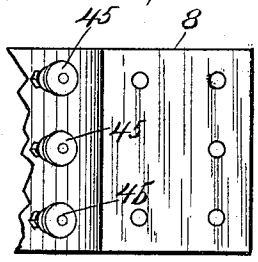



Fig. 3.

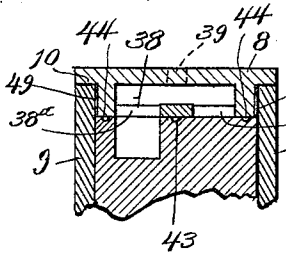
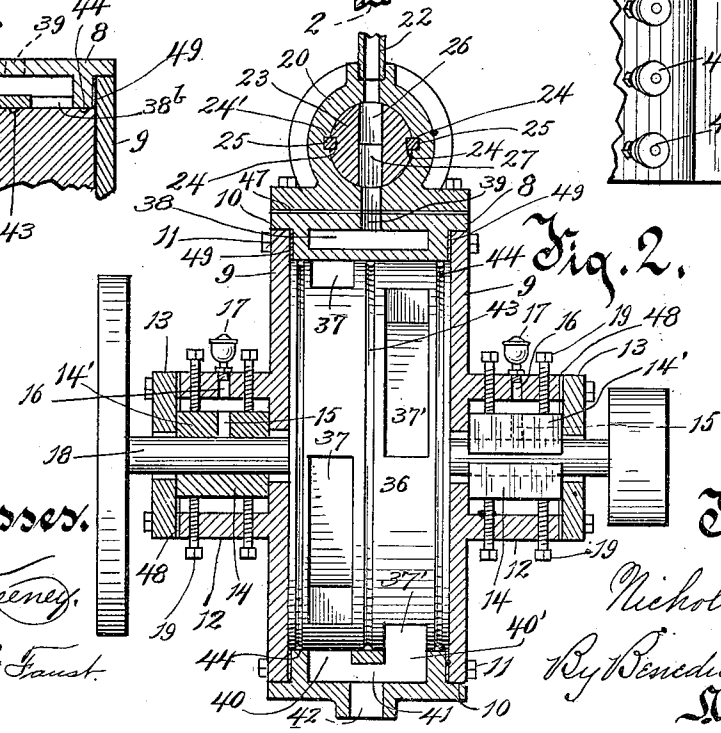



Fig. 2.




Witnesses.

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No. 613,587. Patented Nov. 1, 1898.

# N. J. MOEHN.

## ROTARY ENGINE.

(Application filed Nov. 12, 1897.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 5.

