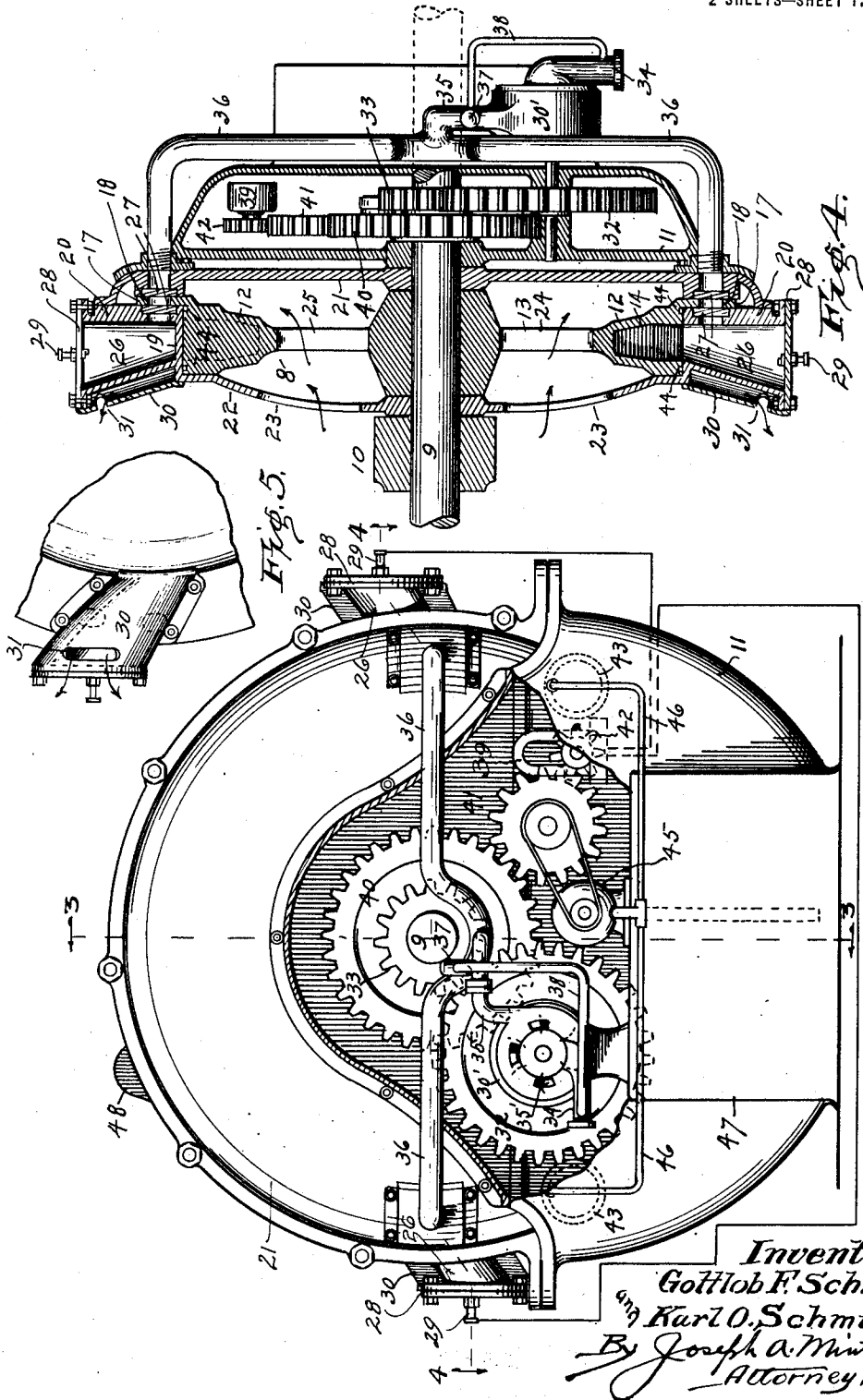


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TURBINE GAS ENGINE.
APPLICATION FILED OCT 30, 1919.

