

PATENT SPECIFICATION

Application Date: Jan. 31, 1936. No. 3001/36.

465,540

Complete Specification Left: Nov. 12, 1936.

Complete Specification Accepted: May 10, 1937.



PROVISIONAL SPECIFICATION

Improvements in or relating to Valve Mechanism for Internal Combustion Engines

We, THE FAIREY AVIATION COMPANY LIMITED, of North Hyde Road, Hayes, in the County of Middlesex, a British Company, and ARCHIBALD GRAHAM FORSYTH, of "Venlaw", Burdon Lane, Cheam, in the County of Surrey, a British Subject, do hereby declare the nature of this invention to be as follows:—

This invention relates to the inlet and outlet valves of an internal combustion engine having for each cylinder two inlet and two outlet valves arranged in pairs. In a known arrangement the two valves (inlet or outlet) of a pair are situated side by side, the pair of inlet valves being on the one side and the pair of outlet valves being on the other side of the median longitudinal plane of the cylinder block, whilst a bifurcated passage leads from the induction pipe to a pair of inlet valves and a bifurcated passage leads from a pair of exhaust valves to the exhaust pipe of the engine. With this arrangement of the valves two parallel cam shafts are employed the one for the row of inlet valves at the one side of said median plane and the other for the row of exhaust valves at the other side of said median plane.

According to the present invention the two valves (inlet or exhaust) of a pair, instead of being arranged as above set forth are situated on opposite sides of said median plane, the valves of each pair are operated through a crosspiece or yoke the yokes of all the pairs are actuated by means of a single cam shaft and the limbs

of the bifurcated induction passages lead to the inlet valves of adjacent cylinders.

This invention not only enables all the valves to be actuated by means of a single cam shaft, but facilitates the arrangement of the water or steam jacketting of the cylinders and of the induction ports and ensures a more even distribution of the gaseous fuel.

In accordance with one form of this invention the cylinder block includes an induction passage for each pair of cylinders, said passages being arranged alongside the cylinders but separated therefrom by part of the water jacket, the axes of said induction passages extending parallel with those of said cylinders. Overhead valves are carried in the usual manner by the cylinder head which is formed with bifurcated passages arranged to communicate, on the one hand with the induction passages on the cylinder block and, on the other hand, with the two inlet valves appertaining to two adjacent cylinders. The cylinder head is formed with guides for the stems of a series of substantially T-shaped crosspieces or yokes, one for each pair of inlet or outlet valves, the cross member of which cooperates with the stems of said pair of valves, whilst a single centrally arranged cam shaft is adapted to actuate all the valves in pairs.

Dated this 31st day of January, 1936.

A. M. & WM. CLARK,
Chartered Patent Agents,
53 & 54, Chancery Lane, London, W.C.2.

COMPLETE SPECIFICATION

Improvements in or relating to Valve Mechanism for Internal Combustion Engines

We, THE FAIREY AVIATION COMPANY LIMITED, of North Hyde Road, Hayes, in the County of Middlesex, a British Company, and ARCHIBALD GRAHAM FORSYTH, of "Venlaw", Burdon Lane, Cheam, in the County of Surrey, a British Subject, 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:—

This invention relates to the inlet and outlet valves of an internal combustion engine having, for each cylinder, two inlet and two outlet valves arranged in pairs. In a known arrangement the two

[P.A.]

3d

valves (inlet or outlet) of a pair are situated side by side, the pair of inlet valves being on the one side and the pair of outlet valves being on the other side of the median longitudinal plane of the cylinder block, whilst a bifurcated passage leads from the induction pipe to a pair of inlet valves and a bifurcated passage leads from a pair of exhaust valves to the exhaust pipe of the engine. With this arrangement of the valves two parallel cam shafts are employed the one for the row of inlet valves at the one side of said median plane and the other for the row of exhaust valves at the other side of said median plane. It has also been proposed that the two valves (inlet or exhaust) of a pair, instead of being arranged as above set forth should be situated on opposite sides of said median plane, the valves of each pair being operated through a crosspiece or yoke, and the yokes of all the pairs being actuated by means of a single cam shaft. According to the present invention a single induction or exhaust passage leads to, or from, each pair of inlet or exhaust valves as the case may be.

This invention facilitates the arrangement of the water or steam jacketting of the cylinders and of the induction ports and ensures a more even distribution of the gaseous fuel.

In the accompanying drawings Figure 1 is a fragmentary sectional elevation transversely of the cylinder head of an internal combustion engine showing a pair of valves arranged in accordance with one form of this invention and Figure 2 is an inverted plan, on a smaller scale, of one form of cylinder head for such an engine.

As illustrated in the drawings a cylinder block *a* includes an induction passage such as *b* for each pair of cylinders such as *c*, said passages *b* being arranged alongside the cylinders *c* but separated therefrom by part *d* of the water jacket, the axes of said induction passages *b* extending parallel with those of said cylinders *c*. Overhead valves *e e* are carried in the usual manner by the cylinder head *f*.

