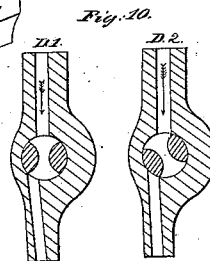
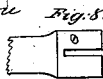
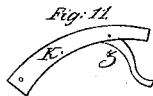
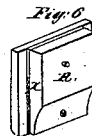
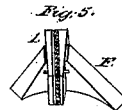
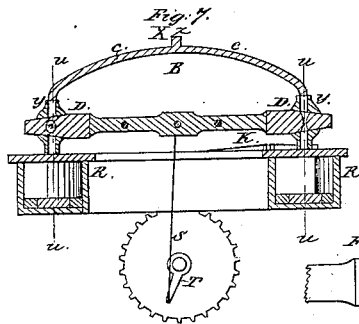
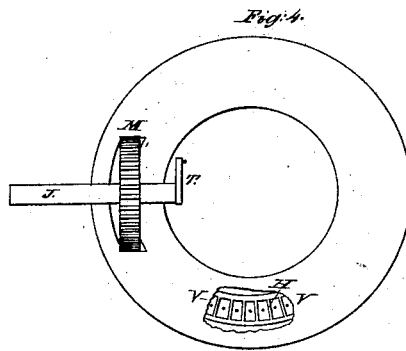
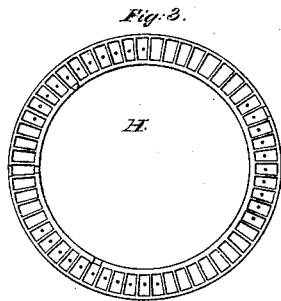
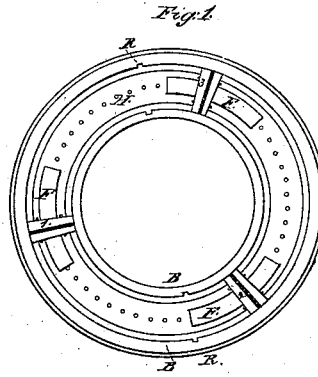
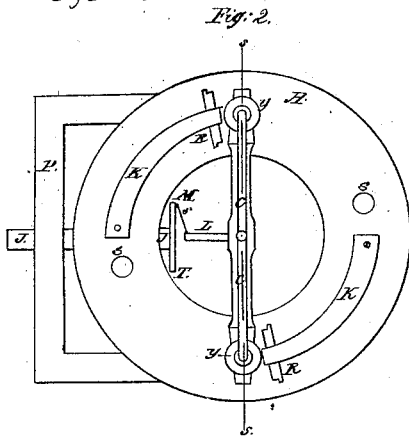


*J. Tremper,*  
*Rotary Steam Engine.*  
*N<sup>o</sup> 6,359. Patented Apr. 17, 1849.*



# UNITED STATES PATENT OFFICE.

JOHN TREMPER, OF LITTLE BRITAIN, NEW YORK.

## PISTON-RING AND METHOD OF DERIVING MOTION THEREFROM IN ROTARY ENGINES.

Specification of Letters Patent No. 6,359, dated April 17, 1849.

*To all whom it may concern:*

Be it known that I, JOHN TREMPER, of Little Britain, in the county of Orange and State of New York, have invented a new and useful Improvement on the Rotary Steam-Engine; and I hereby do declare that the following is a full, clear, and exact description.

The nature of my invention consists, in providing a hollow cylindrical ring in the interior of which I place a movable ring with cogs on its under surface to mesh into a pinion or cog wheel on a shaft, to drive the said shaft when the ring is in motion. The said movable ring moves steam tight, in the cylindrical ring and by peculiar combinations and arrangement (which will be hereafter more clearly explained) operates its or the exhaust valves, and the steam or induction valves in a novel manner.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1, is a top view exhibiting the interior of the engine, with the top plate off for that purpose. Fig. 2 is a top view of the engine with the top plate on and all the parts connected with the same. Fig. 3, is a view of the underside of the movable ring. Fig. 4, is a view of the underside of the engine with a portion of the underplate of the cylindrical ring removed. Fig. 5 is an inclined piston or valve lifter. Fig. 6, is a vertical valve. Fig. 7, is a sectional elevation taken at the line (*s s*) Fig. 1. Fig. 8, is a section of the connecting end of a cross vibrating bar that operates the induction and the cut off of the steam. Fig. 9, is the steam box, wherein the steam is let on and cut off by semi rotative cocks, working therein. Fig. 10, D<sup>1</sup>—D<sup>2</sup>, are sections of the steam box with section of the steam cocks therein taken at the lines (*w w*), Fig. 7. Fig. 11, is a spring valve lever, and Fig. 12, is a side view of the said spring valve lever pressing on the top of the valve.

The same letters indicate like parts on all the figures.

A, is the cylindrical ring. It may be cast all in one piece except the top plate or cover. This ring is secured to a wooden or iron frame of any of the known forms, or on cross beams P, P, raised above the floor

so far as to allow a shaft J, J, and a cog wheel M, (Fig. 4,) to revolve under the engine. B, B, are the elevated rims or sides of the ring, formed so as to have a cavity between them which is the engine chamber. In this cavity is placed the movable ring H. This movable ring is fitted into the bottom of the chamber or cavity into what may be termed a groove for that purpose. The upper surface of H, is made to be on a level with the bottom of the chamber, so that when the top plate is on, the cavity between the rims of the ring A, becomes the steam chamber for the steam to exert its expansive force to drive round the movable ring. To accomplish this, it is necessary that the chamber or cavity should be steam tight and that the movable ring should offer resistance, or a barrier to receive the propelling power of the steam. For this purpose, H, moves freely but steam tight in the bottom of the chamber, and also moves steam tight with the top plate by projections, which we shall call pistons 1, 2, 3. These pistons are square pieces of metal (two pieces) secured together, with a strip of any proper packing material between them. I prefer to secure them together by screws, so that the packing may be easily replaced when required. The pistons are fastened by any proper means, to the upper surface of the movable ring and they are of such depth, as to rub on the underside of the top plate steam tight.

