Sept. 1, 1942. R. B. ROBINSON 2,294,805

ROTARY ENGINE CONSTRUCTION

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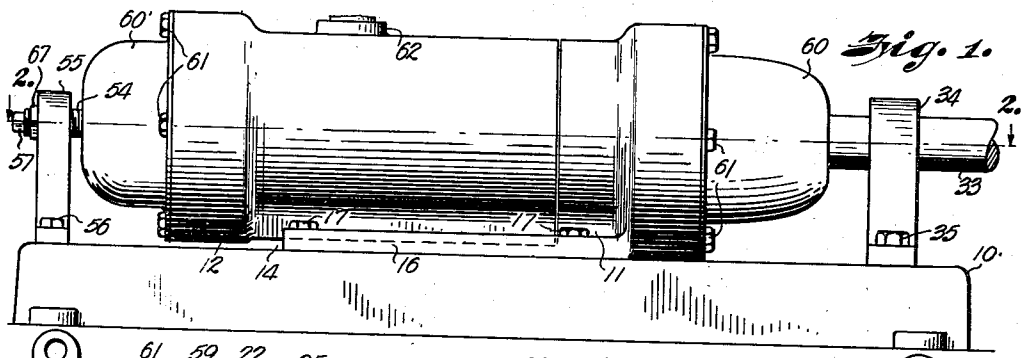


Fig. 1.

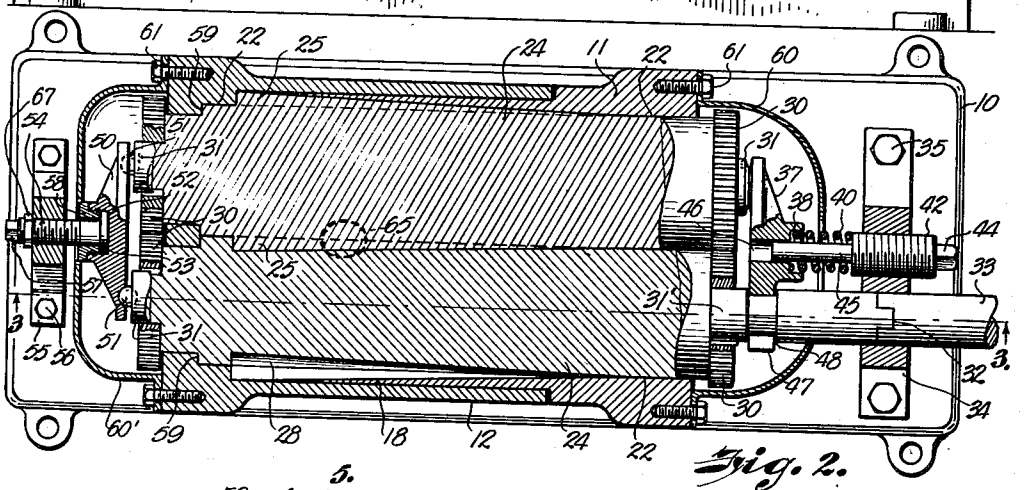


Fig. 2.

