J. H. BAIR.

ROTARY INTERNAL COMBUSTION ENGINE.

APPLICATION FILED DEC. 27, 1918.

1,331,478.

Patented Feb. 24, 1920.

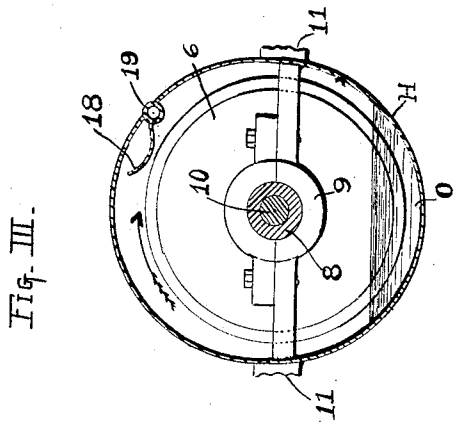


Fig. III.

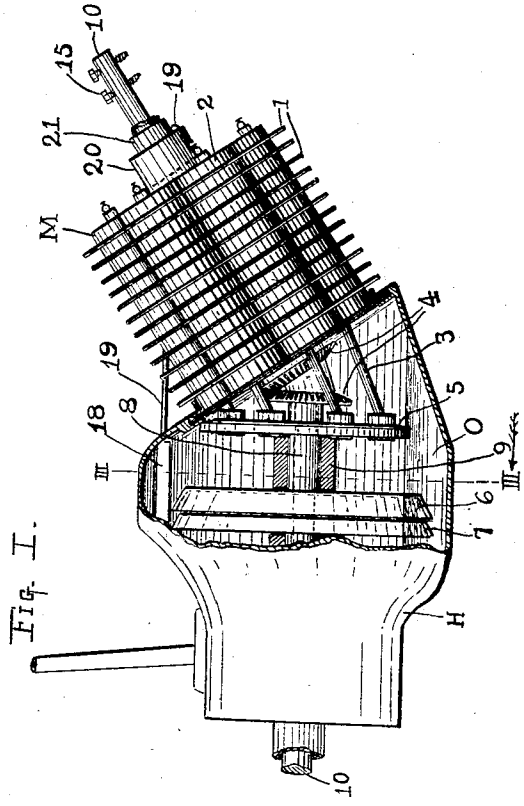


Fig. I.

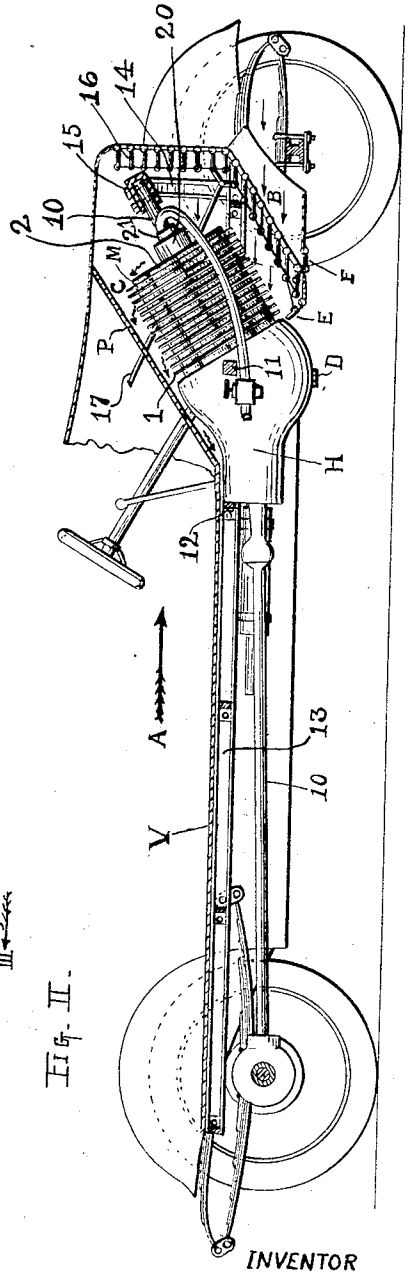


Fig. II.

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ROTARY INTERNAL-COMBUSTION ENGINE.

