No. 863,191. PATENTED AUG. 13, 1907.

A. D. LEE & F. J. E. NELSON, JR.

ROTARY ENGINE.

APPLICATION FILED OCT. 24, 1906.

Fig. 1.

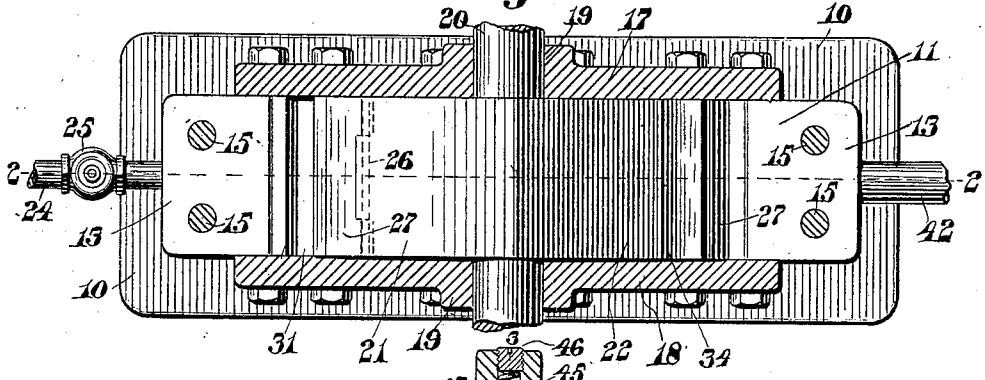


Fig. 2.

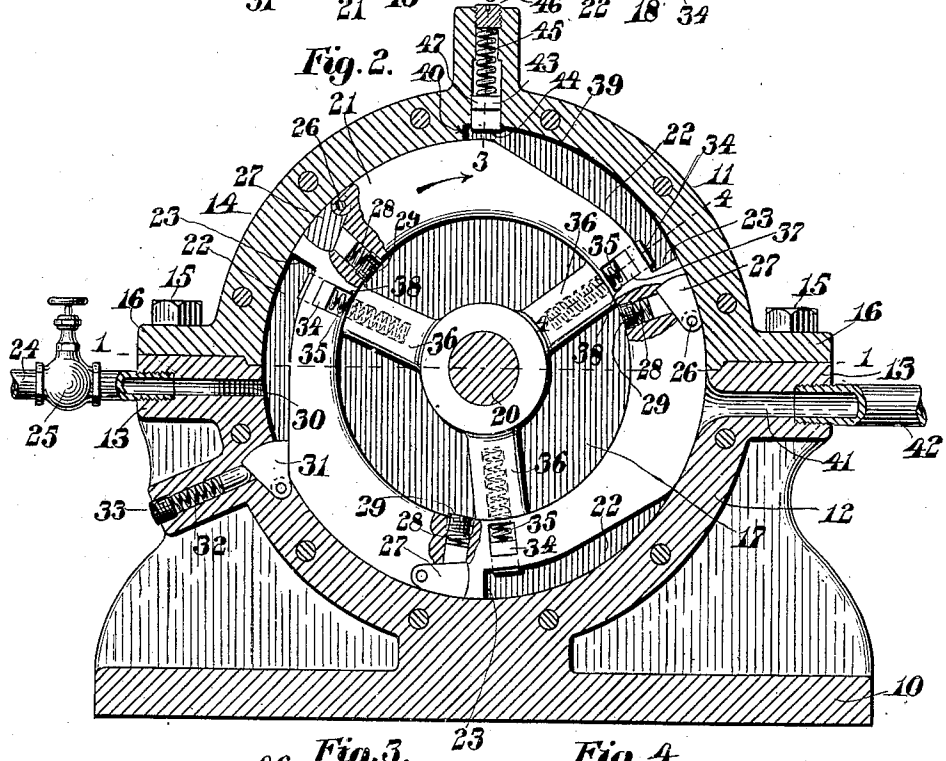


Fig. 3.

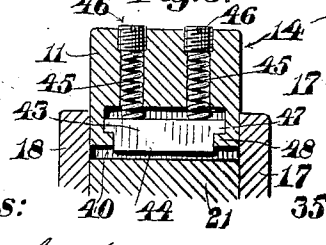
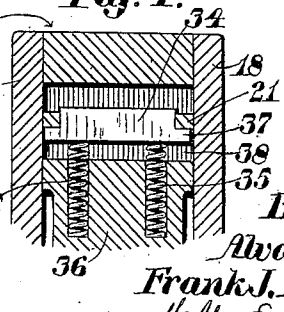


Fig. 4.



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UNITED STATES PATENT OFFICE.

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ROTARY ENGINE.

