O. P. OSTERGREN.

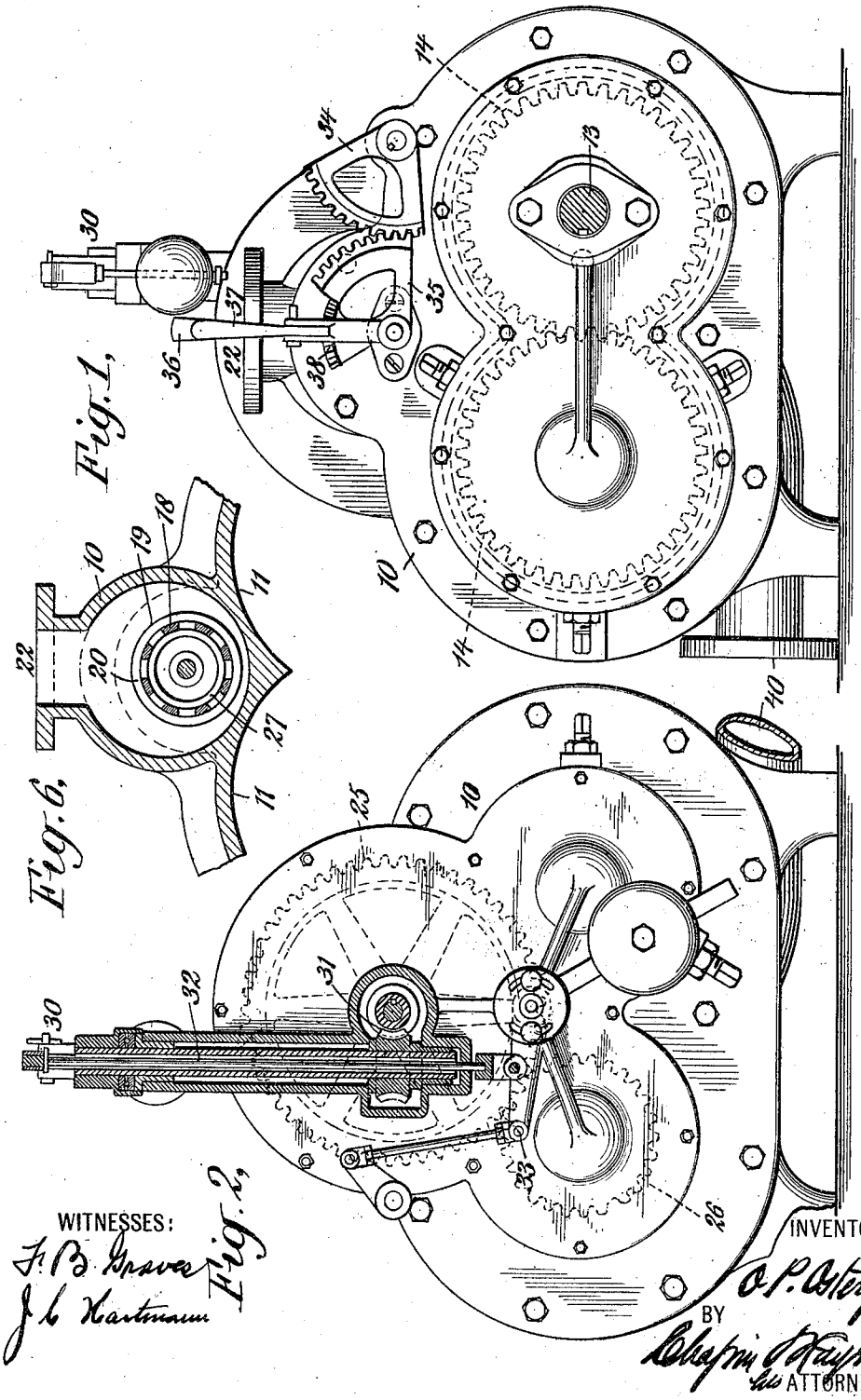
ROTARY ENGINE.

APPLICATION FILED AUG. 12, 1910.