1,331,478. Specification of Letters Patent. Patented Feb. 24, 1920.

Application filed December 27, 1918. Serial No. 268,507.

To all whom it may concern:

Be it known that I, JOSEPH H. BAIR, a citizen of the United States, and residing in Haddonfield, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Rotary Internal-Combustion Engines, of which the following is a specification.

My invention relates to rotary gasolene engines of the type having the cylinders parallel with the axis of rotation and placed obliquely to the driven shaft. The invention pertains to an engine of this character placed in an up-tilted, oblique position, and the driven shaft, constituting the transmission, in a horizontal one in relation to the conveyance for which it is made to furnish motive power.

The primary object of the invention is to provide this arrangement in the conveyance whereby the engine is oiled and cooled without elaborate accessory mechanism for oiling and cooling, and the extravagant loss of oil and power. By installing this engine as disclosed in the drawings more effective oiling and cooling, with no accessory mechanism whatever, can be procured than in any other type of engine with provision for this purpose.

Heretofore this class of engine has been barred from its rightful participation in the propulsion of motor vehicles, first, because no satisfactory means for cooling the engine had been found. Water jacketing a rotary engine is difficult and entirely impracticable and where air cooling was resorted to alone, it was found insufficient. Air could not be gotten a proper advantage of on account of the head-on position of the engine; secondly, the engine cylinders, because of the head-on position of the engine, lay horizontal and had no means of properly oiling them. Such oil as could be gotten in could not drain out. Here it burned, forming a gummy coat and ultimately caused the pistons to stick. What oil drained out dropped upon the roadway, making it a frightfully extravagant consumer of lubricant, besides smoking out the occupants of the motor conveyance. Thirdly, the valve arrangement was complicated and it was difficult to exhaust through a common muffler. This type of engine is usually arranged as four cycle, having two puppet valves for each cylinder. There are seven or nine cylinders making fourteen or eighteen puppet valves producing only an efficiency equivalent to the four-cylinder, non-rotary type commonly used and having but eight puppet valves. Timing valves have always afforded stubborn difficulties in gasolene engines. Timing valves are complicated and must continually be re-seated. Sleeve valves, since they must fit tight into the cylinder and over the piston often stick fast on account of improper oiling or unequal expansion due to uneven distribution of heat in cylinder and piston.

My timing arrangement comprises a sleeve device, one sleeve for all the cylinders in common. It fits snugly into a cylinder recess communicating with all the cylinders, but is loose over the shaft so it can always accommodate itself to its fitting without binding or gaping. Its oiling is also accomplished satisfactory by the tilted arrangement of the engine. The claim on the construction of the engine is a matter of a separate patent application so its construction need not be described here.

By placing the engine, as already described and shown by the drawings at the forward end of the conveyance and in an up-tilted position, I obviate the oiling and cooling difficulties enumerated and reduce this to the simplest, lightest, and cheapest of all engines for the propulsion of a motor vehicle.

Referring to the drawings:

Figure 1, is a side view of the engine, with a part of the housing cut away to show the driven parts and the manner in which the oiling takes places.

Fig. 2, shows the same engine but installed in a car. This drawing illustrates by arrows B and C, the cooling of the engine M, due to its rotation and the movement of the propelled vehicle V in the direction of the arrow A, and

Fig. 3, shows a section on the line 3—3 of Fig. 1, looking in the direction of the arrow. This figure shows the manner in which the timing valve is oiled not directly reached by the splash-system.

M is the motor with the oil casing H at the bottom of which is the nut D to drain oil O. Motor M is installed in car V, which it is arranged to convey by means of trans-

mission line 10. 1, are the cooling rings surrounding the cylinders 2, in which are the pistons connecting with disk 5 by means of pitmen 3. Engine M and countershaft 8 are made to turn together by miter gears 4. Countershaft 8 is supported in thrust bearing 9 which extends at both sides to the housing H and which is continued to the chassis 13 by arms 11. The engine is further supported by cross-bar 12 at back and by an angle iron arch 14 in front, by means of device 15. 6 and 7, are clutch mechanism.