No. 863,191. Specification of Letters Patent. Patented Aug. 13, 1907.

Application filed October 24, 1906. Serial No. 340,298

To all whom it may concern:

Be it known that we, ALVA D. LEE and FRANK J. E. NELSON, Jr., citizens of the United States of America, and residents, respectively, of Brookline, in the county of Norfolk, and East Boston, in the county of Suffolk, both in the State of Massachusetts, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

This invention relates to rotary engines and has for its object the production of an engine of this class which is capable of developing the maximum power with the consumption of a minimum quantity of motive force, thereby increasing the economy of the engine over those of a similar type heretofore known.

The invention consists in certain novel features of construction and arrangement of parts which will be readily understood by reference to the description of the drawings and to the claims to be hereinafter given.

Of the drawings: Figure 1 represents a horizontal section on line 1—1 on Fig. 2, showing the piston member in plan. Fig. 2 represents a transverse section of the same on line 2—2 on Fig. 1. Fig. 3 represents a section on line 3—3 on Fig. 2, and Fig. 4 represents a section on line 4—4 on Fig. 2.

Similar characters designate like parts throughout the several figures of the drawings.

In the drawings, 10 represents a suitable base of a casing 11 upon which is mounted the semi-cylindrical member 12 provided at its top with suitable flanges 13 thereon to which is secured the upper semi-cylindrical member 14 by means of bolts 15 passing through the flanges 16. The semi-cylindrical members 12—14 are secured together in such a manner as to make a perfectly concentric piston chamber which is inclosed by means of the side plates 17—18, each having a bearing 19 to support a shaft 20.

On the shaft 20 between the plates 17—18 is mounted a heavy piston member 21, the periphery of which is cut away at three points and from side to side thereof to provide suitable pockets 22. These pockets 22 are deeper at their front end than at their rear end and at the front end a radial wall 23 provides a suitable abutment against which the motive force admitted to the piston chamber through the pipe 24 may act. The admission of motive force to the pipe 24 is controlled by the valve 25 of any well-known construction.

Immediately in front of each of the pockets 22 is pivoted to the piston member 21 at 26 a member 27 which is moved outwardly by means of the spring 28, the tension of which is regulated by the adjustable threaded member 29. To the rear of the main inlet 30 is pivoted to the lower casing member 12 a member 31 which is moved inwardly by means of the spring 32 the tension of which may be adjusted by means of the threaded member 33. This pivoted member 31 is continually held in contact with the periphery of the revoluble piston 21 and prevents the motive force entering through the main inlet 30 from passing in that direction between the periphery of the piston member 21 and the inner face of the piston chamber. It acts moreover when extended into one of the pockets 22 to form an abutment against which the motive force may act and as this abutment is fixed relative to the revoluble movement of the piston member, the motive force entering the pocket must necessarily act against the radial wall 23 of the pocket to force the piston member 21 in a direction indicated by the arrow on Fig. 2.

It is obvious that as soon as the radial wall 23 comes opposite the outer curved edge of the pivoted member 31 this member 31 will be forced to the bottom of the pocket 22 and to overcome the shock attending this sudden movement a member 34 is movably mounted in the piston member 21, this member 34 being moved outward by means of the springs 35 mounted in suitable recesses in the spokes 36 of said piston member.

The springs 35 normally retain the outer face of the member 34 beyond the bottom of the pocket 22, the member 34 being provided with suitable ears 37 projecting through openings 38 in said piston member 21 to limit the outward movement of said member. It is obvious that when the member 31 is moved inwardly by its spring 32 it will contact with this member 34 and by the compression of the spring 35 the shock of impact will be reduced to a minimum.

The casing 11 is provided on its upper inner face with an expansion pocket 39 which allows the motive force carried thereto by means of one of the pockets 22 to expand, the motive force in said expansion chamber acting upon the radial wall 23 of the piston pocket 22 and the radial wall 40 of the expansion pocket 39.

When the pockets 22 reach the exhaust 41 the motive force contained therein and contained within the pockets 22 is permitted to exhaust through the pipe 42. As the members 27 come opposite the expansion pocket 39 the spring 28 forces them upwardly against their pivot 26 to the bottom face of said pocket 39. In order to prevent the shock attending such sudden movement of the pivoted member 27 a member 43 is provided held normally with its inner face 44 beyond the bottom face of the pocket 39 by means of the springs 45 in suitable pockets in the casing 11, the tension of said springs being regulated by means of suitable threaded plugs 46.

The member 43 is provided with suitable ears 47 which coöperate with shoulders 48 to limit the inward movement of said member 44. The pivoted member 27 acts as a cut-off between the various pockets 22 and the outer periphery of the piston member 21 being made concentric with and of the same size as the piston chamber in the casing 11 the portions of the periphery of said

piston member 21 between the pockets 22 will continually be in contact with the inner face of the casing 11 and also serve as a cut-off between the various pockets 22.