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Patented May 18, 1920.

2 SHEETS—SHEET 1.



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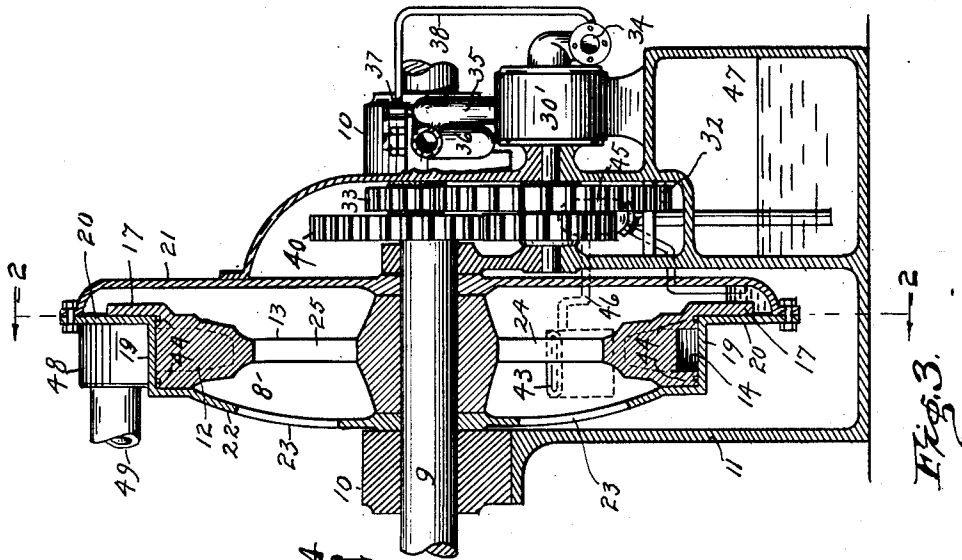


Fig. 3.

