

G. E. DOD.
INTERNAL COMBUSTION GAS TURBINE.
APPLICATION FILED DEC. 2, 1907.

939,229.

Patented Nov. 9, 1909.

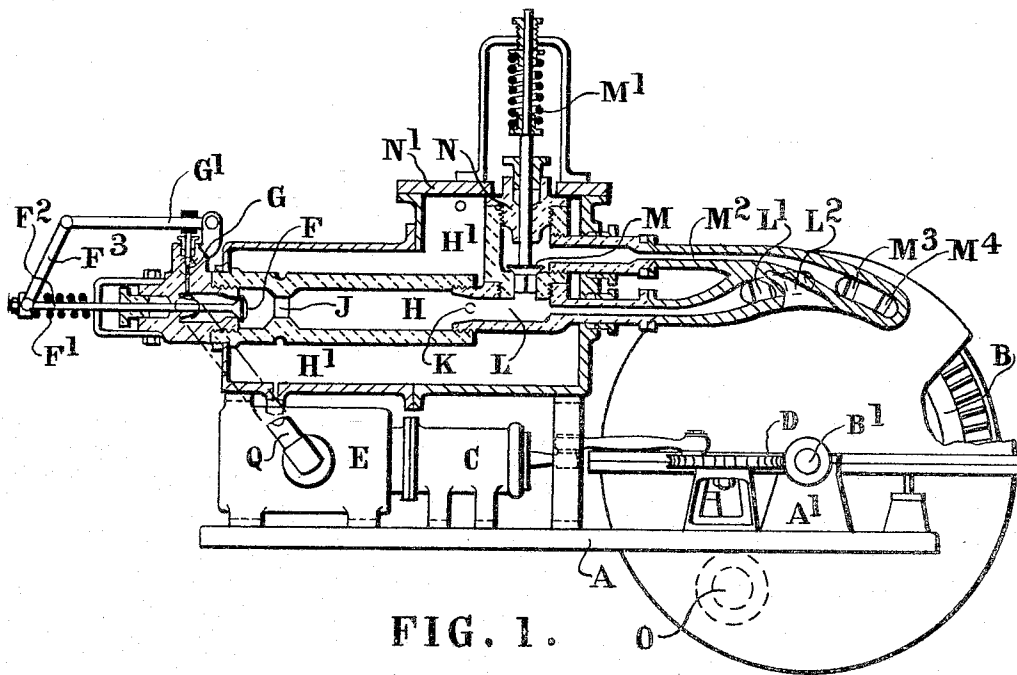


FIG. 1.

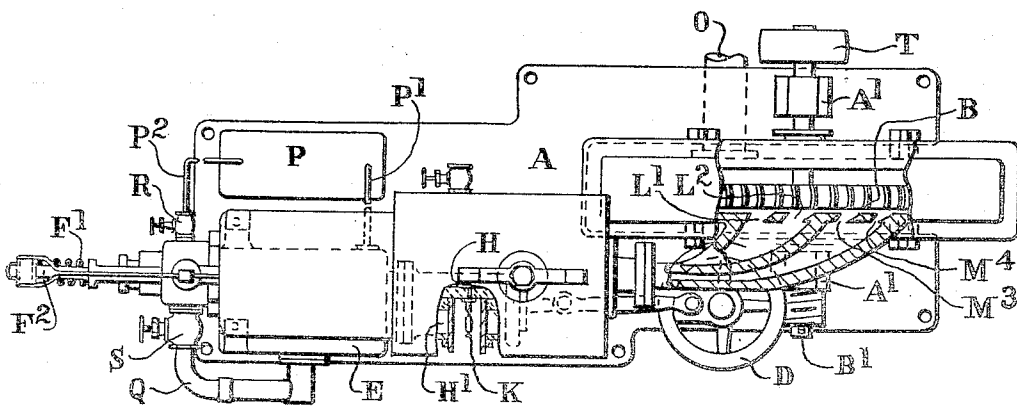


FIG. 2.

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INTERNAL-COMBUSTION GAS-TURBINE.

939,229.

Specification of Letters Patent.

Patented Nov. 9, 1909.

Application filed December 2, 1907. Serial No. 404,726.

To all whom it may concern:

Be it known that I, GEORGE ENDON DOD, a citizen of Australia, residing at Maryborough, in the State of Queensland, Commonwealth of Australia, engineer, have invented new and useful Improvements in Internal-Combustion Gas-Turbines, of which the following is a specification.

For some time past efforts have been made to produce a satisfactory internal combustion or gas turbine, and I am aware of an account being published of such a turbine in which the products of combustion were made to impinge on the blades of a disk through one nozzle leading from a combustion chamber. Such an engine must be open to the same objection that the ordinary gas engine is, viz:—that the impulses are intermittent.

