Jan. 4, 1927. 1,612,985

C. E. QUICK

MOTOR

Filed Feb. 10, 1925 3 Sheets-Sheet 1

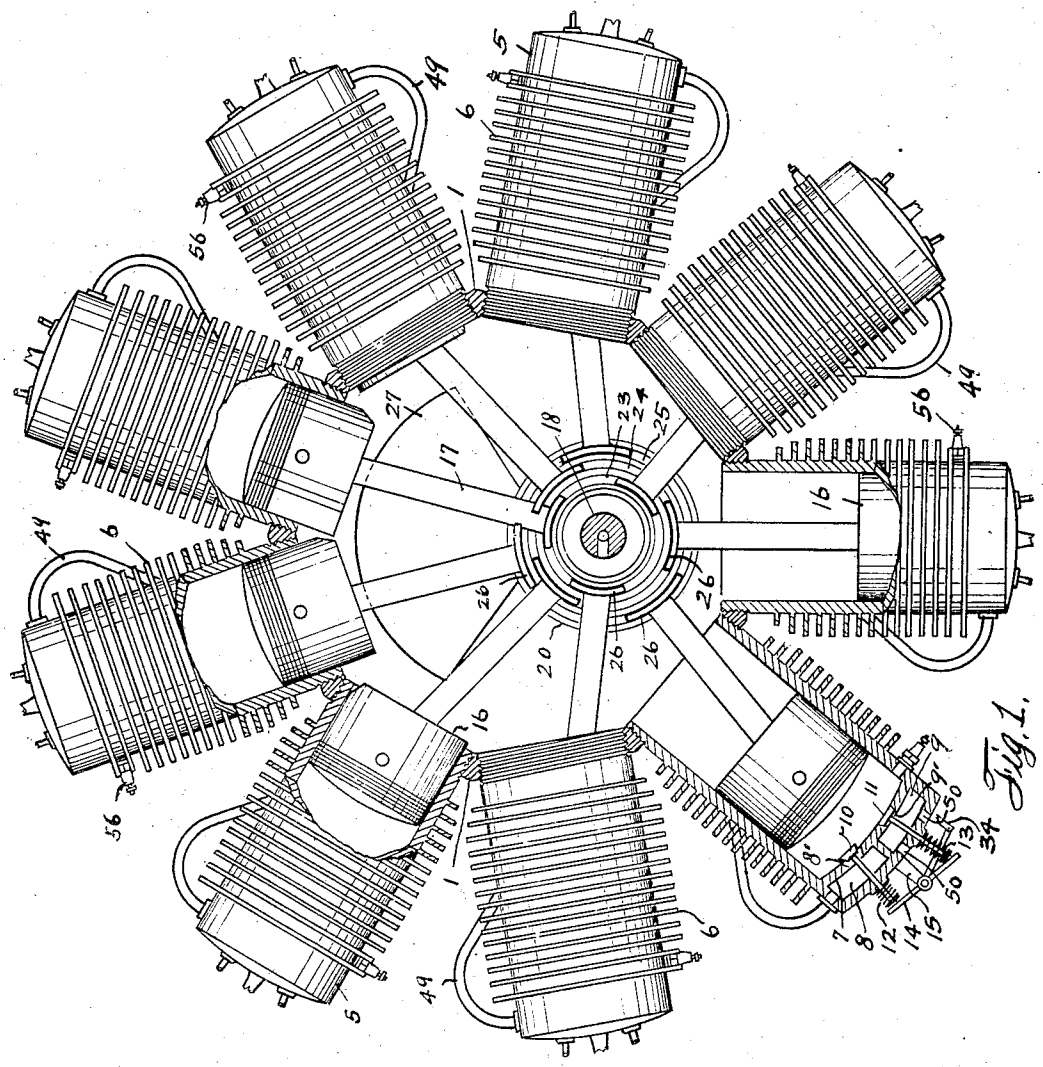


Fig. 1.

INVENTOR.
Charles E. Quick.

BY
Hardway & Catlin
ATTORNEYS.

