

N<sup>o</sup> 4782



A.D. 1910

(Under International Convention.)

Date claimed for Patent under Patents and Designs Act, 1907, being date of first Foreign Application (in France), } 25th Feb., 1909

Date of Application (in the United Kingdom), 25th Feb., 1910

At the expiration of twelve months from the date of the first Foreign Application, the provision of Section 91 (3) (a) of the Patents and Designs Act, 1907, as to inspection of Specification, became operative

Accepted, 27th Oct., 1910

#### COMPLETE SPECIFICATION.

##### Improvements in Explosion Motors.

I, RENÉ BRETON, of 76, rue Bolivar, Paris (Seine), France, Engineer, 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 statement:—

5 This invention relates to an extra-light motor of the kind in which the cylinders, together with their pistons and connecting rods and the casing, rotate about a fixed shaft or axle, the motion being transmitted from the casing itself.

10 The motor of the present invention comprises two coinciding sets of six cylinders each set consisting of three groups of two cylinders set V-wise and so that the angles of the V's are re-entering angles, or in other words so that the set forms three groups of two cylinders, each group having the appearance of a V, the angle of which is situated towards the centre of the system, with the limbs extending away therefrom. By this means great symmetry of the  
15 rotating system relatively to the centre of rotation is obtained, and the mass is brought near the centre of rotation.

20 The coinciding pairs of cylinders of the two sets communicate with each other at their outer ends and the pistons of the coinciding pairs drive crank discs on the shafts of corresponding planet wheels which roll on a wheel keyed on the fixed shaft. The piston rods of the cylinders which form the other limbs of the V's are likewise connected to the crank discs appertaining to the given V.

25 The admission and exhaust valves are operated by means of cams mounted on the fixed shaft at the respective sides of the motor and adapted to operate the valve rods through the medium of levers differing in shape for different cylinders, said cams being arranged to slide on the shaft and thereby to cut out a desired number of cylinders from operation.

With this motor are combined fans disposed on each side and mounted on crank discs driven by the piston rods, said fans serving for or maintaining an active current of air for cooling the interior of the motor.

30 The construction and operation of the motor will be understood from the following description with reference to the accompanying drawing in which:—

Figure 1 is a sectional elevation of the motor;

[Price 8d.]



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Figure 2 is a cross section taken between two groups of cylinders on line X—X, Figure 1; and

Figure 3 is a cross section through the axis of a cylinder on line Y—Y, Figure 1.

Figure 4 indicates the different respective positions of the cams and of the levers that operate the suction valves for the working of a group of two cylinders and for the working of six groups of two cylinders.

Figure 5 represents the different respective positions of the cams and of the levers that operate the exhaust valves for the working of a group of two cylinders and for the working of six groups.

