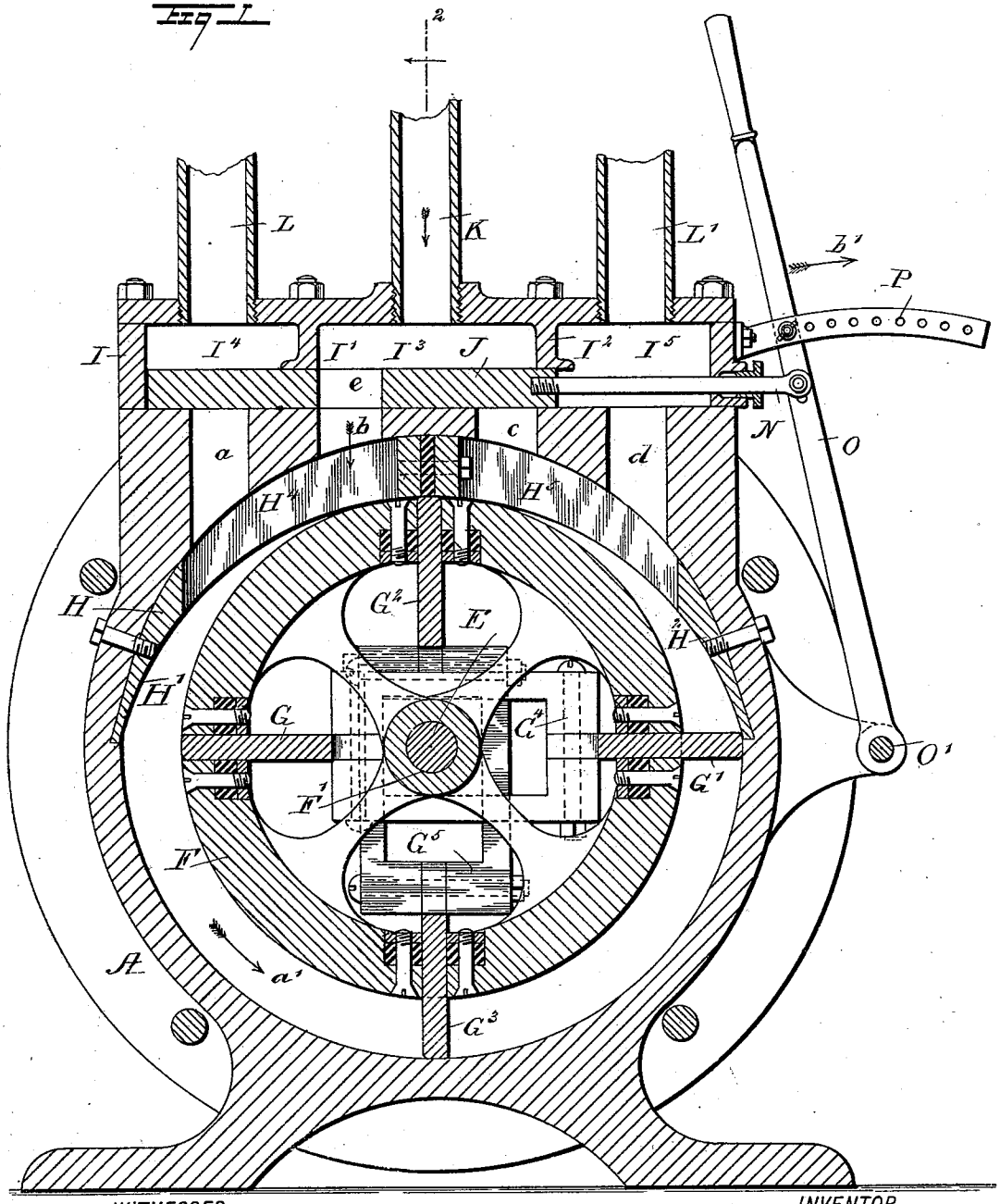
(No Model.) 2 Sheets—Sheet 1.

O. E. MORSE.

ROTARY ENGINE.

No. 507,830. Patented Oct. 31, 1893.

Fig. 1.



WITNESSES:

H. Walker

C. Sedgwick

INVENTOR

O. E. Morse

BY Munn & Co

ATTORNEYS.

(No Model.)

