

N^o 17,983



A.D. 1910

Date of Application, 28th July, 1910

Complete Specification Left, 23rd Feb., 1911—Accepted, 27th July, 1911

PROVISIONAL SPECIFICATION.

An Improved Two Cycle Internal Combustion Motor.

I, FREDERICK LAMPLOUGH, of The Albany Works, Cumberland Park, Willesden Junction, in the County of Middlesex, Managing Director, do hereby declare the nature of this invention to be as follows:—

5 The object of the present invention is to obtain an extremely light and powerful, well-balanced motor for aviation purposes, but which is also suitable for other purposes.

10 In carrying my invention into effect, I employ one or more cylinders, according to the power required, each of which is fitted with a pair of pistons which alternately approach and recede from each other, as has heretofore been proposed.

According to my invention however, I adopt the following arrangements in connection with each of the cylinders.

Each cylinder is water-jacketed for the whole length of the combustion stroke, a deposited copper water jacket being preferably used.

15 The cylinder is extended at its upper end beyond the working part and such extension has a capacity equal to the combined displacement of the two pistons.

This extension forms the charging cylinder and, for small motors, it is placed eccentrically of the bore of the firing cylinder.

20 The charging cylinder is fitted with a piston which is rigidly connected to or is in one with the upper piston, which is hollow, of the firing cylinder and is connected by a connecting rod with a crank on the engine shaft. These two pistons I will hereinafter refer to as a compound piston.

25 The lower piston of the firing cylinder is connected by a connecting rod with a crank on the shaft which is diametrically opposite to the above mentioned crank, that is to say, the two cranks are arranged at 180° apart. For larger motors the charging cylinder may be made concentric with the firing cylinder, in which case the compound piston would be fitted with a connecting rod on each side and an extra crank would be provided on the engine shaft to which such extra connecting rod is connected. In this case the crank connected with
30 the lower piston is arranged centrally of the cranks connected with the compound piston and the pull thereby equalized.

35 On the compression or inward stroke of the compound piston a carburetted mixture, or air only, is drawn through an opening in a chamber fixed in the cover of the charging cylinder; this lifts a disc or ring plate valve on said chamber against the action of three or more light springs in the cylinder cover; the carburetted mixture, or air, then passes into the charging cylinder and into the hollow piston which acts as a receiver, and on the return or firing stroke it is partially compressed in said hollow piston.

40 The partially compressed air or carburetted mixture in the hollow piston is then ready to enter the firing cylinder through ports in said hollow piston and firing cylinder which communicate with the interior of an annular chamber formed around the upper end of the firing cylinder. The air or carburetted mixture thence passes into the firing cylinder through other ports in the latter which communicate with the interior of the said annular chamber, and in so

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doing it drives the gases of combustion out through exhaust ports in the lower part of the firing cylinder into an annular chamber surrounding such part, whence they pass through a pipe into the open air or into a silencer.

The exhaust ports are opened before the inlet ports so as to lower the pressure in the firing cylinder before admitting the new charge. The charge is fired 5 by means of a firing plug inserted in the centre of the firing cylinder.

The inlet and outlet ports are covered and uncovered at the required times by the pistons of the firing cylinder.

By the above construction the motor is in perfect balance and as the pistons and cranks are opposed and absorb the whole of the strains on the body of the 10 engine the motor can be of the lightest construction possible.

Dated this 28th day of July, 1910.

HARRIS & MILLS,
Agents.

COMPLETE SPECIFICATION.

15

An Improved Two Cycle Internal Combustion Motor.

I, FREDERICK LAMPLOUGH, of The Albany Works, Cumberland Park, Willesden Junction, in the County of Middlesex, Managing Director, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following 20 statement:—

The object of the present invention is to obtain an extremely light and powerful well-balanced motor for aviation purposes but which is also suitable for other purposes.

The invention relates to that kind of internal combustion two cycle motor in 25 which the charge is ignited between a pair of pistons fitting a single cylinder and in which one of the pistons is connected to a charging pump piston of larger diameter working in a corresponding cylinder which is fixed with relation to the first mentioned cylinder.

The invention consists in the combination and arrangement of parts herein 30 described and represented in the accompanying drawings, in which:—

Fig. 1 is an elevation partly in section of a two cycle internal combustion motor and Fig. 2 is a sectional elevation drawn at right angles to Fig. 1.

Fig. 3 is a horizontal section drawn on the line 3—3 of Fig. 1, and Fig. 4 35 is a plan of parts drawn on the line 4—4 of Fig. 1.