To keep hot air C from occupants of conveyance and to deflect it under car is oblique partition P. Through this extends, for the convenience of the driver, control arm 17 by means of which ventilator shutters 16 are set to control draft of cooling air B. 18 is a trough receiving oil thrown up by the driven element and 19 is a duct conveying the oil therefrom by gravity to the up-tilted end of timing valve 20, which is hollow and into which it streams, oiling it and the engine bearings and finding its way down the inclined shaft into the oil reservoir again. 21 is a stationary part of the timing valve.

Instead of a radiator is a shutter and air deflecting device 16 under the control of arm 17, which can be manually regulated or associated with a thermostat which is made to control the shutters in the following manner. The shutter is arranged in two tiers, the perpendicular and inclined, controlled by a link at the lower end of arm 17 so that when it is pushed forward the free end of the upper tier rises so as to deflect the air up, and the lower tier downward so as to deflect the incoming air down free of the engine and out at shutter E, which is opened when the lower tier drops. In this position shutter F also drops and leaves some of the air deflected by the lower shutters out.

What I claim is:

1. In a vehicle and in combination therewith, a chassis, a rigid support connected with the chassis, a propelling rotary motor installed in said vehicle and having a bent shaft forming two axes disposed at an obtuse angle in respect to each other and whereof one is arranged substantially in the line of travel of said vehicle and carries the driven element of the motor, and whereof the other is at the front of the vehicle and carries parallel therewith the cylinder element of the motor between the bend therein and the rigid support thus presenting the cylinder element in upright inclined position to receive the direct impact of air on all parts of its inclined surface due to the travel of the vehicle and the rotation of the motor.

2. In a vehicle and in combination therewith, a propelling rotary motor installed in said vehicle and having two axes disposed at an obtuse angle in respect to each other and whereof one is arranged substantially in the line of travel of said vehicle and carries the driven element of the motor, and whereof the other is at the front of the vehicle and carries parallel therewith the cylinder element of the motor thus presenting the same in upright inclined position to receive the direct impact of air on all parts of its inclined surface due to the travel of the vehicle and the rotation of the motor, and at the union of said axes an oil pan associated with an inclosure housing to constitute an element of a splash lubricating system.

3. In a vehicle and in combination therewith, a chassis, a rigid support connected to the chassis, a propelling rotary motor installed in said vehicle having a bent shaft forming two axes disposed at an obtuse angle in respect to each other and whereof one is arranged substantially in the line of travel of said vehicle and carries the driven element of the motor, and whereof the other is at the front of the vehicle and carries parallel therewith the cylinder element of the motor between the bend therein and the rigid support thus presenting the cylinder element in upright inclined position to receive the direct impact of the air on all parts of its inclined surface due to the travel of the vehicle and the rotation of the motor, and circumferential radiating rings projecting from the cylinder element perpendicular to the cylinder bearing axis and inclined to the direction of orientation to deflect affectively the impacting cooling air.

4. In a vehicle and in combination therewith, a propelling rotary motor installed in said vehicle and having two axes disposed at an obtuse angle in respect to each other and whereof one is arranged substantially in the line of travel of said vehicle and carries the driven element of the motor, and whereof the other is at the front of the vehicle and carries parallel therewith the cylinder element of the motor thus presenting the same in upright inclined position to receive the direct impact of air on all parts of its inclined surface due to the travel of the vehicle and the rotation of the motor, and at the union of said axes an oil pan associated with an inclosure housing to constitute an element of a splash lubricating system, a trough at the upper part of the housing and open to receive splash from the driven rotary element, and a gravity line from the trough to the upper inlet end of the inclined element.

5. In a vehicle and in combination therewith, a propelling rotary motor installed in said vehicle and having two axes disposed at an obtuse angle in respect to each other and whereof one is arranged substantially in the line of travel of said vehicle and carries the driven element of the motor, and whereof

the other is at the front of the vehicle and carries parallel therewith the cylinder element of the motor thus presenting the same in upright inclined position to receive the direct impact of air on all parts of its inclined surface due to the travel of the vehicle and the rotation of the motor, a hood arranged over the motor and open at the front and provided in rear of the engine with a deflector plate, and adjustable shutters at the front of the hood for controlling the direction and amount of air admitted to the engine.

JOSEPH H. BAIR.