2 Sheets—Sheet 2.

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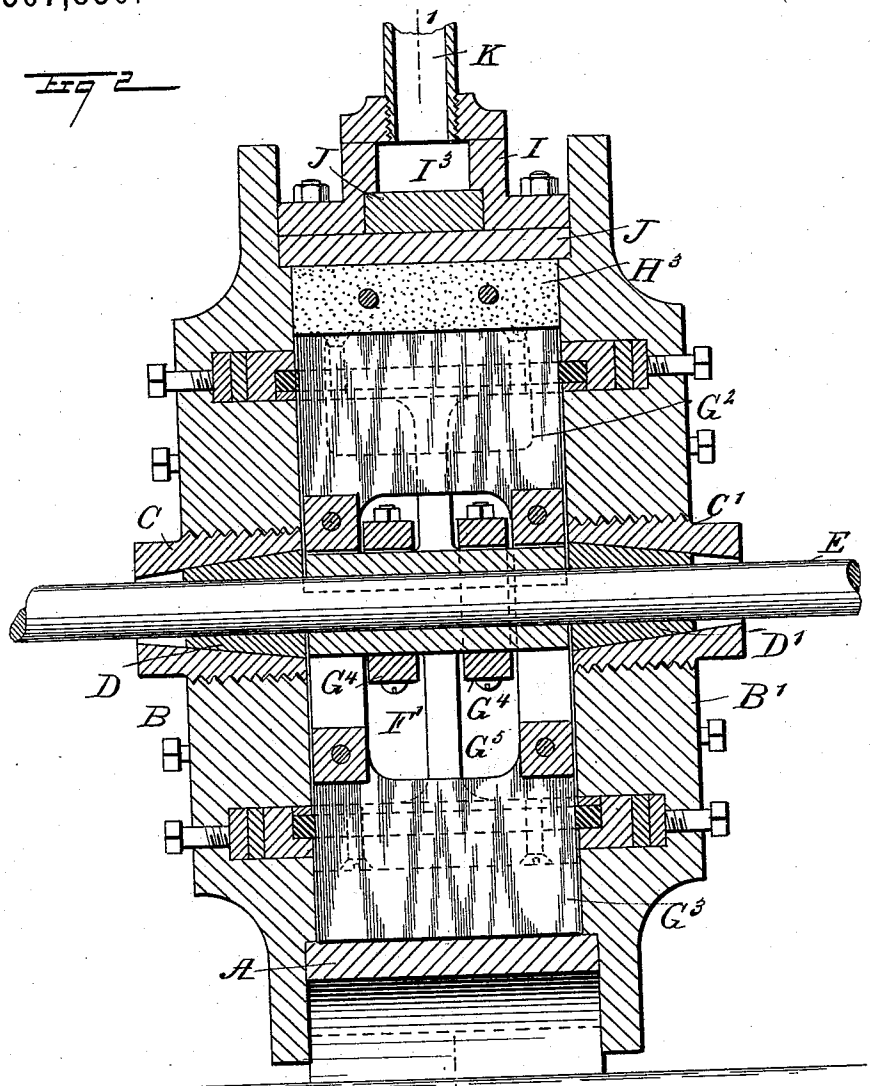
Fig 2



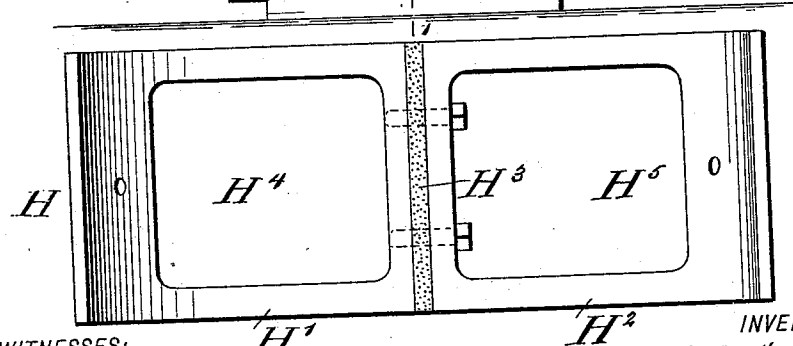


Fig 3

WITNESSES:

H. Walker

C. Sedgwick

INVENTOR

O. E. Morse

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

OSCAR ERNEST MORSE, OF DILLON, MONTANA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 507,830, dated October 31, 1893.

Application filed January 5, 1893. Serial No. 457,324. (No model.)

To all whom it may concern:

Be it known that I, OSCAR ERNEST MORSE, of Dillon, in the county of Beaver Head and State of Montana, have invented a new and Improved Rotary Engine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved rotary engine, which is simple and durable in construction, very effective in operation, arranged to utilize the motive agent to the fullest advantage, and permitting of conveniently reversing the engine whenever desired.

The invention consists of certain parts and details and combinations of the same, as will be hereinafter described and then pointed out in the claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement on the line 1—1 of Fig. 2. Fig. 2 is a transverse section of the same on the line 2—2 of Fig. 1; and Fig. 3 is an inverted plan view of the abutment in the cylinder.

The rotary engine is provided with a cylinder A, arranged on a suitable base and provided with the heads B and B′, carrying conical bearings C and C′, engaged by like shaped blocks D and D′, respectively, secured on the driving shaft E, passing centrally through the cylinder A, as plainly illustrated in the drawings.