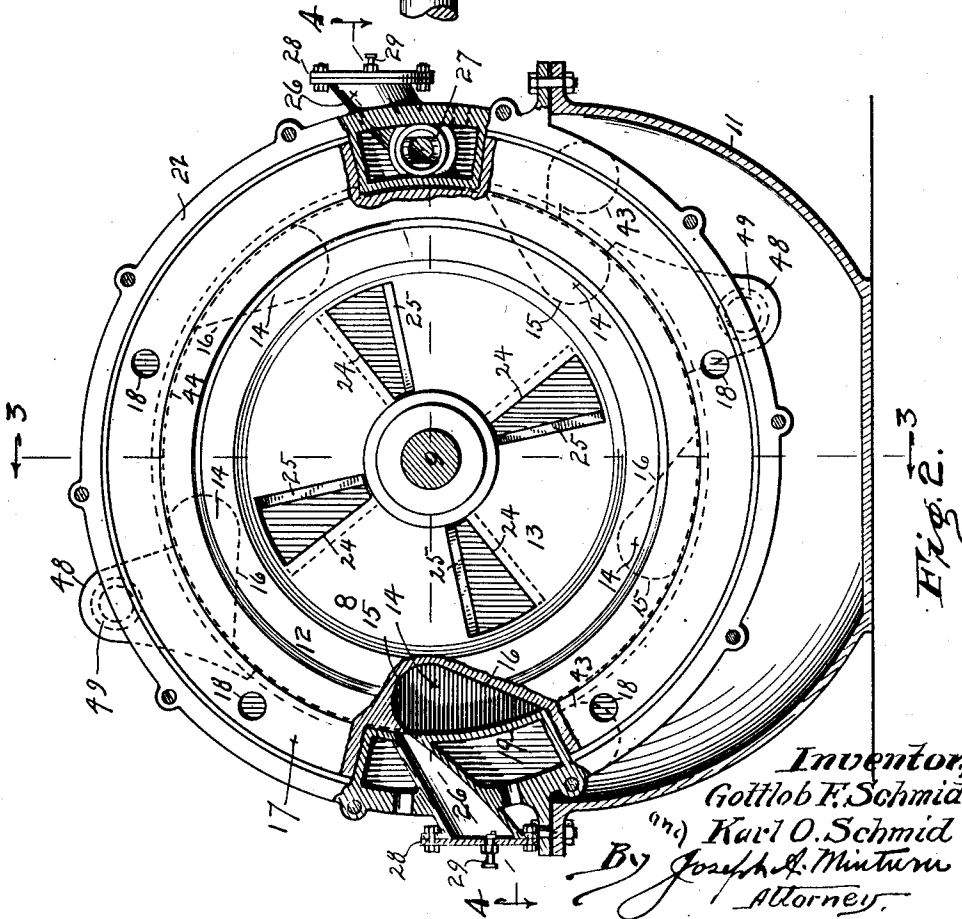


Fig. 2.

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UNITED STATES PATENT OFFICE.

GOTTLÖB F. SCHMID AND KARL O. SCHMID, OF INDIANAPOLIS, INDIANA.

TURBINE GAS-ENGINE.

1,340,563.

Specification of Letters Patent.

Patented May 18, 1920.

Application filed October 30, 1919. Serial No. 334,590.

To all whom it may concern:

Be it known that we, GOTTLÖB F. SCHMID and KARL O. SCHMID, citizens of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Turbine Gas-Engine, of which the following is the specification.

In reciprocating-piston gas-engines the driving impulse is exerted only every fourth stroke, the three other strokes being consumed in cleaning out the cylinder, drawing in a fresh mixture of air and gas, and in compressing the latter before explosion. Moreover, the change in direction of travel of the piston results in lost inertia and causes a pounding strain on the mechanism which is damaging.

The object of this invention is to provide a rotating head which moves in one direction continuously, and is driven by gas explosions at alternate diametrically opposite sides of the head so as to apply the driving impulses in rapid succession, but with maximum cooling intervals in the respective explosion chambers, to prevent disintegration of those parts by the action of the great heat to which they are subjected.

Another object is so to construct and house the rotary head that it will draw the air in and discharge it after the manner of a rotary blower, and cool the walls of the explosion chambers by constantly bathing them with a current of outside air of a much lower temperature.

A further object is to form the parts so they will be easy to construct and assemble, and so they will be readily accessible afterward for cleaning, adjustments and repairs, and the object is to provide for the thorough lubrication of the rotary head.

We accomplish all of the above, and other objects which will hereinafter appear, by the mechanism illustrated in the accompanying drawings, in which—

Figure 1, is a view in side elevation of our assembled invention, a part of the housing being broken away to show the driving gears inside. Fig. 2, is a vertical section at right angles to the main driving shaft, on the line 2—2 of Fig. 3. Fig. 3, is a vertical section on the line 3—3 of Figs. 1 and 2. Fig. 4, is a horizontal section on the line 4—4, of Figs. 1 and 2. Fig. 5, is a detail in side elevation of one of the explosion chambers and its housing.

The rotary head 8, is mounted on a main drive-shaft 9, which shaft is mounted in suitable journals 10, of usual construction, which, in turn, are supported by a base 11, within which there is a chamber with tight sides and bottom within which the head 8, and a more immediate housing for said head, are suspended.

The rotary head 8 comprises a hub mounted in a fixed manner on shaft 9, a rim 12, and a web 13, connecting the hub and rim. Formed equi-distant from each other in the rim are five expansion pockets 14, into which expanding gas from exploded gas mixtures in appropriately located explosion chambers, is admitted at predetermined positions of the head. The walls 15, of the pockets present surfaces toward the direction of travel of the head which are adapted to convert the expansive force of the gas into rotary energy against the head, a concave shape being here shown, which is approached by a plane surface 16, in a chord of the peripheral circle of the head.

The rim 12 is also provided with an integral radial flange 17, having a port 18, between each pair of adjacent pockets 14. This flange shuts off the supply of gas to the explosion chambers except at proper positions when admission of gas is provided for by a suitably located port of the rotating flange coming into register with a port of a stationary explosion chamber.