The valves *e e* shown in Figure 1 are inlet valves, but the relative positions of the inlet and outlet valves are indicated by the relative positions of the seatings which are shown at *g . . .* and *h . . .* respectively in Figure 2 the positions of

the cylinders *c* being indicated by the positions of the corresponding chambers *c¹* in the cylinder head *f*.

The cylinder head *f* is formed with bifurcated passages *j j* arranged to communicate, on the one hand with the induction passages *b* on the cylinder block *a* as shown in Figure 1, and, on the other hand, with the two inlet valves *e e* appertaining to two adjacent cylinders *c c* as indicated in Figure 2.

The cylinder head *f* is also formed with passages *k . . .* leading from the exhaust valve seatings *h . . .* to an exhaust manifold, not shown. Further the cylinder head *f* is formed with guides such as *m* for the stems such as *n* of a series of substantially T-shaped crosspieces or yokes such as *n o* one for each pair of inlet or outlet valves, the cross member *o* of which cooperates with the stems *p p* of said pair of valves, whilst a single centrally arranged cam shaft *q* is adapted to actuate all the valves in pairs. Figure 1 of the drawings shows a cam *r* on the cam shaft *q* for actuating a pair of inlet valves *e e* but it will be understood that a suitably profiled and angularly located cam, not shown, is provided on the cam shaft *q* for actuating each pair of exhaust valves not shown.

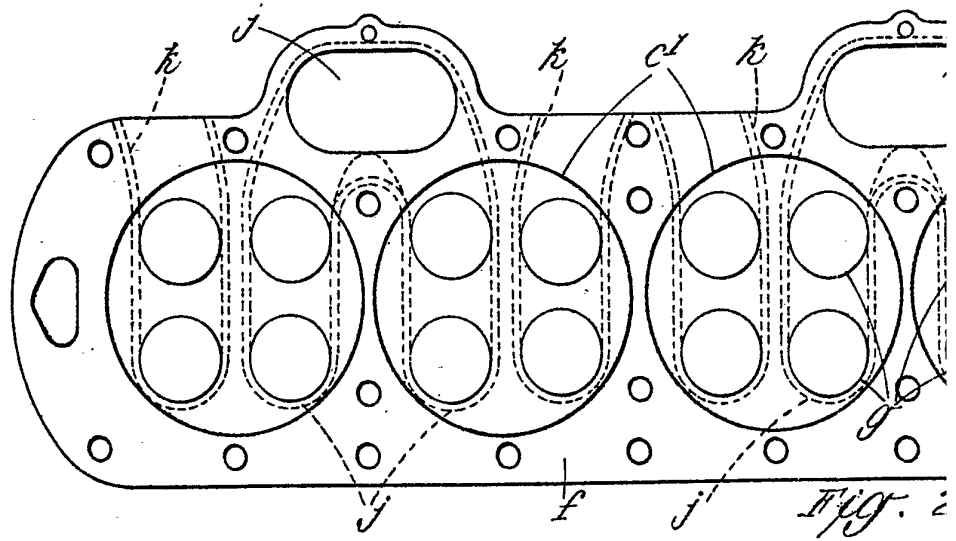
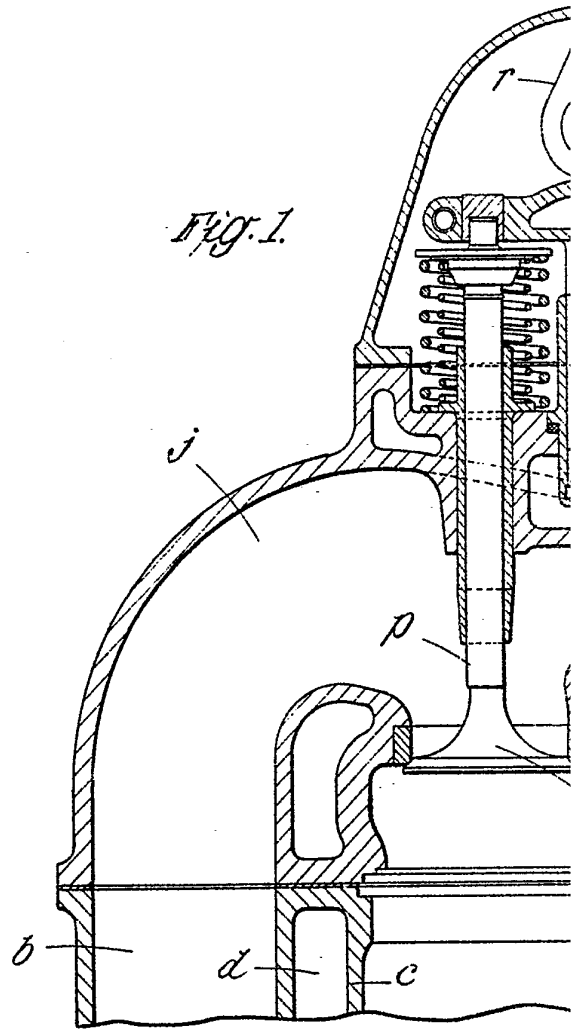
Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