The cylinders, twelve in number, are arranged in two sets as follows. Six of them, A<sup>1</sup>, A<sup>3</sup>, A<sup>5</sup>, A<sup>7</sup>, A<sup>9</sup>, and A<sup>11</sup>, are grouped so as to form three groups of two cylinders juxtaposed V-wise as explained. Or this set of six cylinders may be regarded as formed by the combination of three groups of two cylinders set V-wise and put together in such a way that the angles of the V's are re-entering angles. The other set of six cylinders A<sup>2</sup>, A<sup>4</sup>, A<sup>6</sup>, A<sup>8</sup>, A<sup>10</sup>, A<sup>12</sup> is identical with the first and arranged opposite the same. Further, any two cylinders disposed opposite each other, such as A<sup>1</sup>, A<sup>2</sup> for example, communicate with each other at their outer ends as seen in Figure 3, and the piston rods of the two cylinders that form the limbs of one and the same V for example A<sup>1</sup> A<sup>11</sup>, A<sup>3</sup> A<sup>5</sup>, A<sup>7</sup> A<sup>9</sup>, A<sup>2</sup> A<sup>12</sup>, A<sup>4</sup> A<sup>6</sup>, A<sup>8</sup> A<sup>10</sup>, are connected to one and the same crank disc, e.g. D<sup>1</sup>, D<sup>3</sup>, D<sup>5</sup>, D<sup>2</sup>, D<sup>4</sup>, D<sup>6</sup>. These crank discs are mounted on ball bearings. There are thus side by side two groups of three crank discs the centres of which form the angles of an equilateral triangle. The opposite or corresponding crank discs D<sup>1</sup> D<sup>2</sup>, D<sup>3</sup> D<sup>4</sup>, D<sup>5</sup> D<sup>6</sup> are mounted respectively on a common shaft such as E<sup>1</sup>, and on these shafts are keyed planet wheels such as F<sup>1</sup>. These planet wheels gear with a fixed wheel G<sup>1</sup> keyed on the fixed shaft H. It will thus be seen that the motion of the pistons will be transmitted as follows. The pistons B<sup>1</sup> and B<sup>2</sup> working in parallel and the pistons B<sup>11</sup> and B<sup>12</sup> appertaining to the cylinders A<sup>11</sup> A<sup>12</sup> forming part of the same V-groups, will together drive the coupled crank discs D<sup>1</sup> D<sup>2</sup>, that is to say rotate the planet wheel F<sup>1</sup>, whilst the two other groups of pistons of the V-groups of cylinders will at the same time drive the planet wheels F<sup>2</sup> and F<sup>3</sup>, and the simultaneous rotation of these wheels in gear with the fixed wheel G<sup>1</sup> will cause the whole arrangement to rotate about the fixed shaft H.

The distribution is effected as follows: Upon the fixed shaft H are slidably mounted two sets of symmetrically disposed cams M and N and M<sup>1</sup> N<sup>1</sup>. One set corresponds to the first group of cylinders and the other to the second group. For the sake of simplicity I will only refer to one of these two groups in the following description, the operation of the other group taking place in the same way.

The admission valves a<sup>1</sup>, a<sup>3</sup>, a<sup>5</sup>, a<sup>7</sup>, a<sup>9</sup>, a<sup>11</sup>, are those seen in Figure 1, their rods being marked t. The exhaust valves such as a<sup>2</sup>, are arranged similarly but on the other side of the motor; one of them a<sup>2</sup> is seen in Figure 2. The valve rods t are actuated by bent rocking levers L which are lifted successively by the cams M and N for the admission and by the cams M<sup>1</sup> N<sup>1</sup> for the exhaust. It will thus be seen that for each revolution of the motor about the shaft A there will be two admissions for each cylinder, since the admission valves will be lifted twice. In other words the cylinders will each give two explosions for a complete rotation of the system, and in order that this may be the case it is only necessary to make the ratio of the planet wheels F<sup>1</sup> to the fixed wheel G<sup>1</sup> as 1:4. The cylinders, which may be said to work under identical conditions are grouped as follows: Cylinders A<sup>1</sup> A<sup>2</sup> and cylinders A<sup>7</sup> A<sup>8</sup>, cylinders A<sup>3</sup> A<sup>4</sup> and cylinders A<sup>9</sup> A<sup>10</sup>, cylinders A<sup>5</sup> A<sup>6</sup> and cylinders A<sup>11</sup> A<sup>12</sup>. The cams M and N will be seen from the centre of rotation to subtend an angle of 60° and the levers L will also have the same distance apart.

Such is the operation when all the groups of cylinders work simultaneously.

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I have stated above that when it is desired only to utilise the work of a certain number of cylinders, it is only necessary to alter the position of the cams. For this purpose the cams can be arranged to slide on the fixed shaft H by means of grooves R in which work the operating fingers Q for imparting the sliding motion. I will take for example the admission cams M and N. The cams M on the one hand and N on the other hand have projections disposed in the same manner. The levers L are cut away at the end to different profiles in the direction of their length, and these profiles correspond to the number of valves to be operated. For example in Figure 4 the lower diagram shows how the cam M comes successively against the six levers L numbered 1, 2, 3, 4, 5 and 6 in the figure. It will be seen that this contact takes place in an identical way and consequently in this position of the cam, *i.e.* with M put into the extreme left hand position, all the cylinders operate. On the other hand, with the cam M moved into the extreme right hand position as shown in the upper part of the figure, it will be seen that the cam only lifts the lever L numbered 1, *i.e.* that appertaining to the group of two cylinders A<sup>1</sup> and A<sup>2</sup>. Between these two extreme positions it will be seen that the cam L will successively lift the levers L numbered 1 and 2, then 1, 2 and 3, and so forth.