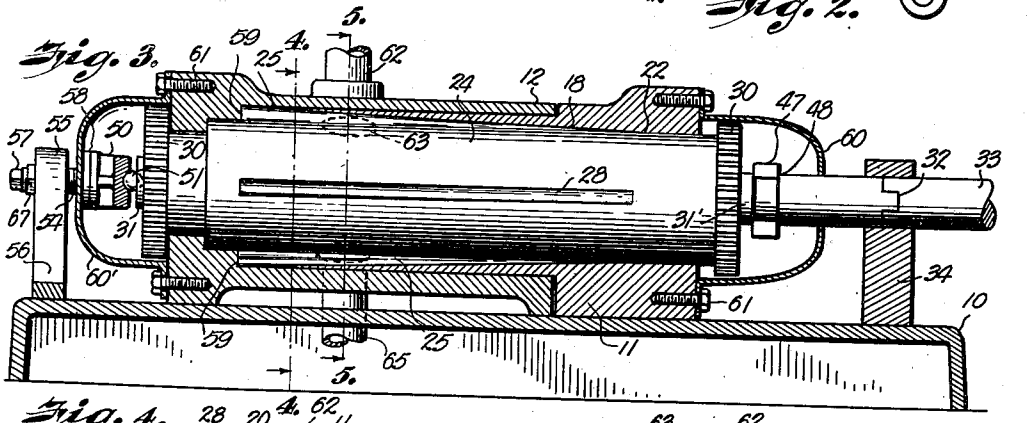


Fig. 3.

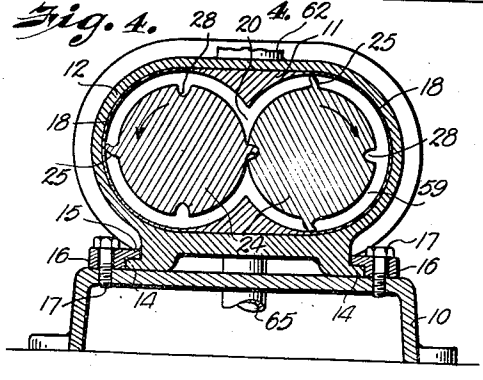


Fig. 4.

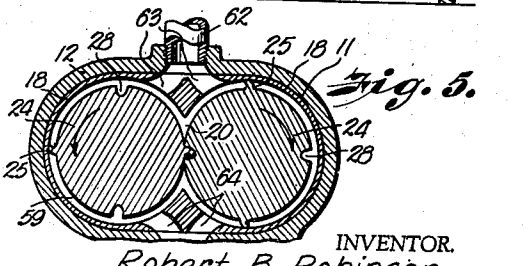


Fig. 5.

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ROTARY ENGINE CONSTRUCTION

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5 Claims. (Cl. 121—70)

The present invention relates to rotary engines and particularly to engines or motors of the expansion chamber type and actuated by a fluid pressure medium; as well as to motors of a similar type of construction adapted for pumping operations.

It is a fundamental object of my invention, in recognition of the outstanding advantages of the rotary type of engine over the common reciprocatory design of engine or motor, to render more practical the said rotary engine design by overcoming the present faults or disadvantages which interfere with the uniform operation of the engine, and to accomplish this by an improved form of construction together with an adjusting means which is always available without any interruption of the regular operation of the engine.

A primary object of the invention, therefore, is to devise an improved construction of this character having a novel design of housing or casing structure in combination with movable piston members or rotors so adapted as to provide for an adjustment of the rotary elements as required for relieving any binding engagement between relatively moving parts, such as may result from excessive speed and resultant heating effects; and, moreover, to provide a construction adapted to facilitate the carrying out of such adjustments during the actual or normal operation of the engine or motor.

In embodying such primary feature of the invention in actual construction, I have found a longitudinally and correspondingly tapered or flaring construction of both the rotary piston members and the interior housing structure, together with convenient means for producing the necessary longitudinal shifting movement of the rotors or pistons, affords a practical construction for effecting the desired results, as sought to be attained by my invention.

It is a further object of the invention to devise a construction which may be readily adapted for assembly in combinations suitable for operation either as ordinary pumping apparatus or as engines or motors of the internal combustion type.

With the foregoing general objects in view, the invention will now be described by reference to the accompanying drawing illustrating one type of construction deemed practical for the embodiment of my proposed improvements, after which those features and combinations believed to be novel and patentable will be particularly set forth and claimed.

In the drawing—

Figure 1 is a side elevation showing a motor embodying the improved features of the present invention;

Figure 2 is a horizontal sectional view, representing a section taken on the line 2—2 of Figure 1;

Figure 3 is a horizontal sectional view, representing a section taken on the line 3—3 of Figure 2;

Figure 4 is a transverse sectional view, representing a section taken on the line 4—4 of Figure 3; and

Figure 5 is a similar transverse sectional view, representing a section taken on the line 5—5 of Figure 3,—but with the lower portion of the construction broken away.