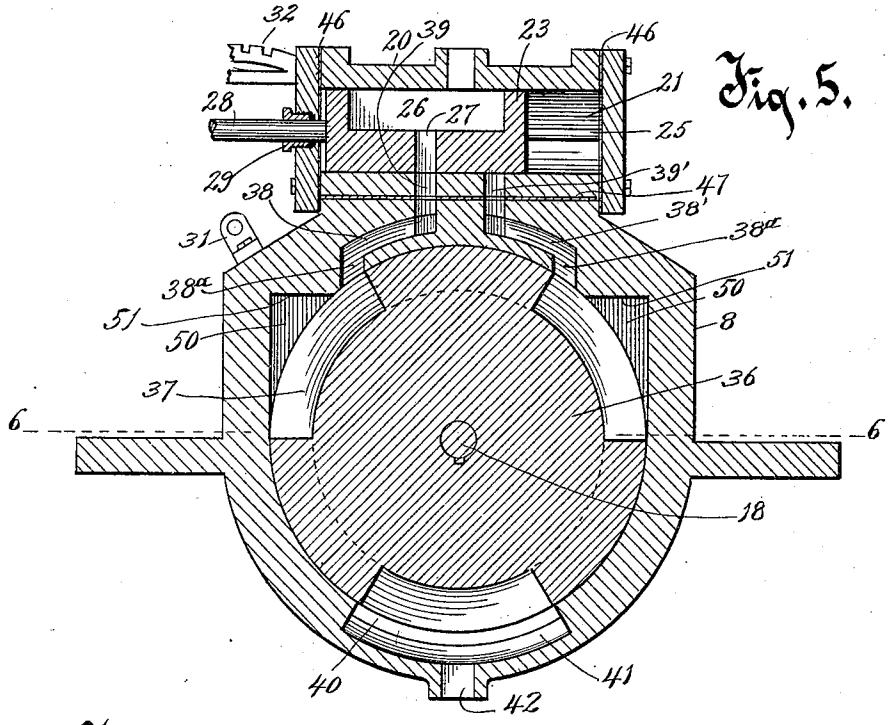



Fig. 6.

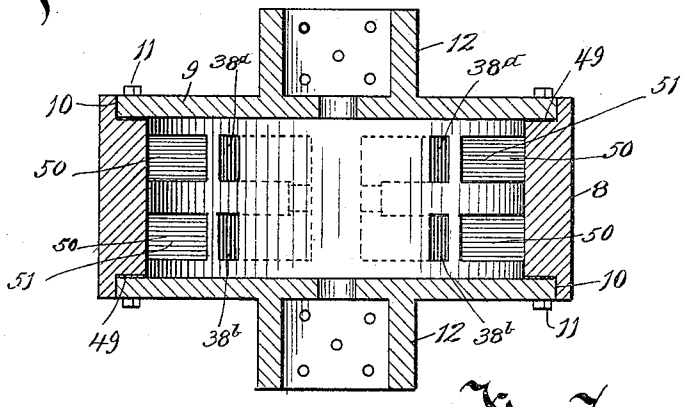
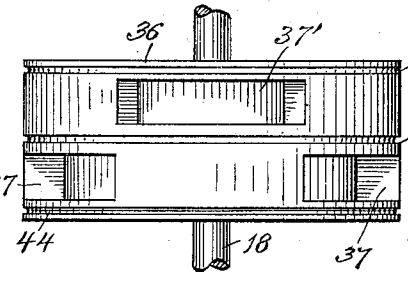



Fig. 7.




Witnesses.

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# UNITED STATES PATENT OFFICE.

NICHOLAS J. MOEHN, OF MILWAUKEE, WISCONSIN.

## ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 613,587, dated November 1, 1898.

Application filed November 12, 1897. Serial No. 658,234. (No model.)

*To all whom it may concern:*

Be it known that I, NICHOLAS J. MOEHN, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Rotary Engines, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention has relation to improvements in rotary engines.

The object of the invention is to secure simplicity in the general construction of the machine as well as an improved form of piston of such construction that a continuous rotation thereof is insured.

With the above primary and other objects in view the invention consists of the devices and parts or their equivalents, as hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a transverse section through the center of the casing and through one of the series of peripheral pockets or recesses of the piston. Fig. 2 is a section on the line 2 2 of Fig. 1, the piston being shown in full lines. Fig. 3 is a fragmentary section through one set of inlet-passages. Fig. 4 is a plan view of a portion of the casing, showing the oil-cups which feed oil to the lubricating-recesses of the piston. Fig. 5 is a section similar to Fig. 1 of a modified form of construction. Fig. 6 is a section on the line 6 6 of Fig. 5, and Fig. 7 is a detail of the piston.

Referring to the drawings, the numeral 8 indicates a cylindrical casing, which is shown as provided with the head-pieces 9 9, which are preferably fitted in recesses 10 10, formed in the opposite side edges of the cylindrical portion of the casing, so as to be flush with said side edges. One or both of these heads may be detachably secured, and in the present illustration of my invention I have shown both heads so secured by means of bolts 11. The head-pieces are similarly constructed, and each is shown as provided with a projecting tubular boss 12, provided with a removable end piece 13. In each boss is fitted a two-part bearing consisting of the semicircular half-sections 14 14′. The half-section 14′ is provided with an oil-passage 15, with which another passage 16 in the boss is in alinement. An oil-cup 17 is fitted to the outer end of the latter passage. The oil fed through the cup is free to flow through the passage 16 and thence through the passage 15 to the shaft to be lubricated.

