

L. J. WING.  
ROTARY ENGINE.

Patented June 20, 1882.

J. W. Garner.  
W. S. D. Haines

Leander J Wing

# UNITED STATES PATENT OFFICE.

LEANDER J. WING, OF LEXINGTON, MASSACHUSETTS.

## ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 259,966, dated June 27, 1882.

Application filed February 20, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, LEANDER J. WING, of Lexington, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Rotary Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to an improvement in rotary engines, the object being to provide cylinders of such construction that they may be manufactured at a small initial cost, and adapted to have their sections locked together in such a manner that the cylinder may be bored out and finished, and when put together the parts will be in perfect alignment, and thus insure the most perfect action of the piston with the least expenditure of power, and consequent wear of the piston or cylinder bore.

With this end in view my invention consists in certain features of construction and combination of parts, as will hereinafter be described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation of an engine-cylinder embodying my invention, a portion of the cylinder being broken away to illustrate its interior construction. Fig. 2 is a plan view of the inner side of one section of a modified construction of cylinder. Fig. 3 is a sectional view of the same.

F represents the annular bore of the cylinder, in which the piston revolves. The abutment N, mounted on the shaft N', is caused to rotate within the slot L, formed in the upper section of the two half-cylinders shown in Fig. 1, which are joined together on a line with the abutment.

The two halves of the cylinder are each constructed with flanges E<sup>8</sup>, through which are inserted the bolts E<sup>9</sup>, by which the sections of the cylinder are securely fastened together. Each half or section of the cylinder is provided with four lugs or projections, E<sup>5</sup>, cast integral therewith. These lugs or projections are located on opposite sides of each end of the hub portion of the cylinder-sections, and are arranged to project outwardly from the division-line of the two sections, so that the lugs or projections on one section will overlap and en-

gage the hub portion of the opposite section and so that the lugs of one section will engage those of the opposite section. Thus it will be observed that this construction of parts prevents any lateral or rotary displacement of the hub-sections, as the lugs serve to securely lock the two sections of the cylinder against any independent movement.

In order that both sections of the cylinder may be cast from a single pattern, and, further, to allow them to be reversed in their positions, if desired, the lugs or projections E<sup>5</sup> on one cylinder are arranged to fit against the lower and plain faces of the lugs E<sup>5</sup> of the other section of the cylinder; or, in other words, the lugs on one cylinder are arranged above and the lugs of the other cylinder are arranged below the line of contact when locked together, and thus the two sections are rendered interchangeable. This feature of my improvement is valuable and important for the following among other reasons:

First, in finishing the cylinder the two sections are secured together by bolts and the lugs or projections, and then they are bored out by a tool mounted within the hub, and after the cylinder is bored, the packing-grooves and adjacent surfaces finished, the tool may be withdrawn and the cylinder set up for use, with its piston, packing-rings, &c. When the sections of the cylinder are put together they will always be in proper alignment, and thus the wear of the piston and friction of parts will be reduced to the minimum. This form or manner of dividing the cylinder also furnishes proper facilities for finishing the packing-grooves F<sup>4</sup>, surrounding the bore of the cylinder on each side of the abutment-chamber L, and also for drilling the holes for the tempered-steel coil-springs which engage with the packing-rings situated in the grooves F<sup>4</sup> F<sup>4</sup>. This form of construction obviates the necessity of fitting the cylinder-extensions into the abutment-chamber L to contain the packing-rings surrounding the annular bore.

It will be seen in Fig. 2 that while the bore of the cylinder is annular in form it is an unbroken section in cross-section, except in that part which is filled by the piston-disk, which disk is packed steam-tight on either side by packing-rings fitting in the grooves H H, which rings (not shown) are made in a half-circle and

joined together by tongue and groove or other similar devices on the line where the two sections E and E' of the cylinder are joined.

