

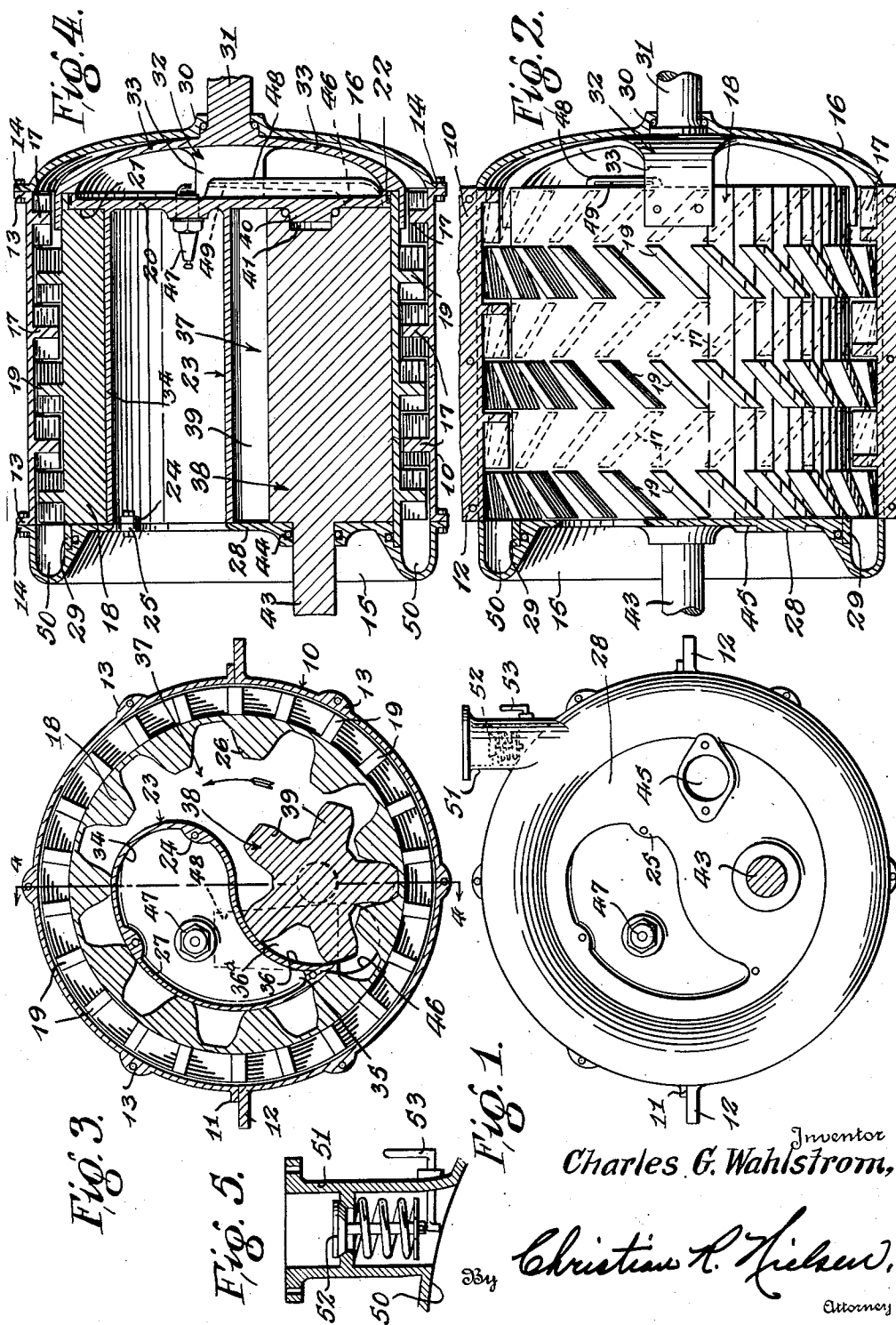
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ROTARY TURBINE MOTOR

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ROTARY TURBINE MOTOR

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5 Claims. (Cl. 60—41)

My invention relates to rotary internal combustion motors of the turbine type and it consists in the constructions, arrangements and combinations herein described and claimed.