The numeral 18 indicates a main shaft. This shaft passes through openings in the end pieces 13 and through registering openings in the heads of the cylinder, said several registering openings being sufficiently greater in diameter than the diameter of the shaft to leave a space around said shaft. The half-sections 14 14′ of the bearings embrace the shaft, and these half-sections are held adjustably thereto by means of adjusting-screws 19, passing through the bosses and engaging the half-sections of the bearings. By this means wear on the bearings or shaft may be readily taken up by means of the screws.

Fitted to the top portion of the casing 8 is a valve-casing 20, formed with the longitudinal valve-chamber 21. This valve-casing may be separate from and secured to the casing 8, as shown in the drawings, or may be an integral part of said casing 8, if preferred.

Leading to the valve-chamber 21 is a valve-controlled inlet-pipe 22, and fitting within said chamber is a longitudinally-reciprocable valve 23. At diametrically opposite points of the valve and valve-chamber are formed registering recesses 24 24 and 24′ 24′, respectively, and in these registering recesses are fitted feathers 25 25. These registering recesses and feathers therein prevent the valve from turning, and consequently maintain said valve in proper position within the valve-chamber. In the top portion of the valve is formed a chamber 26, to which the inlet-pipe 22 leads, and from this chamber extends a port 27. Connected to the valve is a valve-rod 28, which extends through one of the end pieces of the valve-casing and is encircled by a stuffing-box 29, fitted to the end of said valve-casing. Connected medially to the outer end of the valve-rod is an operating-lever 30, the lower end of which is pivotally secured to a projecting arm 31. The lever is adjacent to a segmental rack 32, which rack is connected to and extends from the end piece of the valve-casing. The lever has pivoted thereto a dog 33, the end of which is adapted to engage any of the spaces between the teeth of the segmental rack in order to hold the valve to adjusted po-

sition. Both of the end pieces of the valve-casing are provided with openings 34 34, to which are connected cocks 35 35. These openings when the cocks are opened permit the water of condensation to escape and also permit of the escape of any steam which might get in between the ends of the valve and the ends of the casing.

The numeral 36 indicates a piston which is mounted on the main shaft within the casing 8. This piston is provided peripherally with two sets of pockets or recesses, one set located on one side of the center of the periphery and the other set on the other side of the center of said periphery. The recesses of one set are indicated by the numeral 37 and the recesses of the other set by the numeral 37′. It will be noticed that these recesses alternate—that is to say, at the point where one recess 37 terminates the other recess 37′ begins. These recesses are preferably and advisably formed with opposite side walls, as well as end walls, so that when the piston is fitted within the cylindrical casing closed chambers are formed which retain the steam therein. By this construction the heads of the cylinder 8 could be omitted and successful results still obtained. In the upper portion of the cylindrical casing are provided the steam-inlet passages 38 38′, the inner ends of each of which have branches communicating with the inner chamber of the piston-casing. The outer ends of these passages register with ports 39 39′, formed in the bottom of the valve-casing. In the bottom of the piston-casing are formed exhaust-ports 40 40′, which lead to a common passage 41, said passage in turn leading to the final exhaust-opening 42. The piston is also preferably provided peripherally with a plurality of annular oil-recesses, three being shown in the accompanying illustration. The central recess is indicated by the numeral 43 and is arranged between the pockets or recesses 37 37′. The other oil-recesses are indicated by the numerals 44 44 and are located near the outer edges of the periphery of the piston. Fitted to openings in the piston-casing are oil-cups 45, which oil-cups are in register with the respective oil-recesses and serve to conduct the lubricant to said recesses.