For the exhaust the operation is analogous, but in this case the cams M<sup>1</sup> or N<sup>1</sup> all have a collar b. These cams are identical. The lower part of Figure 5 is a diagram corresponding to the case in which the cam M<sup>1</sup> is slidden fully to the left. In this case the levers Nos. 1, 2, 3, 4, 5 and 6 are actuated in succession and all the cylinders are in operation. In the upper part of Figure 5 the cam M<sup>1</sup> has been slidden to the extreme right and in this case the collar b keeps the levers 2, 3, 4, 5 and 6 raised, that is to say cuts out the five corresponding groups of cylinders, and only lever No. 1, which is clear of the collar b, operates; this diagram therefore corresponds to the case in which only one group of two cylinders is in operation.

The suction is exerted on the carburettor through an annular chamber S in permanent communication therewith. The motor is cooled by a brisk current of air. For this purpose two openings T T<sup>1</sup> are provided on opposite sides of the motor. When the pistons move away from the centre in making their return strokes, they draw in fresh air below them through T, this air being heated by and cooling the walls of the cylinders and being expelled through the opening T<sup>1</sup> when the pistons move towards the centre on their out strokes. To ensure the maintenance of this current of air it suffices to mount two fans U U<sup>1</sup> on crank discs V V<sup>1</sup> driven by the movement of the piston and to set the blades of these fans so that the current shall flow in the direction mentioned.

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. A motor of the kind referred to, comprising two coinciding sets of six cylinders, each set consisting of three groups of two cylinders set V-wise and so that the angles of the V's are re-entering angles and that the set forms three groups of two cylinders, each group having the appearance of a V, the angle of which is situated towards the centre of the system, with the limbs extending away therefrom, whereby great symmetry of the rotating system relatively to the centre of rotation is obtained and the mass is brought near the centre of rotation.

2. In a motor according to Claim 1, operating the admission and exhaust valves by cams mounted on the fixed shaft at the respective sides of the motor and adapted to operate the valve rods through the medium of levers differing in shape for different cylinders, said cams being arranged to slide on the fixed shaft and thereby to cut out a desired number of cylinders from operation, substantially as described.