Referring now to the drawing in detail, one example of construction is shown as comprising a base member 10 on which is mounted a housing structure comprised of two telescoping sections 11 and 12,—the outer section 12 being formed with bottom flanges 14 for engagement with flanges 15 on a pair of longitudinal guide plates 16 forming part of the housing section 11 which is secured to said base member 10 by clamping screws 17, as illustrated in Figures 1 and 4. By this means the housing section 12 is not only removably mounted on said base member 10 but may be longitudinally adjusted thereon as may be required.

The housing section 11 is formed with interior chambers 18 of approximately cylindrical shape but intersecting each other—as indicated at 20 in Figures 4 and 5, and also flaring somewhat in the direction of the other or outer housing section 12, as shown in Figures 2 and 3. The outer ends of the housing sections 11 and 12 are formed with cylindrical openings 22 of the same size and fitting the opposite ends of a pair of rotary pistons 24.

Each of the rotary pistons is provided with lobes or abutments 25 projecting in diametrically opposite directions, and of flared design corresponding to the flaring interior design of the chambers 18 already mentioned; while at right angles to the plane of said lobes 25 each piston is formed with correspondingly shaped grooves 28 in longitudinal position for receiving and accommodating the lobes 25 of the companion piston as required in the operative or rotary movement of the pistons, in an obvious manner,—as represented in Figures 4 and 5.

The opposite ends of the rotary pistons are fitted with suitable intermeshing gears 30 carried by the reduced end portions 31 of the pistons, one of which piston end portions 31 is provided with

an extension 31' having a splined connection 32 with a power shaft 33 journaled in a bearing stand 34 mounted on one end of the base member 10 and anchored thereto by screws 35.

Spring actuating means is provided for exerting a continuous pressure or thrust against the ends of the pistons at the smaller ends of the chambers 18 and thereby tending to crowd said pistons, together with the outer housing section 12, toward the opposite end of said chambers— or toward the left, as viewed in Figure 2. The structure provided for this purpose comprises a crosshead member 37 engaging the adjacent reduced ends 31 of the pistons and provided with a recess 38 for seating one end of a coil spring 40, the opposite end of which is shouldered against an adjusting screw mounted in the bearing stand 34 and terminating in a wrench-head 44 for adjusting purposes. Preferably the said adjusting screw 42 is formed with a stem 45 projecting through said spring 40 and the recess 38 and also a bore 46 alined with said recess in the crosshead 37, and one end of the latter member is formed as a yoke 47 adapted for shouldering engagement (as indicated at 48) with the splined section 32 of the connection with the shaft 33, as clearly outlined in Figures 2 and 3.

At the opposite ends of the rotary pistons 24 a positive adjusting means is provided for counteracting the action of the spring-actuating means just described, and this adjusting means comprises a crosshead member 50 designed for suitable ball-thrust engagement with the adjacent ends of both pistons as indicated at 51. The middle portion of this crosshead member 50 is formed with a recess 52 for accommodating the terminal head portion 53 of a screw 54 which is adjustably mounted in a bracket member 55 anchored by screws 56 to the base 10. The outer terminal of the screw 54 is formed as a wrench-head 57 for application of a suitable adjusting wrench, and the head end 53 of said screw is rotatably retained within the recess 52 by means of an appropriate gland nut 58.

In this connection it is to be noted that the pistons 24 are maintained fixed against any longitudinal movement relative to the housing section 12, inasmuch as the larger ends of the lobes 25 are shouldered against the interior abutment 59 formed in said housing section 12 and serving as an end wall for the piston chambers 18, and the pistons being held in this relation by the gears 30 engaging the outer end of said housing 12. At the same time clearance is provided between the outer end of the housing section 11 and the gears 30 at that end of the construction, for permitting the longitudinal adjusting operation which has just been referred to.