1,001,675.

Patented Aug. 29, 1911.

2 SHEETS—SHEET 1.



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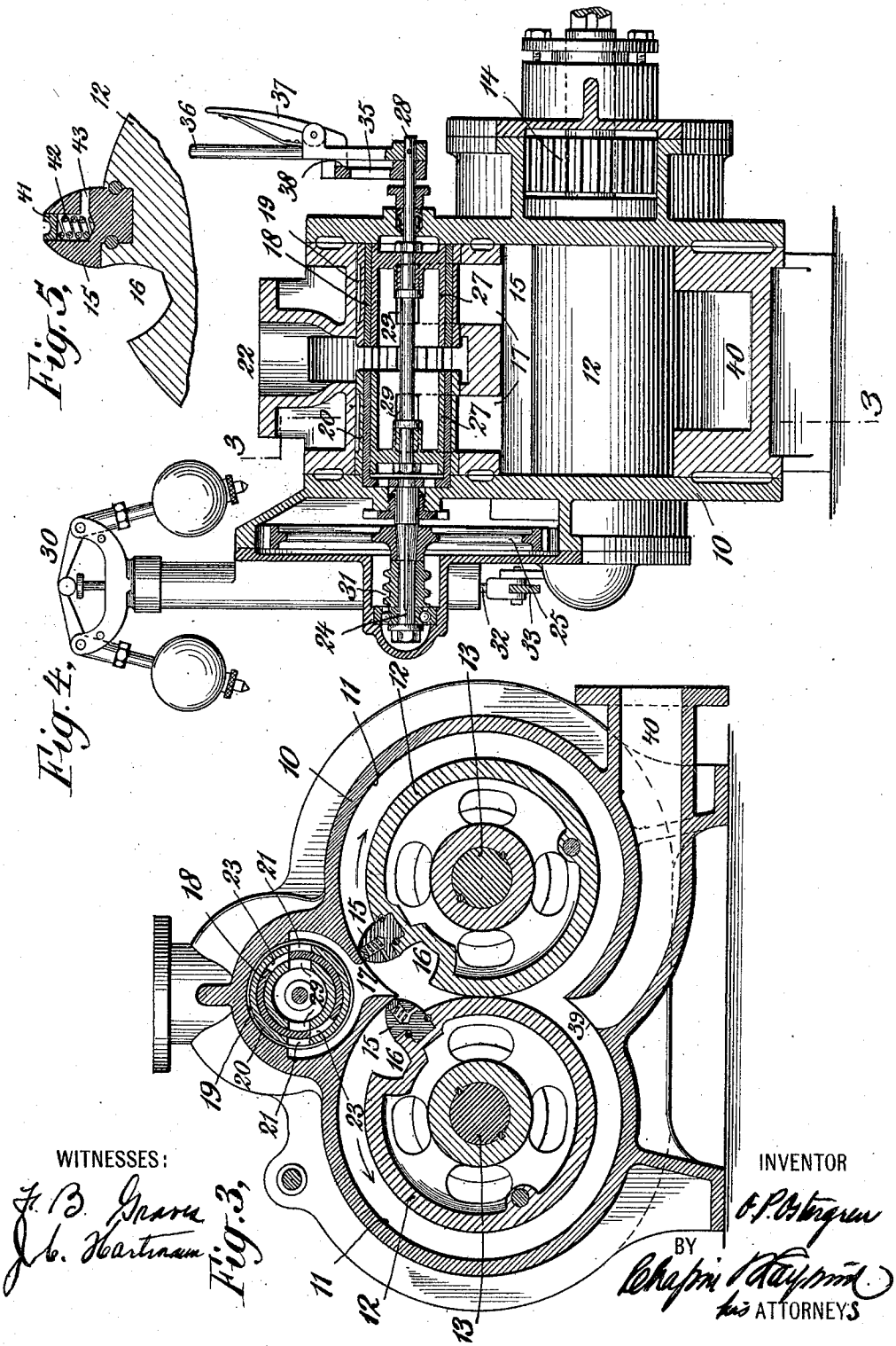

Fig. 3,

Fig. 4,

Fig. 5,

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OSCAR P. OSTERGREN, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-FOURTH TO WILLIAM V. HIRSH, OF BROOKLYN, NEW YORK.

