R. LUCAS.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED JAN. 28, 1909.

952,706. Patented Mar. 22, 1910.

Fig. 2.

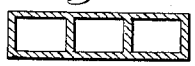
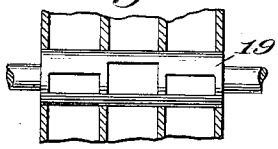


Fig. 3.



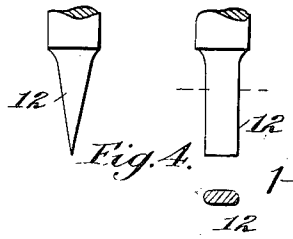


Fig. 1.

Witnesses

C. B. Franzoni.

L. R. Merritt.

Inventor.

Ralph Lucas

by his Attorneys

Baldwin & Wright.

UNITED STATES PATENT OFFICE.

RALPH LUCAS, OF BLACKHEATH, ENGLAND, ASSIGNOR TO "VALVELESS" LIMITED, OF LONDON, ENGLAND.

INTERNAL-COMBUSTION ENGINE.

952,706. Specification of Letters Patent. Patented Mar. 22, 1910.

Application filed January 28, 1909. Serial No. 474,792.

To all whom it may concern:

Be it known that I, RALPH LUCAS, engineer, a subject of the King of Great Britain, residing at 191 Westcombe Hill, Blackheath, in the county of Kent, England, have invented new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

This invention relates to improvements in the details of engines of the well known type having two cylinders placed side by side and opening into combustion and crank chambers common to both, the pistons in the cylinders operating cranks on two parallel crank shafts which are geared together.

Figure 1 is a section of an engine embodying these improvements. Figs. 2 and 3 are local sections. Fig. 4 shows a detail.

1, 1 are the two cylinders, 2 is the combustion chamber, and 3 the crank chamber.

4 are the pistons connected by rods 5 to crank pins 6 fixed to disks 7 on the crank shafts 8, the latter being geared together by toothed wheels 9.

10 and 17 are counterbalance weights fixed to the disks 7.

11 is the pipe supplying liquid fuel through the needle valve 12 and 13 is the air supply valve mounted on the needle 12 and working against the spring 14.

18 is the sparking plug.

30 are lubricating tubes.

31 are oil traps and 32 are draw off cocks.

The action of the engine is as follows:— As the pistons rise air is sucked into the crank chamber 3 and fuel is sucked through the valve 12. When the pistons descend on the charge being fired the air in the crank chamber is compressed until the port 15 is uncovered and then the compressed air rushes past the valve thereby becoming impregnated with inflammable vapor and enters the cylinders 1 and combustion chamber 2 sweeping out the products of combustion through the exhaust port 16. The pistons then rise again compressing the charge and so on. All the above is well known and requires no further explanation.

In order to insure a good blast of air past the fuel valve 12, even when the air supply is throttled, the passage leading to the valve 12 is divided into two or more passages (three are shown at Fig. 3) and the throttle valve 19 has corresponding ports of which the middle one is the larger so that when the valve 19 is partially closed all or nearly all of the air passes through the middle port directly across the valve 12.

In order to better proportion the quantities of liquid fuel and air the needle valve 12 in place of being made conical as is usual is made wedge shaped with cylindrical edges, as shown at Fig. 4.

In order to render the engine more silent the air is admitted to the valve 13 from a chamber 20 formed in the casing of the engine, the air entering this chamber through a hole 21.

The exhaust port is indicated at 16. There is only one exhaust port for the two cylinders.

What I claim in engines of the type referred to is—

1. The combination of two cylinders placed side by side, a combustion chamber open to one end of both cylinders, a crank chamber open to the other end of both cylinders, means for supplying air to the crank chamber, a plurality of passages connecting the crank and combustion chambers, means for supplying fuel to one of the passages, and a valve adapted to close the other passages while the latter passage is left open.

2. The combination of two cylinders placed side by side, a combustion chamber open to one end of both cylinders, a crank chamber open to the other end of both cylinders, a silencing chamber provided with an opening for the admission of air, a non-return valve between the silencing and crank chambers, a passage connecting the crank and combustion chambers, and a pipe supplying fuel to the passage.

3. The combination of two cylinders placed side by side, a combustion chamber open to one end of both cylinders, a crank chamber open to the other end of both cylinders, means for supplying air to the crank chamber, a plurality of passages connecting the crank and combustion chambers, a pipe supplying fuel to one of the passages, a wedge shaped needle with cylindrical edges closing the end of the pipe, and a valve adapted to close the other passages while the latter passage is left open.

4. The combination of two cylinders placed side by side, a combustion chamber open to one end of both cylinders, a crank chamber open to the other end of both cylinders, a silencing chamber provided with

an opening for the admission of air, a non-return valve between the silencing and crank chambers, a plurality of passages connecting the crank and combustion chambers, means for supplying fuel to one of the passages, and a valve adapted to close the other passages while the latter passage is left open.

5. The combination of two cylinders placed side by side, a combustion chamber open to one end of both cylinders, a crank chamber open to the other end of both cylinders, a silencing chamber provided with an opening for admission of air, a non-return valve between the silencing and crank chambers, a passage connecting the crank and combustion chambers, a pipe supplying fuel to the passage, and a wedge shaped needle with cylindrical edges closing the end of the pipe.

6. The combination of two cylinders placed side by side, a combustion chamber open to one end of both cylinders, a crank chamber open to the other end of both cylinders, means for supplying air to the crank chamber, a plurality of passages connecting the crank and combustion chambers, a pipe supplying fuel to one of the passages, a wedge shaped needle with cylindrical edges fixed to the non-return valve and closing the end of the pipe, and a valve adapted to close the other passages while the latter passage is left open.

7. The combination of two cylinders placed side by side, a combustion chamber open to one end of both cylinders, a crank chamber open to the other end of both cylinders, a silencing chamber provided with an opening for the admission of air, a non-return valve between the silencing and crank chambers, a passage connecting the crank and combustion chambers, a pipe supplying fuel to the passage, and a wedge shaped needle with cylindrical edges fixed to the non-return valve and closing the end of the pipe.

RALPH LUCAS.

Witnesses:
H. D. JAMESON,
F. L. RAND.