5 It is an object of the invention to provide a turbine motor employing a minimum number of moving parts and in which a single valve is employed.

10 It is a further object of the invention to provide a motor of compact and rigid construction wherein a compressor member of a gear type is mounted interiorly of a gear type rotor for compressing and expelling gases to the point of ignition.

15 A still further object of the invention is to provide a jet for atomizing the gases prior to its ignition.

20 Additional objects, advantages and features of invention will be apparent from the following description and accompanying drawing forming a part of this application, wherein,

Figure 1 is an end elevation of a motor constructed in accordance with my invention,

Fig. 2 is a horizontal sectional view illustrating the rotor in elevation,

25 Fig. 3 is a vertical sectional view of the motor,

Fig. 4 is a sectional view on the line 4—4 of Fig. 3,

Fig. 5 is a detail sectional view of the control valve for exhaust gases.

30 In carrying out my invention, I employ a cylindrical casing 10 formed in two half sections, suitably flanged as at 11 and 12, for securing the sections together, and if found necessary any suitable packing may be installed between the abutting flange faces, in order to secure a gas-tight connection. The flange 12 in the present instance, is employed for mounting of the engine, and therefore is shown somewhat larger, extending beyond the flanges 11.

40 The sections defining the casing 10 are provided with radially projected ears 13, mating with similar ears 14 formed upon the head members 15 and 16. Thus, the head members 15 and 16 may be bolted to the cylindrical casing in a gas-tight manner which may be effected by providing machined contact faces or by the use of suitable gaskets, as desired.

50 The casing 10 may be of any desired length and in the present instance, I have illustrated the casing as of a length to house three sets of vanes 17, formed integrally with the casing, suitably spaced circumferentially therearound. The vanes project radially inward toward the center of the casing, and it will be noted that the vanes are disposed at an angle, as clearly shown in

dotted lines in Fig. 2, which act to divert exploded gases and effect rotation of the rotor as will be more readily understood as the description proceeds.

5 Within the casing 10, I mount a rotor 18 provided upon its exterior surface with radially projected and angularly disposed vanes 19, the angle of these vanes being opposite to that of the vanes 17, as may be readily seen from a consideration of Fig. 2. Three sets of vanes 19 are 10 arranged circumferentially around the rotor and occupy the space between the sets of vanes 17 and by the arrangement presented exploded gases will be shunted from one set of vanes to the next adjacent set of vanes until all useful 15 power has been absorbed from the gases when they will be allowed to exit from the casing. The rotor 18 is, of course, rotatably mounted within the casing and this is carried out by the provision of a cylindrical head 20 seated within 20 a rabbeted portion 21 formed in the adjacent end of the rotor 18, and as shown suitable packing means 22 may be employed between the head and rotor. The head 20 includes an eccentrically mounted hub member 23 formed integrally 25 therewith, open at its opposite end and of a length to stop flush with the end of the rotor. The open end of the hub has formed thereadjacent ears 24 adapted to register with ears 25 30 formed on the head 15 and it will therefore be apparent that the head 15 and hub 23 may be drawn together to effect a gas-tight connection.

The rotor 18 has formed upon its inner periphery gear teeth 26 which extend circumferentially therearound and from one end of the rotor 35 to the other, and during rotation of the rotor, the crown portions of the teeth 26 will have a contact bearing upon the wall 27 of the hub 23, but such contacting relation in no manner serving to support the rotor, since such support is accomplished by the plate 28 of the head 15, which is suitably rabbeted to receive the cylindrical portion 29 of the rotor.

40 The head 16 is substantially semi-spherical in shape and centrally thereof I provide a bearing 30 through which there is anti-frictionally mounted a shaft 31 having a spider 32 positioned within the head, the legs 33 of which are riveted, brazed or welded to the rotor, as clearly apparent from a consideration of Figs. 2 and 4. From the foregoing, it will be understood that the casing 50 10 and hub 23 remain stationary, while the rotor may be freely revolved.