F, F, F, are wedge or incline planes secured to and forming part of the pistons 1, 2, 3. The dip or incline is represented in Fig. 5.

R, R, R, are vertical valves. These valves are made of one or two pieces of metal as may be desired. If made of one piece, a groove *x*, Fig. 6, is filled with a thin strip of proper packing and the form of each valve will be understood by Fig. 6, which is an unshaded perspective, (linear).

K K K, are broad metal (steel is the best) springs, the form of which will be understood by Figs. 11 and 12. (*s s*) are exhaust openings in the top plate. These openings communicate with the cavity or chamber below.

C, C, are the steam pipes. They branch off from the main pipe into steam boxes *y, y*, Fig. 7. The steam is admitted into the chamber of the engine on the opposite sides, alternately after each stroke of a vibrating shaft O, O. This vibrating shaft or bar is

made of the form represented by Fig. 7, as has its ends made with a mortise like Fig. 8. This mortise receives the tenon of the steam cock, and one steam cock is fixed thus upon each end of the bar, secured also by screws or bolts. The bearings of this vibrating bar are circular holes in the steam boxes *y, y*, and the steam cocks are thus the journals of the said vibrating bar. *D, D*, are the steam cocks. They are made like the wooden stops (valve) of the common faucet, having an opening each bored or drilled through each diametrically and each cock is placed in its steam box *y*, and united to *o*, in such a manner, that the opening of one steam cock (as the bar is vibrating) shall be diametrically opposed to that part of the other steam cock in which there is no opening—in other words, “the opening of one steam cock will be in communication with the boiler and the chamber, when the other steam cock is not—the steam passing through the opening of the cock, and each cock will be alternately allowing the steam to pass into the cylinder chamber, and stopping or cutting off the steam from the chamber. The form of the openings in the steam cocks, and their manner of operation and combination is exhibited in the two side elevated sections of the steam box, Fig. 10. By the form of the steam cock openings and the manner in which they are operated, the steam presses in a most equitable manner upon equal surfaces of the said cock during the “cut off”, so as to form a most excellent balance valve, superior to the slide valve for many purposes, as the slide valve is subjected to an unequal pressure of the steam.

The way in which the valves are operated, is described as follows. On the shaft *J J*, on the under part of the engine, I attach a crank *T*, on the end of the said shaft which projects below into the circular space inside of the ring *A* as seen in Fig. 2. *s, s*, is a connecting rod attached to said crank and extending upward in the circular space inside of the ring as seen in Fig. 7, and attached to a small arm *L*, which is secured to the vibrating rod *O*, and therefore it extends crosswise (transversely) as seen in Fig. 2. When the shaft *J*, is propelled, a reciprocating motion, by the crank on the said shaft, will be given to the connecting rod *s, s*, and a rocking or vibrating motion will be given to the cross bar *O, O*, by it being connected to the reciprocating rod by the arm *L*,—therefore it will be clearly perceived that

the steam cocks will be operated to perform the duties assigned to them and already explained.

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Operation: Allow the steam to enter from the main pipe (by a cock at *X*, Fig. 7,) into the steam boxes. The steam will pass through the open cock into the cavity or chamber of the engine, and by observing the position of the piston 3, Fig. 1, and the small space *R* behind it, where the vertical valve is inserted, it will be observed that when the steam passes into the chamber behind the piston 3, that the wedge piston *R*, will prevent a counteracting force of the steam being exerted against the movable ring, allowing it (the steam) to press against behind the piston 3, and thus propel the circular movable ring *H*; and as *H* is thus moved motion will be given to the wheel on the shaft *J*, as already explained, and also the crank *T*, and the reciprocating rod *s, s*, communicating a rocking motion to *O, O*, to work the steam cocks, so that when the piston 2, will have passed the next valve to it, the steam will be let on behind it and shut off then from behind 1, by the other steam cock, and so on alternately. The openings *s, s*, allow the steam to exhaust in way easily understood by any mechanic.

The way by which the pistons pass the vertical valves, is as follows. The valves have a slight taper on their lower ends, and the wedge incline *F, F, F*, of the pistons (which feather to a line) as they travel round, first touch the under prong spring of *Z*, Fig. 12, and relieves the valve from the said spring, and the piston or pistons are then allowed to pass the valve or valves, when the upper flat spring *K* forces down the piston or pistons just in time to be a check gate to the steam that is then let in behind the piston to propel the movable ring. *K*, and *Z*, are formed of one or two pieces fastened together.

What I claim as new and useful and for which I desire Letters Patent is—

The movable ring with cogs or teeth on the under surface or sides and with the incline or wedge pistons on its upper surface, and moving in the inside of the cavity or chamber of the circular ring *A*, as described, and for the purpose set forth.

JOHN TREMPER.

Witnesses:

C. D. HOUSTON,  
PELIG WILLIAMS, Jr.