Each cylinder *a* is water-jacketted for the whole length of the combustion stroke or nearly so, a deposited copper water-jacket *b* being preferably used; *b*¹ is the inlet and *b*² the outlet to such jackets. The cylinder *a* is extended at its upper end *a*¹ beyond the working part, and such extension *a*¹ has a capacity equal to the combined displacement of the two pistons *c*, *d*. 40

The extension *a*¹ forms the charging cylinder and, for small motors, it is placed eccentrically of the bore of the firing cylinder *a*, as shown.

The charging cylinder *a*¹ is fitted with a piston *e* which is rigidly connected to or is in one with the upper piston *c*, which latter is hollow and is connected by a connecting rod *f* direct to a crank *g*¹ on the engine shaft *g*. The con- 45 necting rod *f* works with the cylinder *a*¹ and outside the cylinder *a*.

These two pistons *e* *c*, I will hereafter refer to as a compound piston.

The lower piston *d* of the firing cylinder *a* is connected by a connecting rod *h* with a crank *g*² on the shaft *g*, which crank *g*² is diametrically opposite to the crank *g*¹, that is to say, the two cranks *g*¹, *g*² are arranged at 180° apart. 50

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For larger motors the charging cylinder a^1 may be made concentric with the firing cylinder a , in which case the compound piston $e c$ would be fitted with a connecting rod f on each side and an extra crank g^1 would be provided on the engine shaft g to which such extra connecting rod f would be connected.

5 In this case the crank g^2 connected with the lower piston d is arranged centrally of the cranks g^1 connected with the compound piston $e c$ and the pull thereby equalized.

10 On the compression or inward stroke of the compound piston $e c$, a carburetted mixture or air only is drawn through an opening i^1 in a chamber i fixed in the cover a^2 of the charging cylinder a^1 ; this lifts a disc or ring plate valve i^2 on said chamber i against the action of three or more light springs i^3 in the cylinder cover a^2 ; the carburetted mixture or air, then passes into the charging cylinder a^1 and into the hollow piston e which acts as a receiver and on the return or firing stroke it is partially compressed in said hollow piston e .

15 The partially compressed air or carburetted mixture in the hollow piston e is then ready to enter the firing cylinder through ports c^1 in said hollow piston and through ports a^3 in the firing cylinder a which communicate with the interior of an annular chamber a^4 formed around the upper end of the firing cylinder a . The air or carburetted mixture passes from the annular chamber a^4 into the firing cylinder a through other ports a^5 in the latter which also communicate with the interior of said annular chamber, and in doing so drives the gases of combustion out through exhaust ports a^6 in the lower part of the firing cylinder a into an annular chamber a^7 surrounding such part, whence they pass through a pipe a^8 into the open air or into a silencer. It will be understood that when air only is pumped into the cylinder a , hydrocarbon is injected into the cylinder after the ports are closed by the pistons $e d$ by means of a suitable pump.

25 The exhaust ports a^6 are opened before the inlet ports c^1 , a^3 , a^5 , so as to lower the pressure in the firing cylinder a before admitting the new charge. The charge is fired by means of a firing plug inserted in the centre a^9 of the firing cylinder a .

The inlet ports a^5 and exhaust ports a^6 are covered and uncovered at the required times by the pistons $e d$ of the firing cylinder a .

35 By the above construction the motor is in perfect balance or nearly so, and as the pistons $e d$ and cranks $g^1 g^2$ are opposed and absorb the whole of the strains on the body of the engine, the motor can be of the lightest construction possible.

40 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 motor having a firing cylinder, two pistons fitting said cylinder, the piston nearer to the crank shaft being connected to a crank by a connecting rod, the other piston being hollow and open at its upper end to a charging cylinder of larger diameter, a piston fitting the charging cylinder and forming part of the hollow piston and one or two connecting rods working within the charging cylinder and without the firing cylinder and connecting the piston of larger diameter direct to a crank or cranks on the crank shaft which crank or cranks is or are arranged at 180° to the first mentioned crank, substantially as shown and described.

50 2. An internal combustion motor as above claimed, characterized by the carburetted mixture or air being admitted to the charging cylinder through an opening leading to a chamber located in the charging cylinder and having a seating fitted with a ring plate valve which is acted upon by light springs in the cylinder cover, substantially as shown and described.