Such longitudinal adjustment of the rotary pistons relieves any binding tendency, such as would interrupt the normal operation of the motor, and thus preserves the important advantages of rotary engine operation while overcoming the defects of such operation which have heretofore retarded the adoption of the rotary engine principle. One of the outstanding features of the present invention is that this important adjustment just referred to can be carried out by the described construction while the motor is in actual operation, since the operator can note the gradually loosening and tightening effect as he manipulates the adjusting screws. This is of particular value under certain conditions, as where the operation of the engine develops overheating tendencies, since the improved adjusting means enables the engine to be instantly relieved of any danger of stalling on account of such overheated condition, by compensating for the expansive action resulting from the excess heating effects. If desired, suitable lock or clamping nuts 67 may be provided for holding the adjusting screws in any given fixed or set position, after completion of any particular adjustment as above explained.

The gears 30 and adjacent parts are preferably enclosed by means of apertured hoods or casings 60 and 60', which are secured by suitable screws 61 to the ends of the housing sections 11 and 12, respectively.

A fluid intake connection 62 is provided, having branch passages 63 communicating with the respective chambers 18; and from the latter are provided outlet passages 64 leading to a common outlet or discharge connection 65, as shown in Figures 1, 4 and 5.

It is of course apparent that the construction shown is merely illustrative of the functional character and relation of the improved features, and that the same are readily adaptable to other conditions of operation, such as in internal combustion engine operation, by simply providing twin or duplicate units for carrying out both the compression and power phases of such explosive type of power medium.

Therefore, while I have illustrated and described what I now regard as one satisfactory mode of practicing the invention, I desire to be understood as reserving the right to make such changes or modifications as may fairly fall within the spirit and scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A rotary engine construction comprising telescoping housing sections including an inner housing section formed with twin flaring and intersecting piston chambers, and a pair of rotary pistons provided with longitudinal lobes or abutments and grooves of correspondingly flared design and adapted for intermeshing relation.

2. A rotary engine construction comprising telescoping housing sections including an inner housing section formed with twin flaring and intersecting piston chambers, and a pair of rotary pistons having longitudinal lobes and grooves of correspondingly flared design and adapted for intermeshing relation, said pistons being also mounted for longitudinal adjusting movement along with the outer housing section relative to said inner housing section.

3. A rotary engine comprising telescoping housing sections including an inner housing section formed with twin flaring and intersecting piston chambers, a pair of rotary pistons having longitudinal lobes and grooves of corresponding flaring design and adapted for intermeshing relation, said pistons being also longitudinally adjustable along with the outer housing section and relative to said inner housing section, and yielding means tending to impart relative separating movement to the housing sections and thereby longitudinally expanding said piston chambers.

4. A rotary engine comprising telescoping housing sections including an inner housing section formed with twin flaring and intersecting piston chambers, a pair of rotary pistons having longitudinal lobes and grooves of corresponding flaring design and adapted for intermeshing relation, said pistons being mounted for longitudinal movement in unison with the outer housing section relative to said inner housing section,

yielding means tending to produce relative separating movement of the housing sections for thereby longitudinally expanding the piston chambers, and manually controlled means for counteracting said first means and maintaining the housing sections in a given telescoped relation.

5. A rotary engine comprising telescoping housing sections including an inner section formed with twin flaring and intersecting piston chambers, a pair of rotary pistons having longitudinal lobes and grooves of corresponding flaring design and adapted for intermeshing relation, said pistons being movable longitudinally in unison with the outer housing section and relatively to the inner section, means at one end of the construction for imparting a yielding longitudinal thrust to said pistons and thereby producing relative separating movement of the housing sections for correspondingly expanding the piston chambers, and manually controlled means operable at the will of the operator of the engine for counteracting said first means and maintaining said housing sections in a given or set telescoped relation, said manually controlled means being adjustable during the operation of the engine.

ROBERT B. ROBINSON.