In the operation of the invention when the valve 25 is opened the motive force is admitted through the main inlet 30 to the piston chamber and as the pockets 22 come opposite the main inlet 30 the pockets are filled with motive force which act between the pivoted abutment 31 and the radial wall 23 of the pockets 22 and the motive force will obviously move the piston in the direction indicated by the arrow. As the concentric portion of the piston 21 comes opposite the inlet 30 the admission of motive force to the pocket 22 will be cut off and the motive force contained within said pocket will be carried by said piston until the pocket 22 uncovers the expansion pocket 39 when the motive force contained within the pocket will escape in the expansion chamber 39 and be permitted to expand the action of said expansion between the radial walls 23 of the pockets 22 and the abutting wall 40 of the expansion chamber 39 serving to continue the movement of the piston member 21 in the direction of the arrow until the pocket uncovers the exhaust 41 when the motive force contained within said pocket and within the expansion chamber 39 is permitted to escape therefrom through the pipe 42.

The pivoted members 27 serve as cut-offs to prevent the motive force from passing from one pocket to the other when they are in contact with the concentric portion of the piston chamber and when they are moved outwardly by their springs 28 to contact with the bottom face of the expansion chamber 39 they serve as abutments to assist in the movement of the piston.

This makes a very simple and compact engine, very effective in its operation, and it is believed that the foregoing description is sufficient for a thorough understanding of the invention.

Having thus described our invention, we claim:

1. In a rotary engine, the combination of a casing provided with a piston chamber; a revoluble piston therein provided with a plurality of peripheral pockets; a movable abutment mounted in said casing adapted to coöperate with the periphery of said piston; a yielding member mounted in the bottom of each pocket of said piston to minimize the force of impact of said abutment; means for admitting motive force to said piston chamber; and means for exhausting therefrom.

2. In a rotary engine, the combination of a casing provided with a piston chamber; a revoluble piston therein provided with a plurality of peripheral pockets; a movable abutment in said casing adapted to coöperate with the periphery of said piston; a spring-pressed yielding member mounted in the bottom of each pocket of said piston to minimize the force of impact of said abutment; means for admitting motive force to said piston chamber; and means for exhausting therefrom.

3. In a rotary engine, the combination of a casing provided with a piston chamber; a revoluble piston therein provided with a plurality of peripheral pockets; a movable abutment in said casing adapted to coöperate with the periphery of said piston; a member mounted in said piston member provided with shoulders to limit its outward movement and a projection extending beyond the bottom face of each of said pockets; springs forcing said member outwardly; a spring-pressed yielding member mounted in the bottom of each pocket of said piston to minimize the force of impact of said abutment; means for admitting motive force to said piston chamber; and means for exhausting therefrom.

4. In a rotary engine, the combination of a casing provided with a piston chamber; a revoluble piston therein provided with a plurality of peripheral pockets extending from side to side thereof; a packing member in front of each pocket extending against the inner face of said piston chamber; means for admitting motive force to said piston chamber; and means for exhausting therefrom.

5. In a rotary engine, the combination of a casing provided with a piston chamber; a revoluble piston therein provided with a plurality of peripheral pockets; a yielding packing member in front of each pocket extending against the inner face of said piston chamber; springs forcing said member into contact with the inner face of said piston chamber; means for regulating the tension of said springs; means for admitting motive force to said piston chamber; and means for exhausting therefrom.

6. In a rotary engine, the combination of a casing provided with a piston chamber; a revoluble piston therein provided with a plurality of peripheral pockets; a pivoted packing member in front of each pocket extending from side to side thereof; springs forcing said member into contact with the inner face of said piston chamber; means for regulating the tension of said springs; means for admitting motive force to said piston chamber; and means for exhausting therefrom.

7. In a rotary engine, the combination of a casing provided with a piston chamber; a revoluble piston therein provided with a plurality of peripheral pockets; a pivoted packing member in front of each pocket; springs forcing said member into contact with the inner face of said piston chamber; means for regulating the tension of said springs; means for admitting motive force to said piston chamber; and means for exhausting therefrom.

8. In a rotary engine, the combination of a casing provided with a piston chamber and an expansion chamber communicating therewith; a revoluble piston therein provided with a plurality of peripheral pockets; a pivoted member on the periphery of said piston; springs for forcing said member outward; and a yielding member on said casing for receiving the shock of impact.

Signed by us at Boston, Mass., this 19th day of October, 1906.

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FRANK J. E. NELSON, Jr.

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