The periphery of the rotary head 8, makes a close running fit in an annular band 19, of a fixed housing comprising also a radial flange 20, having a close running fit against the flange 17 of the head. The flange 20 is bolted to a removable disk 21, which closes that side of a housing for the rotary head. A web 22, on the other side of the head, is integral with the band 19. The web 22 has a series of openings 23, for the admission of air to the interior of the housing for the purpose of air-cooling the metal of the rotary head surrounding its expansion pockets 14. A positive air-current is insured by the formation of openings in the web 13, each having similarly oblique radial edges 24, 25, which act as vanes, on the principle of a blower to draw in the air and discharge it when the head is rotated.

The explosion chambers 26, here shown as two in number, are located diametrically opposite each other in the angle between the casing-members 19 and 20, and are pref-

erably cast integrally with said casing. They are funnel-shaped—tapering toward the rotary head—and they discharge through suitable openings in the annular band 19, into one of the expansion pockets 14, as the latter are successively brought into position opposite an open end of one of said explosion chambers 26. By providing an odd number of equally spaced expansion chambers with a port 18 between each, and two explosion chambers at opposite sides of the engine, all as here shown, the driving impulses will be exerted on the rotary head at alternate diametrically opposite intervals; and a maximum cooling time will be afforded to the parts which are heated as an accompanying result of the explosions.

By placing the ports in flange 17 of the rotating head proper timing is secured; and leakage between the flange and adjacent gas-passages is prevented by forming annular sockets in the side members bearing said passages, in which are close-fitting split spring-metal packing-rings 27, 27, (see Figs. 2 and 4) which bear against said flange 17.

The explosion chambers 26 are closed at their outer ends by removable heads 28, which support sparking-plugs 29, of usual construction; and, to insure the maximum obtainable air-cooling efficiency we surround the major portion of said chamber 26 with a casing 30, having entrance ports from the main housing and discharge ports 31 near their outer ends.

To supplement the ordinary carbureter, or as a substitute in some instances, we provide a fan, in housing 30' of usual construction, which is driven by spur gears 32 and 33, from shaft 9. Gas enters the housing through pipe 34 and is discharged through pipe 35 into manifold 36. The latter has two branches each leading to a respective explosion chamber 26, on each side of the engine. A damper 35' affords means for regulating the supply of air to the housing 30.

A pop-valve 37 takes from the pipe 25 and has a pipe 38 to return the excess gas mixture to the pipe 34 so none will be wasted.

A magneto 39, operated by gears 40, 41 and 42, from shaft 9, is wired in the usual manner to the spark-plugs 29. The magneto has the usual timing device (not shown) for furnishing the required spark at the right time and place.

Oil cups 43, are provided in suitable proximity to the rotary head 8. These have oil-saturated wicks which wipe the periphery of the head, and the lubricant thus deposited is carried and distributed by the rotating head. This periphery has annular channels 44, in which the surplus oil is drained and deposited by gravity in the lower

part of the housing for the rotary head, as shown in Fig. 3. From there it is taken by a pump 45. The pump is driven from the arbor of gear wheel 41, by a belt as shown in Fig. 1. The pump returns the oil to the cups 43, through pipes 46, and any additional quantity needed is taken from an oil tank 47. The journals for shaft 9, and other shafts and rubbing parts are accessible and may be lubricated in any usual and suitable manner.

The exhaust is to chambers 48, 48, on diametrically opposite sides of the rotary head 8, when the respective charged heads reach them, and the spent gas is taken thence through suitable pipes 49 to a muffler (not shown) or wherever desired.

In the operation of our engine the hydrocarbon mixture is in the branches of the manifold pipe ready to charge one of the explosion chambers when one of the ports in the rotary flange registers and provides the required opening. Then the supply is cut off by the travel of the flange and the charge in the explosion chamber is fired just as the next expansion chamber reaches the opening in the small end of the explosion chamber. The expanding gas enters the expansion chamber as the latter moves on and a further rotation of the head brings the expansion chamber opposite the exhaust chamber where the spent gas escapes.