On the outsides of the cylinder, near the hub, and over the packing-grooves H H, are formed bosses for the purpose of being bored out to contain the tempered-steel coil-springs which press against the packing-rings in the grooves F<sup>4</sup> F<sup>4</sup>. These bosses are also provided with caps screwed over or into them to furnish suitable end bearings for said coil-springs. Each section of the cylinder E and E' is formed with projections E<sup>3</sup> E<sup>3</sup>, which furnish suitable supports for the thrust and main bearings of the abutment-shaft N'. The ears E<sup>2</sup> are also formed on the outside of the sections E and E' of the annular cylinder. In a double-abutment cylinder, like Figs. 2 and 3, projections similar to E<sup>3</sup> E<sup>3</sup> are cast on opposite sides of the ears E<sup>2</sup> in order to furnish bearings for abutment-shafts on opposite sides of the cylinder. This form of cylinder admits of the application of a steam-jacket, upon the principle shown in my patent the application for which was filed November 29, 1881, and which contains a description of the other parts of this invention.

On the outside of the sections or flanges which, when the cylinder is bolted together, form the abutment-chamber L are secured pockets, with a cap upon the top, (neither of which is shown,) which pockets and cap surround that part of the abutment N not inclosed in the abutment-chamber L, by which means the abutment or rings may be removed without necessitating the taking apart of the two sections E and E' of the annular cylinder. The flanges of the caps forming the sides of the abutment-chamber are wider than the sections they are to cover, and are formed with a rim or projection on each side which fits closely over the outer edges of the projections, and so counteract any tendency of the sections E and E' of the cylinder from being thrown apart by the pressure of the steam between the piston and abutment.

The double-abutment cylinder shown in Figs. 2 and 3 may be used in connection with one or with two pistons. When two pistons are employed steam is admitted simultaneously between each piston and the closed abutments in rear of the pistons, and, owing to the fact that the pressure on opposite sides of the piston-disk, the cylinder, and driving-shaft is thus equalized and balanced, I am enabled to employ an immense pressure of steam without danger of creating any unequal strain or increasing the friction or wear of the moving parts. This form of construction of the annular cylinder not only avoids the necessity of forming a steam-tight joint around the outer surface of the bore, requiring more labor and more strength of metal, but simplifies the process of construction, and by the use of the special tool made for that purpose allows the cylinder to be completely finished inside without removing the tool therefrom.

This engine may be constructed with two cylinders, with one piston in each cylinder, and the cylinders placed in such relation to each other as that one abutment shall suffice for both cylinders, the main shafts being so geared together that the steam shall alternately fill each cylinder, and yet only one abutment be required.

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

1. A cylinder for rotary engines, consisting of two sections having one or more abutment-recesses located at right angles to the bore, and flanges between the hub and abutment-recesses for the insertion of bolts for fastening the sections together, substantially as shown and described, and for the purposes herein set forth.

2. A cylinder for rotary engines, consisting of two sections, each provided with a semicircular bore for the piston and a connecting-chamber for the piston-disk, and furnished with abutment-flanges on one or both sides, and with flanges between the hub and abutment-flanges, through which are inserted bolts for securing the sections together, substantially as shown and described, and for the purposes herein set forth.

3. A cylinder for rotary engines, consisting of two sections, each provided with a semicircular bore for the piston, a packing-ring groove located on the inside of the bore, and with flanges between the hub and bore for the insertion of bolts for securing the sections together, substantially as shown and described, and for the purposes herein set forth.

4. A cylinder for rotary engines, consisting of sections provided with interlocking lugs, substantially as shown and described, and for the purpose herein set forth.

5. A cylinder for rotary engines, consisting of two sections provided with lugs or projections on the hub portions constructed to interlock and to allow the sections to be interchangeable, substantially as shown and described, and for the purposes herein set forth.

6. A cylinder for rotary engines, constructed in sections and provided with an annular bore for the piston and intervening space for the piston-disk, the end of the section being grooved around the bore, said groove extending to the opposite sides of the space for the piston-disk, and provided with a series of pockets for the reception of springs for keeping the packing-rings pressed outwardly against the revolving abutment, substantially as shown and described, and for the purposes herein set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

LEANDER J. WING.

Witnesses:

F. O. McCLEARY,  
W. McDEVITT.