55 3. An internal combustion motor as claimed in Claim 1, characterized by the firing cylinder being formed at each end with an annular surrounding

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chamber, the upper one of which communicates by two sets of ports with the interior of the firing cylinder and one set of such ports communicates with a set of ports in the hollow piston, whilst the other annular chamber communicates with exhaust ports in the lower end of the cylinder and is provided with an exhaust outlet which may communicate with a silencer. 5

4. An internal combustion motor as claimed in Claim 1, characterized by the charging cylinder being formed eccentric to the firing cylinder and having its piston and the upper hollow working piston connected by a single connecting rod to a crank on the main shaft.

5. An internal combustion motor constructed substantially as herein set forth 10 and as represented in the accompanying drawings.

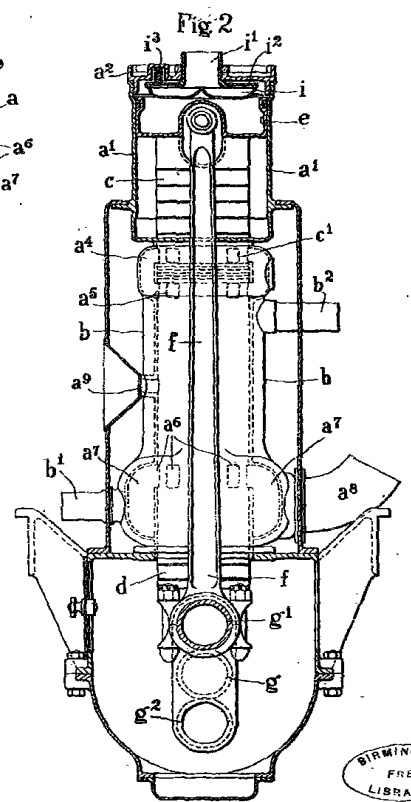
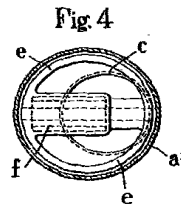
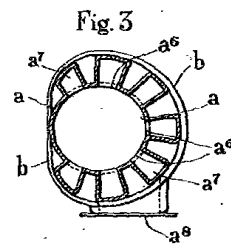
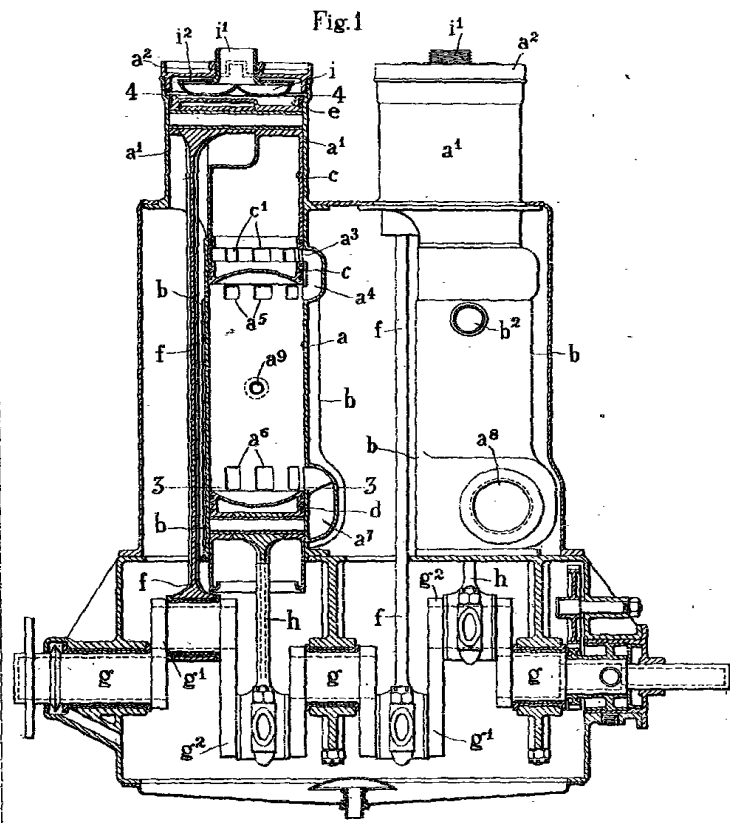
Dated this 23rd day of February, 1911.

HARRIS & MILLS,
23, Southampton Buildings, London, W.C., and at
Sheffield and Llanelly,
Agents. 15

SHEET 1

SHEET 2

[This Drawing is a reproduction of the Original on a reduced scale.]



