Oct. 2, 1934. F. GOSSLAU 1,975,600

INTERNAL COMBUSTION ENGINE

Filed Jan. 21, 1931

Fig 1

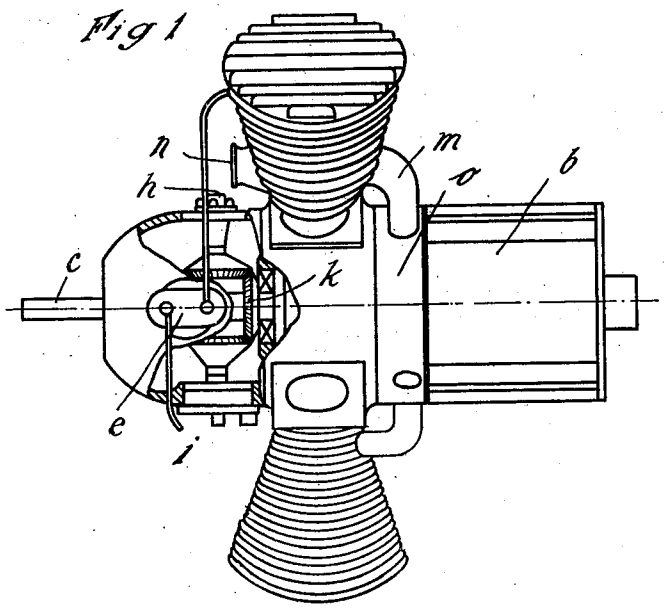
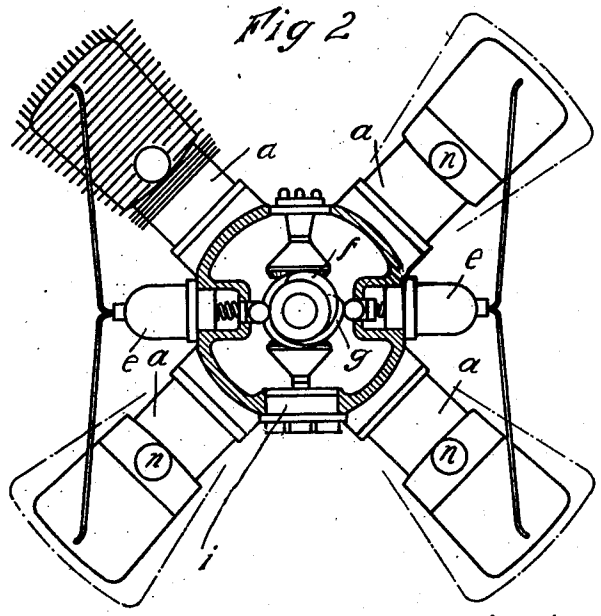


Fig 2



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Patented Oct. 2, 1934 1,975,600

UNITED STATES PATENT OFFICE

1,975,600

INTERNAL COMBUSTION ENGINE

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Application January 21, 1931, Serial No. 510,104
In Germany January 24, 1930

1 Claim. (Cl. 123—195)

My invention relates to internal combustion engines, and more particularly to engines with radially arranged cylinders and a one-throw crank shaft.

It is known to employ internal combustion engines with radially arranged cylinders, more particularly on aircraft. For reducing the air resistance it is necessary to make the front surface of the motor as small as possible. To attain this object the number of cylinders must be as small as possible. Motors with one, two and three cylinders have proved unsuitable for aircraft purposes, since it is impossible to balance perfectly the large pressures exerted by their masses which quickly destroy the motor base. A four-cylinder motor cannot be operated on the four-cycle principle, usually employed now, because the maintenance of equal periods between the ignitions is rendered impossible. The smallest number of cylinders which has up to now been used with success in motors of the radial cylinder type is five.

The object of my invention is to provide a motor with a one-throw crank shaft, regular sequence of ignitions and vibration-free operation, but with as small a number of cylinders as possible. This problem is according to my invention solved by providing stationary cylinders working on the two-cycle principle, and supplying the fuel to them by pumps which are arranged separate from the cylinders. The theory shows that four cylinders radially arranged around a motor crank and operating on the two-cycle principle, if spaced apart by 90° can be perfectly balanced as regards the pressures exerted by their moving masses. In the two cycle engine the sequence of ignitions and thus the torque exerted on the crank shaft furthermore becomes uniform, since the power stroke in the cylinders follows directly one after the other.

The necessary scavenging and charging air is supplied by a blower. The employment of a four cylinder motor renders it possible to dispense with a ratio gear and permits of the blower running at the speed of the crank shaft. The dimensions of the blower running at such a speed are such that they do not hinder the accommodation of the blower on board of an airplane. If the four cylinder motor operates according to the Diesel method four fuel pumps become necessary. These pumps are preferably arranged in groups of two diametrically opposite and are controlled by cams displaced by 90°.

I will now describe the nature of my invention with reference to the drawing affixed to my specification and forming part thereof.

In the drawing:—

Fig. 1 represents a partly sectional side-elevation, and

Fig. 2, a partly sectional front elevation of a motor working according to the Diesel method.

Referring to the drawing, *a* indicates the four cylinders spaced apart by 90° which are charged by the blower *b*. The scavenging blower *b* is located on the rearward extension of the crank shaft *c*. The four fuel pumps *e* are arranged in diametrically opposite pairs and are controlled by cams *f* and *g* displaced in relation to each other by an angle of 90°. *h* is the compressed air starter, *i* the lubricating oil pump. Both these auxiliary devices are driven by the common bevel wheel *k* mounted on the crank shaft *c*. The scavenging blower *b* conveys its charge into an annular duct *o* whence the charge passes into the cylinders *a* through the individual pipes *m*. *n* are the exhaust pipes.

I claim as my invention:—

A two-cycle Diesel-type engine for air craft, having a plurality of multi-port cylinders arranged in star fashion on the engine crank case and having the ports of each cylinder controlled by its appertaining piston, and having a single throw crank shaft for said cylinders, an air blower arranged on the trailing end of the engine integrally therewith and being positively driven from the trailing end of said crank shaft, and means for conducting from said blower scavenging and combustion air individually to said cylinders, individual fuel pumps for and connected to said cylinders and being mounted on the leading, power delivery end of the engine, and cams on the leading end of said crank shaft for operating said fuel pumps.

FRITZ GOSSLAU.