ROTARY ENGINE.

1,001,675. Specification of Letters Patent. **Patented Aug. 29, 1911.**

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To all whom it may concern:

Be it known that I, OSCAR P. OSTERGREN, a subject of the Crown of Sweden, and a resident of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to improvements in rotary engines, and particularly to a type of duplex rotary engine wherein two rotary elements are arranged side by side in parallel relation, each being provided with an abutment which is arranged to be received in a complementary recess in the other element.

To the end that my invention will be thoroughly understood, I will describe in detail an embodiment of my invention having reference to the accompanying drawings illustrating the same and will then point out the novel features in claim.

In the drawings: Figure 1 is a view in elevation looking toward one end of a rotary engine constructed in accordance with my invention. Fig. 2 is a view partly in end elevation and partly in transverse section looking toward the opposite end of said rotary engine. Fig. 3 is a view in transverse section through the engine, the plane of section being upon the line 3—3 of Fig. 4. Fig. 4 is a view in central longitudinal section through the engine. Fig. 5 is a detail view in transverse section upon an enlarged scale through the abutment of one of the rotary elements. Fig. 6 is a detail view in central transverse section through the inlet valve and valve chamber.

The engine is provided with a suitable casing 10 having two cylindrical bores 11 therein arranged side by side and in intersecting relation whereby the two said bores are in open communication laterally with each other. Concentrically disposed in each of the said bores is a rotary element 12, the shafts 13 of which are suitably journaled in the casing 10. The diameter of the rotary elements is less than the diameter of the bores 11 so that there is an annular space between the said rotary element and the casing walls, but the diameter of the two said rotary elements is such that their peripheries are in rolling contact with each other as will be well understood by reference to Fig. 3 of the drawings. The two said rotary elements are connected together by means of intermeshing gear wheels 14 secured fast upon their respective shafts 13.

Each of the rotary elements is provided with a radially projecting abutment 15 and in close proximity thereto with a recess 16 complementary to the said abutment, whereby the abutment of one of the said rotary elements is adapted to be received in the complementary recess of the other said element. It being understood that the connection through the gearing is such that the adjacent sides of the rotary elements move in the same direction (the actual direction of movement of the rotary elements, as a whole, being, of course, opposite with respect to each other) it will be noted that the position of the recesses and abutments differ in the two elements: that is to say, in one of the elements the recess is in advance of the abutment in the direction of rotation of the said element, while in the other it is to the rear of the abutment in the direction of movement of that element. In angular relation, radial lines of the two elements which pass between the abutment and the recess in each element, coincide.

Motive fluid is admitted behind the abutments through an inlet passage 17 which is common to both of them. This inlet passage is controlled by means of a rotary valve 18 as follows. The casing 10 is provided with a cylindrical valve chamber 19 in which is mounted a stationary bushing 20. This bushing is provided with admission openings 21—21 in the side walls thereof, and for convenience in manufacture is constructed in two halves spaced apart at the middle portion thereof as is shown in Fig. 4, whereby motive fluid will pass from inlet channel 22 through the space between the bushing portions into the interior thereof.

The valve 18 which is of tubular form is rotatively mounted in the bushing 20, being provided with central openings by which

motive fluid is admitted to the interior thereof, and with lateral openings 23 arranged in the rotation of the valve to register with the openings 21 in the bushing. This valve is secured to a shaft 24 (see particularly Fig. 4), and the said shaft is arranged in driving relation with one of the rotary element shafts 13 by means of a spur gear 25 upon the shaft 24 and a pinion 26 upon the shaft 13. The gear ratio is two to one so that the valve is caused to revolve once for every two revolutions of the rotary elements. There being, however, two inlet openings arranged angularly 180 degrees apart, the valve will open to admit motive fluid to the rotary elements twice for each revolution it makes and hence once for each revolution of the rotary elements.