On the shaft E within the cylinder A is secured the hub F′ of a wheel F, containing a series of pistons G, G′, G^2 and G^3, fitted to slide in the rim of the said wheel F, as plainly shown in Figs. 1 and 2. The pistons G and G′ are connected with each other at their inner ends by a slotted frame G^4, the opening of which is elongated and through it passes the shaft E, so that the pistons G and G′ can freely move radially in such a manner that when one moves inward the other moves outward, and vice versa. The pistons G^2 and G^3 are likewise connected with a slotted frame G^5, and the said pistons stand at right angles to the other pistons G and G′, and are arranged to slide diametrically in such a manner that when one moves inward the other moves outward, and vice versa. The outer ends of the several pistons are adapted to engage the inner surface of part of the cylinder A, and part of an abutment H, secured in the said cylinder and adapted to engage at its innermost part at the middle the peripheral surface of the wheel F. The abutment H serves to press an outermost piston inward so that its opposite mate slides outward into contact with the peripheral inner surface of the cylinder A. The abutment H is preferably made in two parts H′ and H^2, bolted at their outermost ends to the cylinder A and connected with each other at their innermost ends by suitable bolts, with a packing strip H^3 intervening the adjacent faces; see Fig. 3. The abutment H is formed with two openings H^4 and H^5, both leading into the interior of the cylinder, as plainly shown in Fig. 1.

Into the opening H^4 lead the ports *a* and *b*, and into the other opening H^5 lead two ports *c* and *d*. The ports *a*, *b*, *c* and *d* are formed in the cylinder and open into a steam chest I containing a slide valve J formed with a single port *e* adapted to be connected with either of the ports *b* or *c*. The steam chest I is provided with two transverse partitions I′ and I^2, extending across the top of the valve J and forming three compartments I^3, I^4 and I^5, of which the middle compartment I^3 is the steam inlet compartment and is connected with the steam supply pipe K connected with the boiler or other suitable source of supply. The side compartments I^4 and I^5 are connected with exhaust pipes L and L′ respectively, leading to the outer air.

The slide valve J is connected with a valve stem N passing through a suitable stuffing box in the chest I to the outside, the outer end of the stem being pivotally connected with a lever O fulcrumed at O′ on the cylinder A, and adapted to be locked in any desired position on a segmental arm P bolted or otherwise secured to the steam chest I.

The operation is as follows: When the slide valve J is in the position shown in Fig. 1, its port *e* registers with the port *b*, so that the motive agent entering the pipe K and passing into the middle compartment I^3 passes through the said registering ports *e* and *b* into the opening H^4 of the abutment H, and

into the cylinder A to exert a pressure on the outwardly extending piston G^3, thus turning the wheel F in the direction of the arrow a'. When the wheel F rotates in the direction indicated, the piston G′ is forced inward by coming in contact with the part H^2 of the abutment H, so that the other piston G connected with the piston G′ is forced outward and comes in contact with the inner surface of the cylinder A at the time the said pistons G′ and G stand vertically, the outer edge of the piston G′ then being under the lower edge of the packing plate H^3 of the abutment H. The motive agent entering the cylinder A, as above described, then exerts its force on the piston G, so as to revolve the wheel F in the direction of the arrow a', whereby a continuous rotary motion is given to the wheel, it being understood that the pistons are all moved outward into peripheral contact with the cylinder A when they reach their lowermost position, as shown in the drawings. The exhaust takes place in front of the respective piston, through the opening H^5, the port d, compartment I^5, and exhaust pipe L′. Now, when it is desired to reverse the engine, the operator unlocks the lever O and swings the same outward in the direction of the arrow b', so that the slide valve J is shifted and closes the port b and connects the port e with the port c. At the same time, the port d is closed, while the port a is opened to connect with the compartment I^4 and the exhaust pipe L. The motive agent entering the middle compartment I^3 thus passes through the registering ports e and c, and the opening H^5 into the right hand side of the cylinder A to act on the piston therein to rotate the wheel F in the inverse direction of the arrow a'. The exhaust then takes place in front of the piston through the opening H^4, the port a, compartment I^4 and the exhaust pipe L.

It will be seen that by this arrangement, the motive agent is utilized to the fullest advantage and the engine can be reversed at any time by simply shifting the lever to change the position of the slide valve J, as above described.

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

In a rotary engine the combination with the cylinder A provided with the ports $a\,b\,c\,d$, and the wheel F mounted in the cylinder and provided with the pistons G, G′, G^2, G^3, fitted to slide in the rim of the wheel and connected together in pairs by the slotted frames G^4 and G^5, of the abutment H secured to the inner surface of the cylinder said abutment being formed of the two parts H′ H^2 and provided with the openings H^4 H^5, registering with the ports $a\,b$ and $c\,d$ respectively, the steam chest I above the cylinder and provided with the three compartments I^3 I^4 I^5, the middle compartment I^3 being connected with the steam supply pipe and the end compartments I^4 I^5 with the exhaust pipes, the slide valve J in the steam chest and provided with the port e, and means for shifting the slide valve to reverse the engine substantially as herein shown and described.

OSCAR ERNEST MORSE.

Witnesses:
T. J. MURRAY,
E. H. BRUNDAGE.