Jan. 4, 1927. 1,612,985

C. E. QUICK

MOTOR

Filed Feb. 10, 1925 3 Sheets-Sheet 2

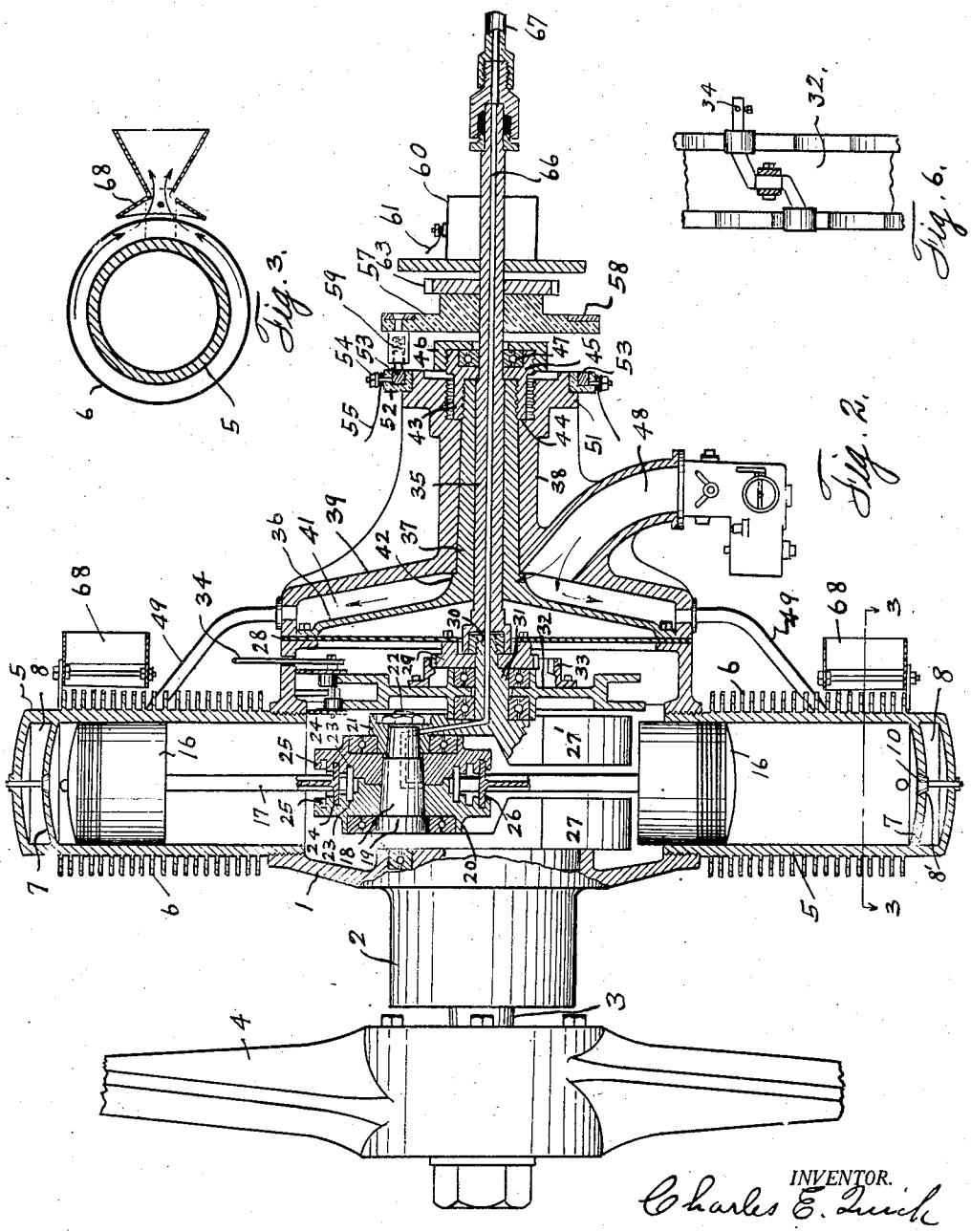


Fig. 3.

Fig. 6.

Fig. 2.

INVENTOR.
Charles E. Quick

BY
Hardway & Cathy
ATTORNEYS.

