G. BOURET.

ROTARY INTERNAL COMBUSTION ENGINE.

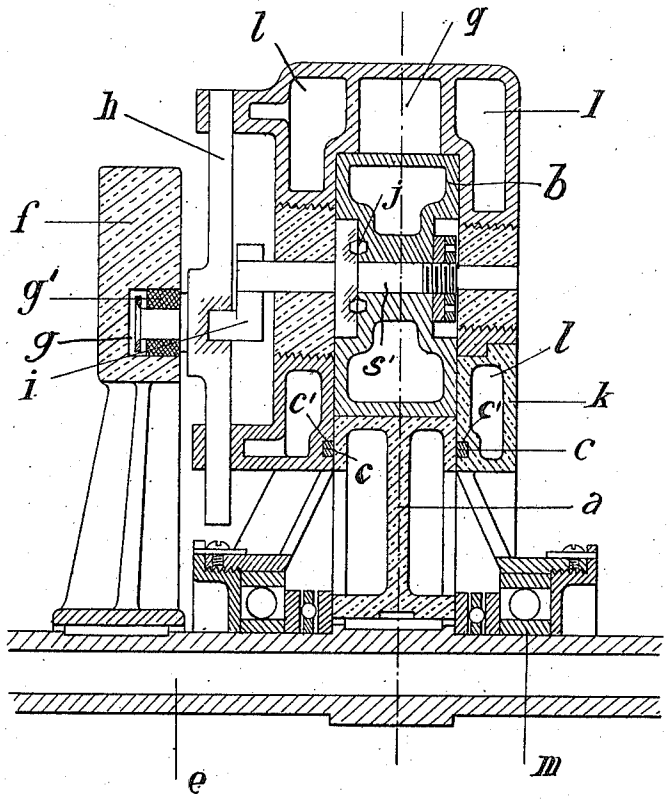
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1,093,309.

Patented Apr. 14, 1914.

2 SHEETS—SHEET 1.

Fig. 1.



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Inventor:
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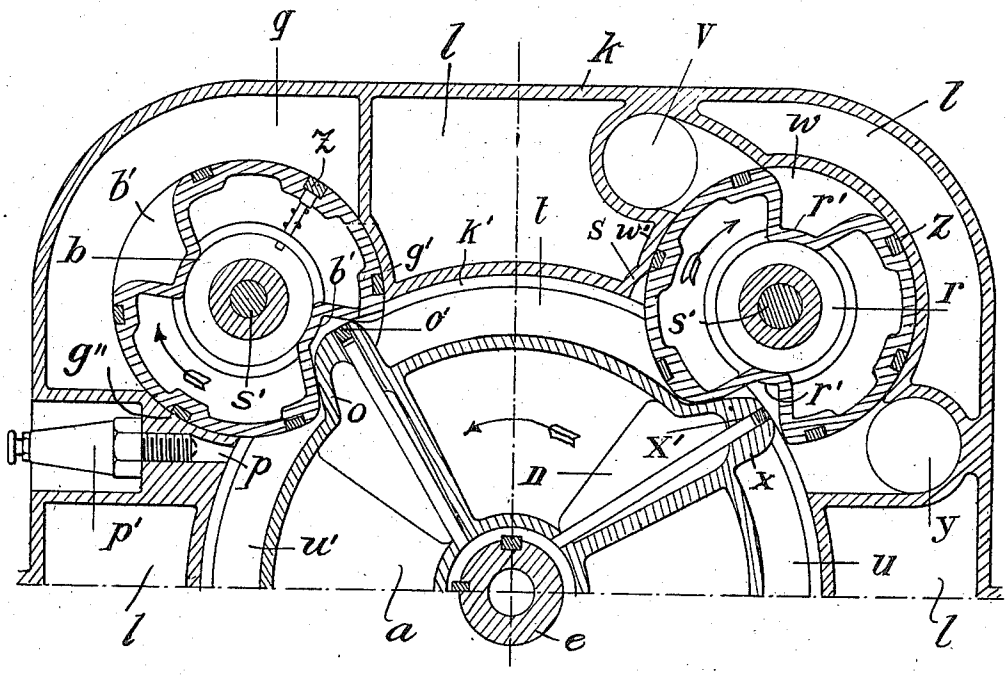
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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

GUILLAUME BOURET, OF PARIS, FRANCE.