3. In a motor according to Claim 1 or 2, fans mounted at each side of each

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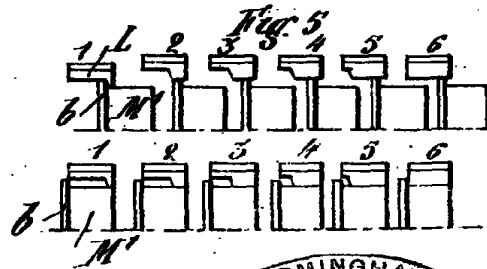
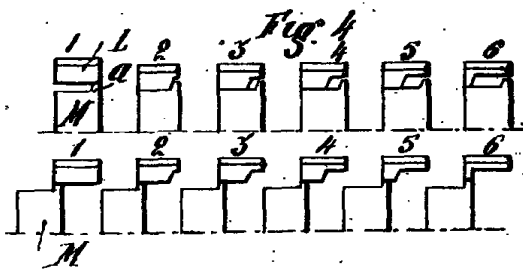
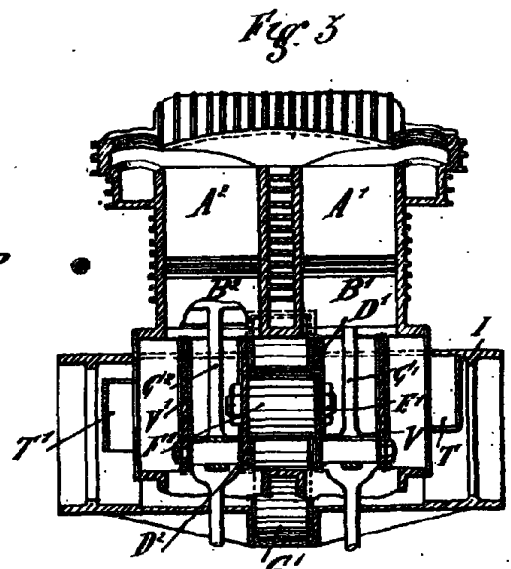
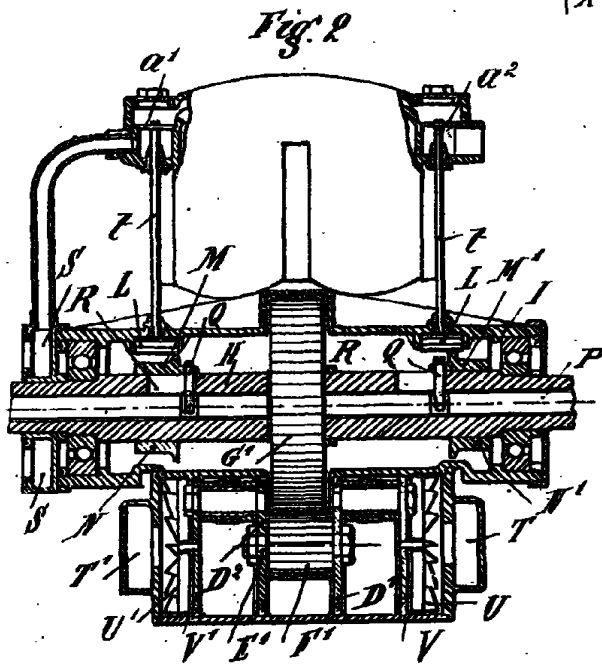
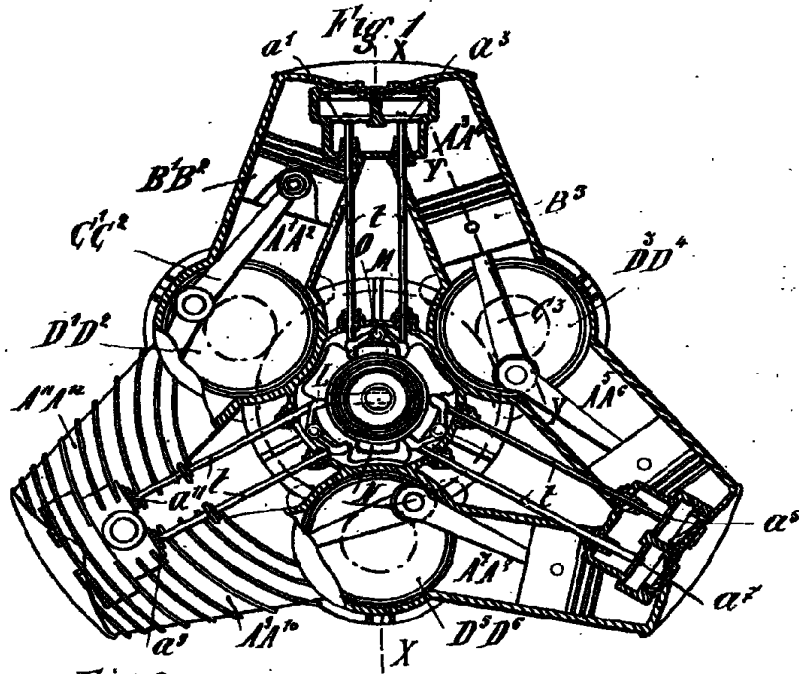
of the three planet wheels driven by the piston rods, and disposed on each side of the motor, said fans being adapted on the one side to draw air through suitably located air sleeves and on the other side to force it into the atmosphere, for the purpose of maintaining a current of air for cooling the interior of the motor, substantially as described.

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Dated this 25th day of February, 1910.

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



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