Jan. 4, 1927. 1,612,985

C. E. QUICK

MOTOR

Filed Feb. 10, 1925 3 Sheets-Sheet 3

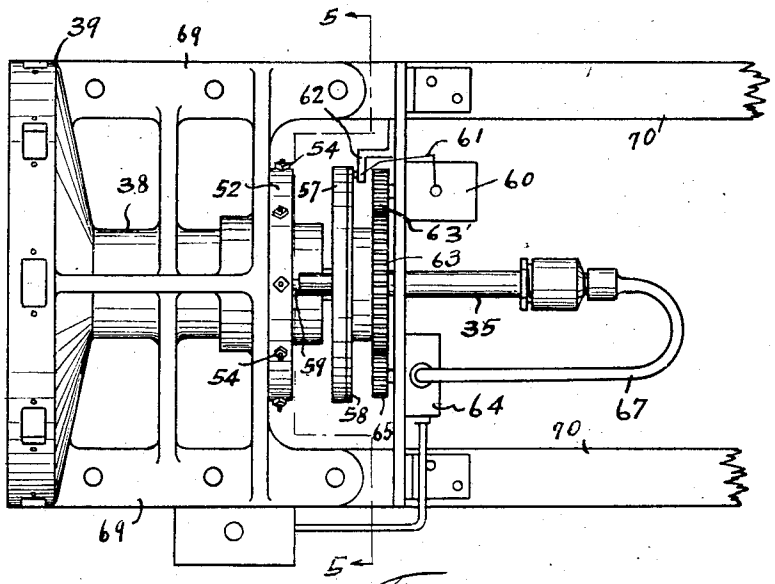


Fig. 4.

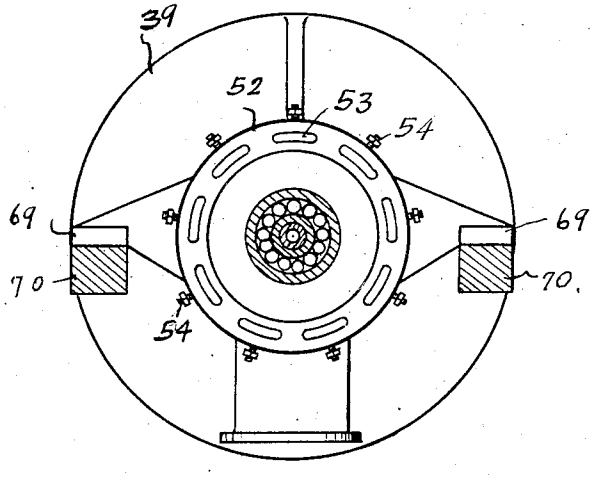


Fig. 5.

INVENTOR.
Charles E. Quick
BY
Hardway & Patty
ATTORNEYS.

Patented Jan. 4, 1927. 1,612,985

UNITED STATES PATENT OFFICE.

CHARLES E. QUICK, OF HOUSTON, TEXAS.

MOTOR.

Application filed February 10, 1925. Serial No. 8,304.

This invention relates to new and useful improvements in motors, and has particular relation to motors of the radial internal combustion type.

One object of the invention is to produce a radial, internal combustion motor, specially adapted for use in aircraft.

Another object of the invention is to produce a motor of the character described embodying a novel combination with the motor proper of means for securely fastening the motor onto the frame of the fuselage, said fastening means embodying also a manifold provided with an intake conduit from the carbureter and distributing intake pipes through which the motor fluid is delivered to the cylinders.

A still further feature of the invention resides in the provision of suitable counterweights carried by the propeller shaft, and which together with the wrist pin bearing form in effect a balancing wheel or momentum wheel.

The type of motor herein described may be readily produced from various types of obsolete rotary motors, and said rotary motors thus converted into motors of the radial type.

With the above and other objects in view this invention has particular relation to certain novel features of construction, operation and arrangement of parts an example of which is given in this specification and illustrated in the accompanying drawings, wherein:—

Figure 1 shows a front elevation of the motor, partly in section.

Figure 2 shows a side view partly in section.

Figure 3 shows a sectional view of a cylinder, taken on the line 3—3 of Figure 2.

Figure 4 shows a fragmentary plan view of the motor, and

Figure 5 shows a transverse sectional view taken on the line 5—5 of Figure 4, and Figure 6 shows a fragmentary edge view of the valve actuating disc.

Referring now more particularly to the drawings, wherein, like numerals of reference designate similar parts in each of the figures, the numeral 1 designates the motor case as a whole. This case is of a general cylindrical contour and its forward end is reduced forming a bearing housing 2 for the propeller shaft 3. The foward end of this shaft has the propeller 4 fixed thereon.

A plurality of radial cylinders 5 are provided, each provided with spaced annular heat radiating flanges 6, and each having its inner end threaded through the wall of the case 1. The outer end of each cylinder is closed, and also provided with a transverse web, or partition 7, spaced from said outer end, forming the intake and exhaust chambers 8 and 9 separated by a suitable partition as shown.