ROTARY INTERNAL-COMBUSTION ENGINE.

1,093,309. Specification of Letters Patent. Patented Apr. 14, 1914.

Application filed February 12, 1912. Serial No. 677,101.

To all whom it may concern:

Be it known that I, GUILLAUME BOURET, a citizen of the Republic of France, residing at 18 Rue Pierre-Levée, Paris, in the Republic of France, have invented certain new and useful Improvements in Rotary Internal-Combustion Engines, of which the following is a specification.

My present invention relates to rotary internal combustion engines, in which the fly wheel may be directly connected to the shaft supporting the rotor receiving the impulses of the explosion.

The principal object of my invention is to provide an equally balanced engine, simple in construction, efficient in action and inexpensive to manufacture.

Further objects of my invention are to avoid the use of reciprocating valves and spring actuated members; to provide a compact structure; to provide an engine with an inlet stroke interior to the expansion stroke, so that the waste products of combustion escape only after the maximum power of the explosion has been utilized; and, to provide a high speed engine with smooth and silent running qualities.

Other objects of my invention will appear in the specification, in connection with the accompanying drawings, forming a part thereof, in which:

Figure 1 is a central section through the engine at a plane coincident to the axis of the main shaft thereof, and passing through one of the drum valves, only that portion of the mechanism above the said axis being shown, it being understood that the mechanism is duplicated below the horizontal plane coincident with said axis. Fig. 2 is a view similar to Fig. 1, but in a plane at right angles to the axis of the main drive shaft of the engine.

In the drawings, where similar characters refer to similar parts in both views, *e* designates the main drive shaft which has keyed thereto, in any suitable manner, a disk rotor *a*, and fly wheel *f*, the shaft being supported by a casing *k*. It is desirable that the bearings between the shaft *e* and casing *k* include ball bearings *m* to facilitate rotation of the shaft, such balls being confined to a predetermined path of movement in any suitable manner, preferably so that the position of the rotor may be adjusted with respect to the casing *k* into an annular cavity *k'* of which, its periphery extends. Packing segments *c* are carried by annular grooves *c'* in the casing *k* and said segments contact closely with the sides of the rotor *a* adjacent its periphery, to render the cavity *k'* fluid tight, as desired, at this portion of the engine.

With particular reference to Fig. 2 of the drawing, it will be noted that the rotor *a* is provided with a plurality of peripheral teeth *o* and *x* provided with yieldable packings *o'* and *x'*, respectively, set in the crowns of said teeth, to contact with the inner wall of said cavity *k'* during rotation of the rotor with respect to the casing *k*. An inlet port drum valve *r* is carried within a cavity *w* in said casing, open to the cavity *k'* and is provided with peripheral recesses *r'* adapted to accommodate any of the teeth of the rotor *a*, and also to peripherally contact with the rotor to divide the cavity *k'* into conduits *t* and *u*. This valve *r* contacts with a curved wall *w'* of said cavity *w*, said wall *w'* being intermediate an inlet port *v* for combustible fluid and the cavity *k'* of the rotor casing. A by-pass *s* is provided in said walls *w* so that the relative curved linear dimension of the wall with respect to the peripheral openings of either recesses *r'* is such that the valve *r*, in rotating, at predetermined periods provides a communication between the port *v* and cavity *k'*. An outlet port *y* in communication with cavity *k* at the opposite side of valve *r* from inlet port *v* is open to the conduit *u* provided by the teeth of the roller and the contact of the valve with the periphery of the rotor.

