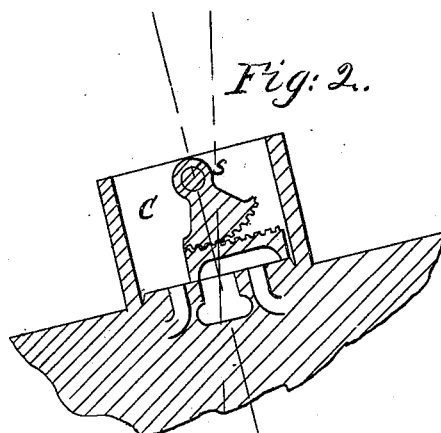
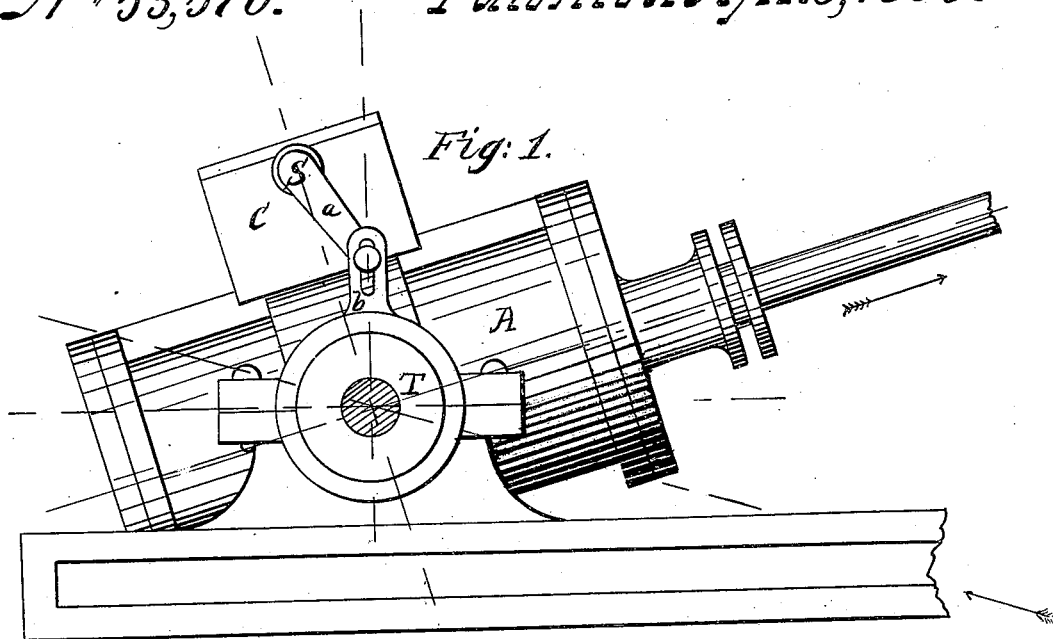


*H. T. Carter,*  
*Oscillating Steam Engine.*  
*N<sup>o</sup> 53,570. Patented Apr. 3, 1866.*



*Witnesses.*

*J. H. Richardson*  
*William H. Clifford*

*Inventor.*

*Henry T. Carter*

# UNITED STATES PATENT OFFICE.

HENRY T. CARTER, OF PORTLAND, MAINE.

## IMPROVEMENT IN VALVE-GEAR FOR OSCILLATING ENGINES.

Specification forming part of Letters Patent No. 53,570, dated April 3, 1866.

*To all whom it may concern:*

Be it known that I, HENRY T. CARTER, of Portland, in the county of Cumberland and State of Maine, have invented a new and useful Improvement in the Valve-Gear for Oscillating Engines; and I hereby declare the following to be a full, clear, and exact description of the same, which will enable others skilled in the art to make and use my invention, reference being made to the accompanying drawings, forming a part of this specification, in which—

Figure 1 shows a side elevation of a cylinder embodying my improvement; Fig. 2, a longitudinal section of the steam-chest, showing the toothed racked valve and segment-gear therein.

My invention consists in the combination of a rocking valve-stem, an arm, and a stud or link upon the trunnion-box cap, for the purposes and as by the description hereinafter following more fully appears.

In Fig. 1, A shows a cylinder, which oscillates upon trunnions T. The rock-shaft S passes transversely through the steam-chest C, and operates the valve by means of the toothed segment and rack. In the steam-chest there is a plain three-ported seat, upon which the valve is caused to move. Outside the chest, the rock-shaft S carries the arm *a* connected with the stationary slotted link *b*.

The oscillation of the cylinder alternately opens and closes the induction-ports by means of the stationary link, arm, rock-shaft, segment-gear, and toothed rack on the back of the valve.

I am aware of the grant of Letters Patent to Marcus D. Du Bois, May 22, 1865, and numbered 12,904; but my invention differs from

the subject-matter of said patent in the following particulars, to wit: In furnishing the rock-shaft S with a single arm, while in the patent above cited it carries two three-armed levers; in dispensing with the use of a fixed stud and arms, by which the oscillation opens the ports, and of two spring-catches to close the same; in not employing two other arms to strike two fixed pieces to insure the closing of the ports when the valve has a short throw.

Greater simplicity and economy in construction is obtained by the employment of a single arm and the slotted link.

If the steam-chest were placed on the bottom of the cylinder, the piston would move in a direction contrary to that indicated by the arrows, the position of the cylinder being the same.

The throw of the valve is controlled by the length of the arm *a*. In proportion as the arm is shortened and the slotted link lengthened, the transit of the arm is enlarged.

This valve-gear can be applied to any oscillating engine, whether the cylinder oscillates upon a vertical or horizontal axis.

I do not claim to be the first inventor of applying the toothed rack, segment-gear, rock-shaft, and arm to an oscillating engine; but

What I do claim, and desire to secure by Letters Patent, is—

The rocking valve-stem S, arm *a*, in combination with a slotted link upon the trunnion-box cap, in the manner and for the purposes herein set forth.

HENRY T. CARTER.

Witnesses:

J. F. RICHARDSON,  
WILLIAM H. CLIFFORD.