Each partition 7 has the inlet and exhaust ports 8′ and 9′ controlled by the inwardly opening inlet and exhaust valves 10 and 11. These valves are fastened to stems which work through suitable bearings in the cylinder ends and they are normally held closed by pressure springs 12 and 13. The valves are opened through the yoke 14 which is pivoted on the standard 15 and whose ends are adapted to work alternatively against the outer ends of the stems to open the valves in proper sequence.

In the cylinders 5 the pistons 16 reciprocate and the connecting rods 17 are hinged, at their outer ends, to the respective pistons.

The propeller shaft 3 has an offset, or eccentric, wrist pin 18, in the motor case, which is tapering and formed with an annular shoulder 19, at its large end. A sectional bearing 20 is rotatably mounted on this wrist pin and is confined thereon by the shoulder 19, on one side, and the bushing 21, on the other, said bushing, in turn, being secured on the pin by the nut 22. The bearing 20 is formed of two annular, coinciding sections, as shown in Figure 2, whose margins are spaced apart and formed with annular, opposing, inner, intermediate and outer channels, 23, 23, 24, 24, and 25, 25. The inner ends of the connecting rods 17 are formed with wide, arcuate bearing plates 26, which are disposed to work in said respective opposing channels to form operative connections with the bearing 20.

Opposite the wrist pin 18 are the segmental weights, or balances, 27, 27′, spaced apart and on opposite sides of the connecting rods, one of said weights being integral with the shaft 3 and the other being integral with the bushing 21. These weights, with the wrist pin and its bearing, form in effect a balance, or momentum wheel.

The case 1 is closed by the end plate 28 which is clamped thereto as hereinafter described, and fastened to the inside of said plate there is a fixed spur gear 29 which has a bearing, concentric with the shaft 3, pro-

vided to receive the stub shaft 30 which is formed integrally with the weight 27'. The stub shaft 30 is formed into an eccentric portion 31, between the weight 27' and the gear 30 and mounted on this eccentric portion there is a valve actuating disc 32 which has double flanges with sinusoidal margins forming staggered cams, and carries an annular internal rack 33 of larger diameter than the gear 29 and which is adapted to run in mesh with the said gear. The rotation of the eccentric 31, acting in combination with the gear 29 and rack 33, causes the disc to swing around the gear 29 but to remain in operative connection therewith, thus providing, in effect an eccentric gearing. The yoke 14, of each cylinder, is connected to, and adapted to be actuated by, a push rod, as 34, and these push rods are actuated to operate the intake and exhaust valves, 10 and 11 of the cylinders in the proper sequence as the disc 32 swings around its cycle by the marginal cams of the marginal flanges of said disc. This valve actuating mechanism is conventional and a more specific illustration and description thereof is not deemed necessary.

An actuating shaft 35 has a separable connection with the stub shaft 30 and is in axial alignment therewith and works through a central bearing in the end plate 28. There is an annular web 36 whose margin is bolted to the adjacent end of the motor case and clamps the end plate 28 in position. This web is formed with an extended bearing 37 in which the shaft 35 runs. Fitted over the bearing 37 there is a sleeve 38, whose end, adjacent the case 1, is formed with an annular concavo-convex plate 39 having the marginal flange 40 which fits closely around the margin of the web 36. An enclosed chamber 41, forming an intake maanifold is thus formed. The inner end of the sleeve 38 abuts against an outside annular shoulder 42 on the bearing 37 and its outer end has an enlarged socket 43 and an inside annular shoulder 44. A bushing 45 is threaded over the outer end of the bearing 37 and abuts against the shoulder 44. A retaining cap 46 is threaded over the outer end of the bushing 45 and retains the anti-friction bearings 46, for the shaft 35, in place.

Cast integrally with the sleeve 38 there is an intake conduit 48 which leads from the carbureter and enters the manifold 41 and leading from said manifold there are the intake pipes 49 which radiate to the respective cylinders and enter the intake chambers 8 thereof. After explosion of the charges the spent gases are exhausted through the exhaust ports 50, 50, in the outer ends of the cylinders.