As has been previously stated, the hub 23 is eccentrically positioned within the rotor and as 55

shown, the wall 27 thereof is concentric with the gear teeth 26 for a substantial distance whence it is bent gradually to define an enlarged portion 34, finally merging with itself in a reduced portion 35, but intermediate the enlarged portion 34 and the reduced portion 35, the wall 27 has formed therein a semi-circular recess 36, for a purpose which will presently appear. The hub 23 occupies approximately one-half of the interior area defined by the gear 26 providing a combined intake and compression chamber 37. A compressor 38 is rotatably mounted within the chamber 37, in the present instance, the compressor being illustrated as a gear having teeth 39 so shaped as to mesh with the teeth 26 of the rotor 18.

Attention is invited particularly to Fig. 4 wherein it is clearly shown that the compressor 38 is of a length to extend into snug contacting relation with the head 20 and the plate 28, the head 20 having a stud bearing shaft 40 journaled in the recess 41 of the compressor and in order to reduce friction to a minimum, suitable ball bearings 42 are installed between the shaft and recess. The opposite end of the compressor terminates in a shaft 43 which is anti-frictionally mounted in a bearing 44 formed in the plate 28. The shaft 43 projects beyond the head 15 a suitable distance and may be provided with means for manually or mechanically rotating the compressor for initial starting of the motor.

It will be noted that the compressor 38 is so journaled as to lie within the recess 36 of the hub 23, the crowns of the teeth 39 snugly abutting the wall of the recess. Thus, the space between those teeth abreast of the recess 36 defines a closed pocket as at 36a within which a combustible gas may be enclosed for compression, as will be described.

An intake port 45, with which a conventional carburetor may be installed, is formed in the plate 28, the port opening upon the chamber 37, and an outlet port 46 is formed in the head plate 20. The port 46 is positioned at a point immediately below the reduced portion 35 of the hub and in line with a pair of teeth on the compressor and rotor about to become intermeshed, so that gases carried around between the teeth on the compressor and the wall defining the recess 36 will be compressed longitudinally by action of the intermeshed teeth forcing the gases toward and through the outlet port 46, where the gases are conducted to a spark plug 47 by means of an atomizing jet 48 formed in the head plate 20. The jet 48 has an opening 49 of tapering formation, the most restricted portion thereof being adjacent the spark plug, so that a fine gas mist will be expelled at the firing point.

In order to accommodate the exhaust gases, the head 15 has formed therein a circumferential passage 50 opening upon the casing 10 and of a width to overlie the space between the inner periphery of the casing and the outer periphery of the rotor which is the portion of the motor traversed by the exploded gases. An exhaust outlet nipple 51 is in communication with the passage 50 and within the nipple there is a spring seated valve 52. The valve 52 remains normally in seated engagement with its seat but operable to open position upon development of a predetermined pressure developed by the exhaust gases. However, the valve may be manually regulated to vary the setting thereof, by means of a cam lever 53 operable upon the stem of the valve. By manipulating the valve 52 the speed of the rotor may be controlled, i. e., with the valve 52 closed the back

pressure of the gases on the vanes 17—19 will tend to retard rotation of the rotor with consequent retardation of the compressor 38, reducing the charge of motive fluid supplied to the combustion chamber, and with opening of the valve, the pressure being reduced, the speed of the rotor and compressor will be correspondingly increased.

The operation will be substantially as follows:

The compressor 38 is rotated through the shaft 43 causing the rotor 18 to be revolved in the direction indicated by the arrow in Fig. 3, by virtue of the intermeshing of the teeth 26 and 39. Such intermeshing of the teeth will cause a suction of carbureted gas through the intake 45 into the chamber 37. The gas thus drawn into this chamber will be trapped in the pocket 36a and will be compressed as soon as mating teeth of the rotor and compressor are intermeshed, forcing the gas longitudinally along the pockets defined by intermeshed teeth and through the jet 48 in a fine gaseous mist to be ignited by the spark plug 47. The exploding of the charge takes place in the head 16 completely filling the same and passing evenly to the first stage of vanes 17. The gases will traverse the angularly disposed vanes 17 until they encounter the vanes 19 of the rotor which are set at an angle opposite to the first mentioned vanes, thereby reversing direction of flow of the gases. This action is followed throughout the several stages of the vanes until the gases are spent and permitted to exhaust into the port 50.