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Fig. 3

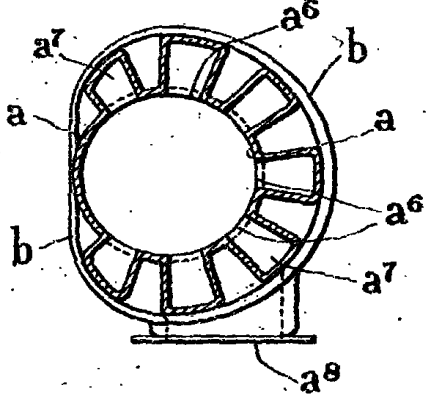


Fig. 4

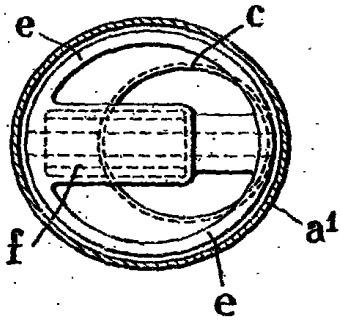
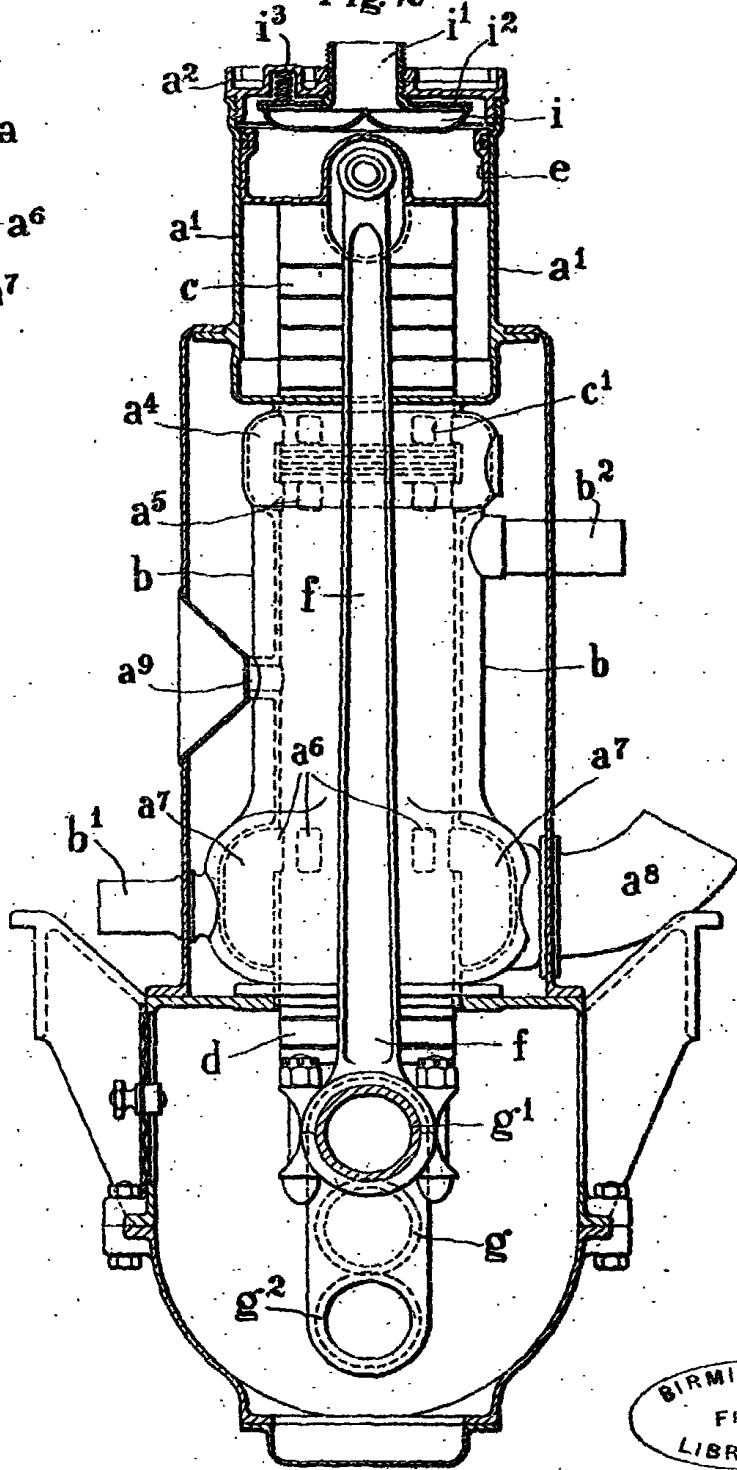


Fig 2



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