The outer end of the sleeve 38 has an annular flange 51, which carries a fiber ring 52, provided with metallic inserts 53 spaced apart and having the binding posts 54 connected thereto. The wiring 55 leads from these binding posts and connects with the spark plugs 56 of the cylinders. There is a fiber disc 57 fixed on the shaft 35 and provided with a metal ring 58 which is electrically connected with the yieldable metallic plunger 59 which rides on the ring 52 and contacts successively with the inserts 53. The magneto 60 is connected through the wiring 61 with a yieldable tongue 62 which rides on the ring 58 and forms an electrical connection therewith. The magneto is driven from the shaft 35 through the gears 63, fixed on the shaft 35, and 63', fixed on the magneto shaft and an oil pump 64 is driven from said gear 63 which is in mesh with the gear 65, fixed on the pump shaft. There is an oil duct 66 which leads through the shafts 35 and 30 and terminates in the wrist pin bearing and an oil line 67 leads from said pump and is connected onto the outer end of the shaft 35 by means of a swiveling connection.

At the rear of the explosion chambers of the cylinders, where the greatest heat will occur I have provided the flues 68. These flues are flared each way and their ends, adjacent the cylinders, are comparatively wide. Without the flues the air passing around the cylinders, each way, as indicated by the arrows in Figure 3, as the motor moves through the air, will form an eddy in the rear of each cylinder, and the flues tend to prevent this and suck the air from the cylinders more rapidly thus assisting in keeping the cylinders cool.

The sleeve 38 has lateral supporting legs 69, 69, preferably cast integrally therewith and with the plate 39. These legs rest upon the side members 70, 70 of the fuselage, and are secured thereto forming a convenient and secure means for installing the motor in the fuselage.

What I claim is:—

1. In an internal combustion motor a manifold formed with an annular chamber having an intake conduit, an extended sleeve-like shaft bearing carried by the manifold, lateral legs forming motor supports carried by said bearing.

2. In an internal combustion motor a manifold formed with an annular chamber having an intake conduit, an extended sleeve-like shaft bearing integral with the manifold, a distributor support carried by said bearing, and lateral supporting legs carried by said bearing.

3. In an internal combustion motor a means for supporting the motor in a frame, said means embodying a shaft bearing and lateral legs forming supports adapted to engage the side members of said frame.

4. In an internal combustion motor a means for supporting the motor in a frame,

said means embodying a shaft bearing formed with a manifold and lateral supporting legs carried by the bearing and adapted to engage the frame.

5. In an internal combustion motor means for supporting the motor in a frame, said means including a shaft bearing formed, at one end with a manifold having an intake conduit, and at its other end formed with a distributor support, lateral supporting members carried by said bearing and adapted to rest on said frame.

6. In an internal combustion motor means for supporting the motor in a frame, said means including a shaft bearing formed, at one end with a manifold having an intake conduit, and at its other end formed with a distributor support, lateral supporting members carried by said bearing and adapted to rest on said frame, and intake pipes leading from said manifold and provided to enter the motor cylinders.

7. In an internal combustion motor for aeroplanes, a means for supporting the motor in the frame of the aeroplane, said means embodying a shaft bearing and having a distributing manifold, and also embodying lateral supports adapted to rest on said frame.

8. In an internal combustion motor for aeroplanes, a means for supporting the motor in the frame of the aeroplane, including a sleeve whose end adjacent the motor case is formed with a plate, a web formed with an extended shaft bearing fitted through said sleeve, said web and plate being spaced apart and forming a manifold between them, said manifold having an intake conduit, and lateral supports carried by said sleeve and adapted to rest on said frame.

9. The combination with the fuselage of an aeroplane having side members, of a motor, a supporting means for the motor embodying a sleeve-like extension attached to the motor case and having a shaft bearing and a manifold, lateral supports carried by said extension and adapted to rest on said side members.

10. The combination with the fuselage of an aeroplane having side members, of a motor, a supporting means for the motor embodying a sleeve-like extension attached to the motor case and having a shaft bearing and a manifold, lateral supports carried by said extension and adapted to rest on said side members, said manifold having an intake conduit and intake pipes leading from the manifold and entering the motor cylinders.

11. The combination with the fuselage of an aeroplane having side members, of a motor, a rearward sleeve-like extension attached to the motor, lateral supports carried by said extension and engaging said side members and supporting the motor in front of the fuselage.

12. The combination with a motor having radial cylinders, of means for supporting said motor in a frame, said means embodying a rearward extension adapted to be secured to said frame and to support the motor in front of the frame.

In testimony whereof I have signed my name to this specification.

CHARLES E. QUICK.