We have shown and described the construction embodying the principles of our invention now thought to be the best for the purpose intended, but we do not limit ourselves to such construction; on the contrary we hold ourselves at liberty to make such changes as fairly fall within the scope of our invention, and therefore claim as our invention:

1. In an internal combustion engine, a rotatable member having a plurality of expansion chambers, relatively stationary explosion chambers, means comprising a flange on the rotatable member with ports to supply a hydrocarbon mixture to the explosion chambers, means to explode the mixture, means for discharging the expanding product into the expansion chambers, and means for discharging the spent product.

2. In an internal combustion engine, a rotatable member having a plurality of peripheral cavities and a radial flange with a port opening between each peripheral cavity, a stationary member having an annular band in which the periphery of said rotatable member makes a close running fit, said stationary member also having a fixed radial flange making a close running fit against the flange of the rotatable member, one or more explosion chambers fixed in the angle between the annular band and its flange, each chamber having an inlet opening through its adjacent flange adapted to register with suc-

cessive port-openings of the rotatable flange and said explosion chambers each having an outlet opening through the annular band of the stationary member whereby communication is established between an explosion chamber and a peripheral cavity when one of said cavities is brought opposite the outlet opening of that chamber by the movement of the rotatable member, means for supplying a hydrocarbon mixture to an explosion chamber when the openings in the two flanges register, and means for exploding the mixture.

3. In an internal combustion engine, a rotatable member having a plurality of peripheral cavities and an adjacent radial flange, said flange having a transverse port-opening between each two of said cavities, a fixed explosion chamber having an inlet port closed by said flange except when in registration with a port of the flange and having an outlet opening closed by the rotatable member except when in register with one of the peripheral cavities of said rotatable member, a manifold pipe supplying a hydrocarbon mixture and closed by the rotatable flange except when its opening is in register with a port of the flange, and means for exploding a mixture in the explosion chamber.

4. In an internal combustion engine, a rotatable flange having a plurality of port-openings, an explosion chamber having an inlet port closed by the flange except when in register with a port of the flange, a manifold pipe supplying a hydrocarbon mixture and closed by the rotatable flange except when its opening is in register with a port of the flange, and packing between the flange and explosion chamber and between the flange and manifold pipe to prevent hydrocarbon leakage.

5. In an internal combustion engine, a rotatable member having peripheral cavities forming explosion chambers and having an adjacent peripheral flange with transverse ports between said cavities, a fixed member having an annular band and a radial flange

both making close running fit with the periphery and flange of the rotatable head, respectively, and means for automatically lubricating the rubbing parts.

6. In an internal combustion engine, a rotatable member having peripheral cavities forming expansion chambers, fixed explosion chambers, means for creating air currents by the rotation of the rotatable member and means for subjecting said chambers to the cooling action of the air currents.

7. A rotary member for internal combustion engines having peripheral cavities forming explosion chambers and a peripheral flange with transverse ports between the cavities in combination with a fixed member having expansion chambers discharging into the cavities of the rotary member as the cavities come opposite, and means for supplying a hydrocarbon element to the expansion chambers through the ports in the peripheral flange.

8. A rotary member for internal combustion engines having peripheral cavities forming explosion chambers, annular peripheral oil-runs, and a peripheral flange with transverse ports between the cavities in combination with a fixed member having expansion chambers discharging into the cavities of the rotary member as the cavities come opposite, and means for supplying a hydrocarbon element to the expansion chambers through the ports in the peripheral flange.

9. A fixed member for internal combustion engines having one or more explosion chambers and one or more exhaust outlets, in combination with a rotary member having peripheral cavities which are successively brought into communication with said explosion chambers, and a flange with transverse ports between said cavities through which a hydrocarbon element is supplied to said explosion chambers.

In witness whereof we have hereunto set our hands at Indianapolis, Indiana, this 25th day of October, 1919.

GOTTLOB F. SCHMID.
KARL O. SCHMID.