The object of my invention is to reduce this intermittent action and thus secure a much more evenly running engine.

In carrying out my invention I have a single combustion chamber provided at one end with an admission valve for compressed air and oil vapor and one for the oil or oleaginous vapor; while at the other end the chamber is restricted and a passage leads to one or more nozzles in close proximity to the turbine wheel. Opening out of the restricted portion of the combustion chamber is a secondary passage closed by a valve controlled by an adjustable spring. This secondary passage leads also to one or more nozzles which are restricted more than the others. In order however that my invention may be clearly understood I will now describe it reference being made to the accompanying drawings in which—

Figure 1 is a side elevation with the salient parts shown in section, and Fig. 2 is a plan of same, also showing some of the important parts in section.

A is the bed plate, carrying the turbine wheel shaft B' in the bearings A'. The turbine B may be of the de Laval or other suitable type of turbine wheel. The air pump C for compressing air to about 80 lbs. is also carried on the bed plate A and is driven by the worm and worm wheel D, or other intermediate gearing as may be found suitable. The air pump C delivers into the receiver E from which a pipe is led to the inlet valve F controlled by the spring F'.

Articulated to the spindle F² of the valve F is the lever F³ which in turn is connected to the lever G' so that it gives a slight move-

ment to the oil inlet valve G, every time the valve F opens.

H is the combustion chamber having the valve F seated at one end, and near by, it has the throat J which restricts the flow of the compressed air and oleaginous vapor.

K is the ignition or sparking plug in the mouth of the primary passage L which latter terminates at the turbine in two nozzles L' L². The ignition plug K is held in a tube screwed through the water jacket H' and into the combustion chamber H.

M is the secondary passage controlling valve, which is closed by the spring M' and can be adjusted. Leading from this valve M is a passage M² provided with two nozzles M³ M⁴ of restricted area.

The combustion chamber H is surrounded by a water jacket H' and is secured at one end by a flange or other suitable means while the opposite ends pass through stuffing boxes to allow for any undue expansion, the stuffing box N being loosely jointed to the cover N' of the water jacket H' so that it can move with the expansion of the combustion chamber.

O is the exhaust from the turbine.

P is the oil receiver connected to the air receiver E by the pipe P' and to the oil inlet valve G by the pipe P² with the regulator R.

Q is a pipe leading from the air receiver E to the valve F a regulator S being provided in such pipe.

Having described the general design of my engine I will now explain its working. At the first start the compressed air receiver E has to be charged either by hand or otherwise; then on opening the oil and air regulators R and S together the pressure accumulates, opens the valve F and allows an explosive mixture to fill the combustion chamber H. When the ignition plug K is reached the charge is fired causing a considerable rise of pressure in the chamber, some of which escapes through the primary passage L and nozzles L' and L², while some opens the valve M and allows a portion of the pressure to go along the secondary passage where it gradually escapes through the restricted secondary nozzles M³ and M⁴ causing the turbine wheel to revolve and compress more air, which in turn, as the pressure falls in the combustion chamber H, causes the valve F to reopen and admit a further charge which sweeps out of the combustion chamber the spent gases, until the ignition tube is again

reached and a further explosion occurs; then again part of the gases go along the primary passage L and part past the valve M reheating the gases still left in the secondary passage and adding to the pressure there.

I have not shown any nozzle controlling device but almost any arrangement of taper valve such as is used in the de Laval turbine will do, and generally speaking the drawings are only diagrammatic, as in every size of motor the design would vary.

The spring M' would of course have to be regulated so that part of the explosive force would be admitted into the secondary passage, where the pressure would, to a certain extent be augmented after each explosion not only by the addition of pressure but also by the addition of heat.

A belt pulley T is shown on the shaft B' and can of course be placed on either side.

Any of the known mechanical devices for operating the ignition may be adopted.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. An internal combustion gas turbine comprising a combustion chamber having two passages leading from one end, nozzles

at the outer ends of said passages, a valve controlling the communication of one passage with the combustion chamber, said chamber having an inlet passage at its other end, a valve controlling the passage, a compressed air reservoir communicating with said inlet passage, a fuel supply also communicating with said inlet passage, and means operated by the movement of the last named valve for opening the fuel supply to the passage.

2. An internal combustion gas turbine comprising a combustion chamber having a series of passages connected with one end thereof, nozzles at the outer ends of said passages, a valve in one passage, means for supplying compressed air and fuel to the other end of said combustion chamber, a water jacket surrounding the combustion chamber and secured to one end thereof and a stuffing box located between the other end of the jacket and the combustion chamber.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE ENDON DOD.

Witnesses:

CHARLES MCGHIE,
JOHN CHALK.