Spaced apart from cavity *w* is a second cavity *q* adapted to accommodate a compression control drum valve *b*, substantially like valve *r*, in that it is provided with peripheral recesses *b'* adapted to accommodate any of the teeth of the rotor, and to peripherally contact with said rotor to divide the cavity *k'* into conduits *t* and *u'*. The valve *b* peripherally contacts with wall portions *q'* and *q''* of the cavity *q*, the curved linear dimension of said walls *q'* and *q''* being such that cavity *b'* at predetermined periods provides communication between the conduits *t* and the cavity *q* and the cavity *q* and the conduit *u'*. To provide a fluid tight contact between the periphery of the valves and the several elements they contact with, I may find it desirable to provide yieldable packing strips *z* disposed crosswise the periphery of the valves and

carried thereby. A port p in casing k communicates with the conduit u' and the end of a spark plug p' adapted to ignite the charge introduced into said conduit u'. The rotor and valves rotate in the directions indicated by arrows, and it will be noted that the recesses b' of the valve b pass the conduit u' in advance of the port p.

The valves b and r are mounted upon shafts s', the shafts, as indicated in Fig. 1 of the drawing, carrying a crank i operatively connected to a reciprocable and oscillatable member h. The fly wheel f is provided with a cam groove g into which a rotor g' carried by member k rides. By this construction, the drum valves are driven at a positive ratio with respect to the rotor a, that is, so that the teeth of the rotor are successively accommodated by alternate recesses of the valves. The disposition of parts are such that member h is carried over its dead centers, by the engagement of the rotor teeth with the recesses of its respective valve, so that there is positive movement provided for throughout the working of the engine. To facilitate assemblage of the valves, in place, they may be keyed to their respective shafts s' as indicated at j and such cavities l, of the casing k may be utilized for cooling the engine by the introduction of fluid thereinto, in the well known manner. It is to be noted that the rotor a carries vanes n extending laterally of the rotor in the space comprehended by the outer edges of the cavity k', these vanes facilitating cooling of the engine when working.

The operation of the engine is as follows: Assuming that the relative disposition of parts are such as shown in Fig. 2 of the drawing, upon rotation of the rotor a as soon as tooth x has passed by-pass s, the recess r' in valve r forms communication with cavity k' and inlet port v, the periphery of the valve r contacting with the periphery of the rotors preventing egress of the combustible fluid to the outlet port y, a charge is drawn within conduit t. As the rotor moves on in the direction indicated by the arrow, the tooth x approaches the valve b, the recess b' of the valve forms a communication with cavity q and conduit t, past walls q' and the charge from conduit t enters compression cavity q. The tooth x becomes accommodated by the said recess b' after passage of the fluid past wall g' and continued rotation of the parts permits the same recess b' to afford communication past wall q'' between compression cavity q and the conduit q', as soon as the tooth x has passed the port p communicating with the spark plug. The charge is thus drawn into conduit u', inasmuch as the periphery of the valve b contacts with the periphery of rotor a, preventing egress of fluid to the conduit t. Any time after the recess b' closes communication between cavity q and conduit u' the spark may be emitted and the charge exploded, the impact of which impinges the tooth x forcing the rotor in the direction indicated by the arrow. It is to be understood that an outlet port similar to that designated at y is in communication with the conduit u' beyond port p affording egress of the waste products of combustion when the said tooth x passes such port, and becomes accommodated by a recess in a valve h identical to that indicated by r, and disposed diametrically opposite said valve with respect to the rotor. When the engine is working properly, explosions occur simultaneously in conduits u and u', or any number of pairs of coacting inlets and charge drum valves may be provided and a corresponding number of teeth provided on the rotor to coöperate with said valves, to successively or simultaneously act to impart movement to the rotor.

I claim:

In a rotary internal combustion engine, the combination of a casing provided with a rotor cavity, cavities for accommodating an inlet port drum valve and a compression controlled drum valve, a rotary disk mounted on a concentric shaft and provided with teeth forming pistons dividing said rotor cavity into conduits, rotary valves provided with a plurality of peripheral cavities and segments, said valve cavities being equal in number to the number of teeth for regulating the admission of the explosive mixture, cranks keyed to the axles of the rotary valves for actuating said valves at a positive ratio for movement of said rotary disk to position said cavities of said valves in operative relation to the teeth of said rotary disk, a fly-wheel, and cam-driven rollers within cam grooves of said fly-wheel for controlling said cranks, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GUILLAUME BOURET.

Witnesses:
VICTOR PRÉVOST,
H. C. COXE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."