Suitable packings are provided for different parts of the machine—*i. e.*, packings 46 46 are interposed between the end pieces of the valve-casing and the ends of said valve-casing, another packing 47 is arranged between the under side of the valve-casing and the top of the piston-casing, packings 48 48 between the ends of the bosses 12 and the end pieces 13 of said bosses, and packings 49 49 are fitted in the recesses 10 10 of the piston-casing, between the walls of said recesses and the heads of the piston-casing. These latter packings effectually prevent the escape of steam from the piston-chamber.

The operation of my invention will now be explained. In the position of the parts shown in Fig. 1 of the drawings the port 27 of the valve is in register with the port 39 in the bottom of the valve-casing and with the steam-inlet passage 38 of the piston-casing. The piston is also at such a position as to receive the steam into one of the pockets or recesses 37 of the piston through the port $38^a$, branching from the passage 38. The piston will then be rotated, and the moment the pocket or recess 37 has passed its branching port $38^a$ the recess or pocket 37′ of the other set will be in position to receive steam through the other and corresponding branching port $38^b$, and so on continuously, so that a continuous rotation of the piston is secured. After the piston has rotated a sufficient distance to bring the pocket or recess 37 which first received the steam into register with the exhaust-port 40 the steam in said pocket will pass through said port, thence into the passage 41, and finally out through the exhaust 42. As the next succeeding pocket 37′ comes into position to exhaust its steam is exhausted through the exhaust-port 40′ into the passage 41, and thence through the final exhaust-opening 42.

When it is desired to reverse the engine, all that is necessary to be done is to throw the operating-lever so as to bring the port 27 of the valve into register with the port 39′ in the bottom of the valve-casing and the passage 38′ in the piston-casing. The steam will then pass through said registering port and passage and from the latter passage alternately through branching ports similar to $38^a$ $38^b$ of passage 38′ to the respective pockets 37 and 37′.

The modified form of construction illustrated in Figs. 5 and 6 of the drawings differs from that shown in the other figures in the provision of expansion-chambers 50 50, which chambers are formed with the upper shoulders 51 51, against which the steam acts expansively. This construction is perhaps best adapted for securing maximum power, as fixed shoulders are thereby formed for the expanding steam.

While in the foregoing description I have only referred to steam as the medium of power-supply, it must be understood that this engine is also adapted for the use of gas, compressed air, or other analogous expansive fluid medium for producing power.

What I claim as my invention is—

In a rotary engine, the combination of a revoluble piston provided peripherally with two sets of pockets or recesses, the pockets or recesses of one set alternating in position to the position of the pockets or recesses of the other set, a casing for the piston, said casing provided with inlet-ports, and with an exhaust, one inlet-port extending in one direction for a short distance circumferentially in the wall of the casing, and the other inlet-port extending in the opposite direction for a short distance circumferentially in the wall of the casing, the discharge end of each inlet-port provided with two branches, which extend through the wall of the casing, the ar-

rangement being such that one recess of a set takes steam from one of the branches of one of the inlet-ports, when one recess of the other set is cut off from taking steam from the other branch of said inlet-port, the steam in each recess of the sets adapted to exhaust therefrom through the exhaust-opening, as the alternating recesses are successively brought into register with the exhaust-opening, a valve-casing having an inlet-pipe leading thereto, and also provided with ports registering with the inlet-ports of the piston-casing, and a valve within the valve-casing and having a port extending therethrough, said port on one adjustment of the valve adapted to register with one of the ports of the valve-casing and with one of the inlet-ports of the piston-casing, the bottom of the valve closing the other port of the valve-casing, whereby the engine is rotated in one direction, and said valve on the opposite adjustment thereof adapted to bring its port into register with the other port of the valve-casing and the other port of the piston-casing, the first-mentioned port of the valve-casing being closed by the bottom of the valve, whereby a reversal of the rotation of the engine is secured.

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

NICHOLAS J. MOEHN.

Witnesses:
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ANNA V. FAUST.