It should be understood that when the firing of the gaseous charge occurs, a slight back pressure in the jet 48 occurs due to expansion of the gases in the head 16, tending to slightly retard the gaseous mixture discharged therefrom and by such action, a more highly compressing action of the gases is obtained.

I claim:

1. In a rotary turbine motor, a casing, a gear rotor revolvably mounted therein, a gear compressor revolvably mounted within said rotor and having teeth in mesh with the teeth of the gear rotor, an intake port opening upon a pair of partly intermeshed gear teeth and receiving the motive fluid therebetween, an atomizing nozzle receiving the compressed motive fluid from intermeshed teeth of the gears, the casing and rotor having means at one end for receiving the compressed motive fluid, vane means on the rotor and casing in communication with the last named means and receiving the impact of the motive fluid and valve means for controlling the exhaust of the motive fluid from the vanes of the rotor and casing.

2. In a rotary turbine motor, a casing, a hollow rotor revolvably mounted in the casing, the rotor having gear teeth internally thereof and extending the length of the rotor, vane members formed on the interior of the casing arranged in circumferential rows, vane members carried by said rotor arranged in circumferential rows, the vane members of the rotor occupying the spaces between the rows of vane members of the casing, a toothed gear member revolvably mounted within the rotor, the teeth thereof being in mesh with the teeth of the rotor throughout its length, an intake port at one end of the casing and opening upon the interior of the rotor, means within said rotor for trapping motive fluid between pairs of teeth of the gear member for compressing action upon intermeshing of the teeth of the rotor and gear member, an atomizing nozzle receiving the motive fluid from

the intermeshed teeth, a head member on the casing in communication with the vanes and means for controlling the passage of motive fluid around the vanes.

- 5 3. In a rotary turbine motor, a casing having a combustion chamber and an exhaust chamber at respective ends thereof, a hollow rotor rev-
 10 olubly mounted in the casing, and extending the length of the casing, the rotor having internal gear teeth, a fixed hub member within the rotor,
 15 the hub having a semi-circular recess, a gear member revolubly mounted within the rotor and recess and extending throughout the length of
 20 the rotor, teeth of the gear being adapted to mesh with the teeth of the rotor, an intake port at one end of the casing opening upon the in-
 25 terior of the rotor whereby upon rotation of the rotor a gaseous charge will be drawn there-into, an atomizing nozzle aligned with inter-
 30 meshed teeth of the rotor and gear member and discharging into the combustion chamber, igniting means in the combustion chamber, vane members formed on the interior of the casing arranged in circumferential rows, vane mem-
 bers formed on said rotor arranged in circumferential rows, the vane members of the rotor occupying the spaces between the rows of vane members of the casing, the combustion chamber having communication with said vanes at one
 end of the casing, the exhaust chamber being in

communication with said vanes at the opposite end of the casing, and manually operated valve means associated with the exhaust chamber for controlling discharge of exhaust gases.

4. In a rotary motor, a casing having a com- 5 bustion chamber, a rotor revolubly mounted in the casing, said rotor having internal gear teeth, a toothed compressor member within the rotor and in mesh with the teeth of the rotor, the cas-
 10 ing and rotor having means for admitting an im- pelling fluid between inter-engaged teeth of the rotor and compressor for compressing and forc-
 15 ing the impelling fluid into the combustion chamber, means in the combustion chamber for igniting the compressed charge and vane means 15
 on the rotor and casing receiving the impact of the exploded charge.

5. In a rotary motor, a casing, a hollow rotor revolubly mounted therein, a rotary compressor member within the rotor in driving contact with 20 the inner circumference thereof and rotated upon rotation of the rotor, means within the rotor interposed between the compressor member and rotor defining a pocket, an intake port open-
 25 ing upon the pocket, an atomizing nozzle asso- ciated with the pocket, igniting means adjacent 25
 the nozzle, and said casing and rotor having vane members receiving the impact of an ignited charge.

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