Rotatively mounted within the said rotary valve is a rider cut-off valve 27 conveniently in the form of two heads or sleeve portions mounted upon a spindle 28, and spaced slightly apart so that motive fluid will be freely admitted to the interior thereof. This valve has lateral passages 29 in its opposite walls, corresponding to the passages 23 and 21, and by shifting the angular position of the said rotary cut-off valve, the length of time during which motive fluid will be admitted to the rotary elements may be varied. I have provided a governing means for automatically determining the position of the rider cut-off valve as follows:—A centrifugal governor 30 is mounted upon the casing in the machine, being driven through a worm and gear connection 31 from the valve shaft 24. The longitudinally movable rod 32 of the governor is connected through suitable links and levers 33 with a gear sector 34, the teeth of the latter being in mesh with the teeth of a complementary gear sector 35 which is mounted upon the spindle 28. This sector is preferably loosely mounted upon the spindle 28 whereby the relative position of the same with respect to the spindle may be varied. I have shown a manually operated means for thus varying the position, comprising a lever 36 secured fast to the spindle 28 and carrying a locking dog 37 for engagement with a set of teeth 38 upon the sector 28. By manipulation of this adjusting means the initial position of the cut-off valve may be readily determined, while thereafter the position will be varied by action of the centrifugal governor in accordance with the speed at which the engine is running. Thus the manual operating means may be employed to adjust the position for any speed of running and the governor will then operate to prevent the engine from running at a higher rate of speed, as will be well understood.

From the foregoing description the operation of the engine will be readily understood. Motive fluid being admitted to the inlet 22 it will flow to the interior of the cut-off valve 27 and thence as the rotary valve 18 reaches its proper position it will flow through the passage 29, 23, and 21, into the inlet passage 17, and thence to the annular spaces formed between the peripheries of the hubs 12 and the walls of the cylindrical bores 11. At the moment the valve reaches a point wherein the motive fluid will be thus admitted, the abutments 15—15 will have just passed the opening 17 in which position they are shown in Fig. 3 of the drawings. Motive fluid being admitted behind these abutments the hubs will be rotated by the force thus applied. After the hubs have rotated a predetermined distance, say, one-third of a revolution, the valve 18 will have reached a point wherein it will cut-off further supply of motive fluid and for the next portion of their rotary movements the power of the motive fluid will be applied expansively upon the abutments until in completing their revolution the said abutments pass the exhaust port 39. Then the motive fluid will be exhausted through the exhaust passage 40, the recesses 16 of the two hubs will receive the complementary abutments 15 of the other hubs, and the rotary elements will complete their revolution to again receive motive fluid as they reach the position shown in Fig. 3.

In order to prevent leakage between the rubbing surfaces of the abutments 15 and the walls of the cylindrical bores 11, I have provided the said abutments with wearing shoes 41, spring-pressed radially by means of springs 42. I have also provided a passage 43 to admit the motive fluid back of the shoe 41 so that the shoes will not only be pressed out by the springs 42 but also by the action of the motive fluid itself.

What I claim is:

The combination with a casing having two parallel and overlapping cylindrical bores, of rotary elements fitted therein, one in each bore, the said rotary elements comprising cylindrical hubs of a diameter less than the diameter of the said bores, whereby an annular working space is formed between the periphery of each of the said hubs and the walls of the said bores, the two said hubs having their peripheries in rolling contact with each other, each of the said hubs being provided with a lateral abutment projecting across the said annular space into engagement with the walls of the bores and with a recess for receiving the abutment of the other hub, means for connecting the rotary elements to rotate together, a tubular rotary valve for admitting motive fluid to the said annular spaces behind the said abut-

ments for a portion of each revolution of the said rotary elements, gearing connecting the said valve and rotary elements together, a tubular cut-off valve mounted within the said rotary valve, automatic governing means for rotatively adjusting the said cut-off valve so as to vary the point of cut-off for the motive fluid, and manual adjusting means for adjusting the said cut-off valve with respect to the governing means.

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Witnesses:

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