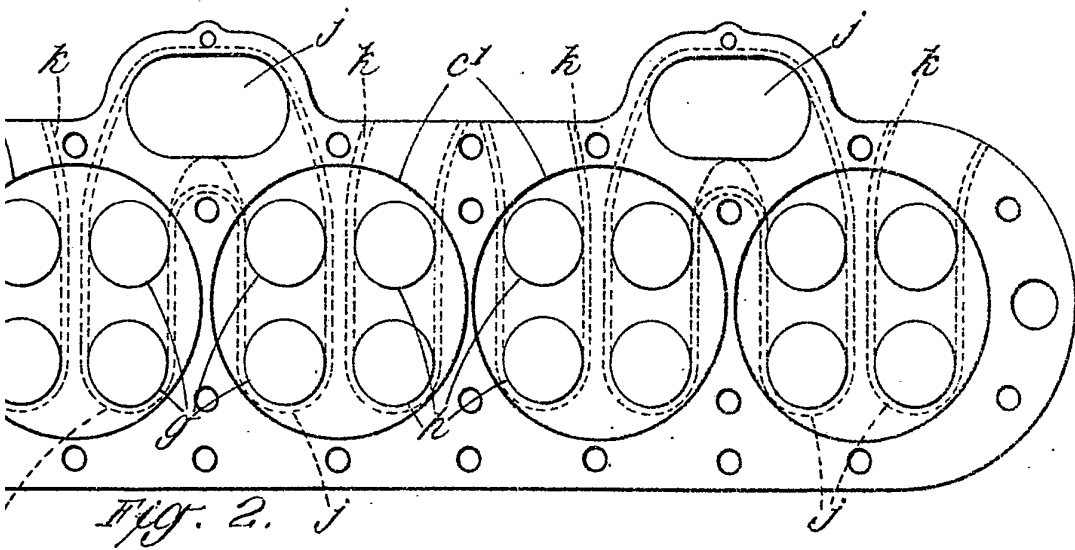
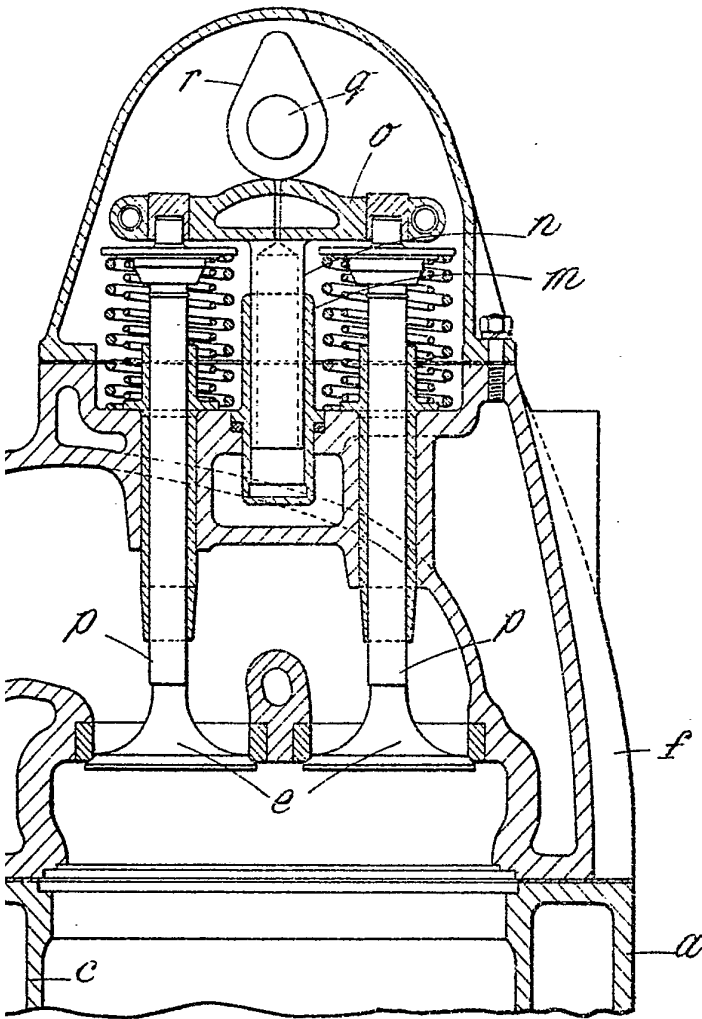
1. An internal combustion engine having, for each cylinder, two inlet and two outlet valves arranged in pairs, the two valves (inlet or exhaust) of a pair being situated on opposite sides of the median longitudinal plane of the cylinder block and operated through a crosspiece or yoke, the yokes of all the pairs being actuated by means of a single cam shaft, wherein a single induction or exhaust passage leads to, or from, each pair of inlet or exhaust valves as the case may be.
2. An internal combustion engine having valve mechanisms and passages arranged substantially in the manner and for the purpose hereinbefore set forth with reference to the accompanying drawings.

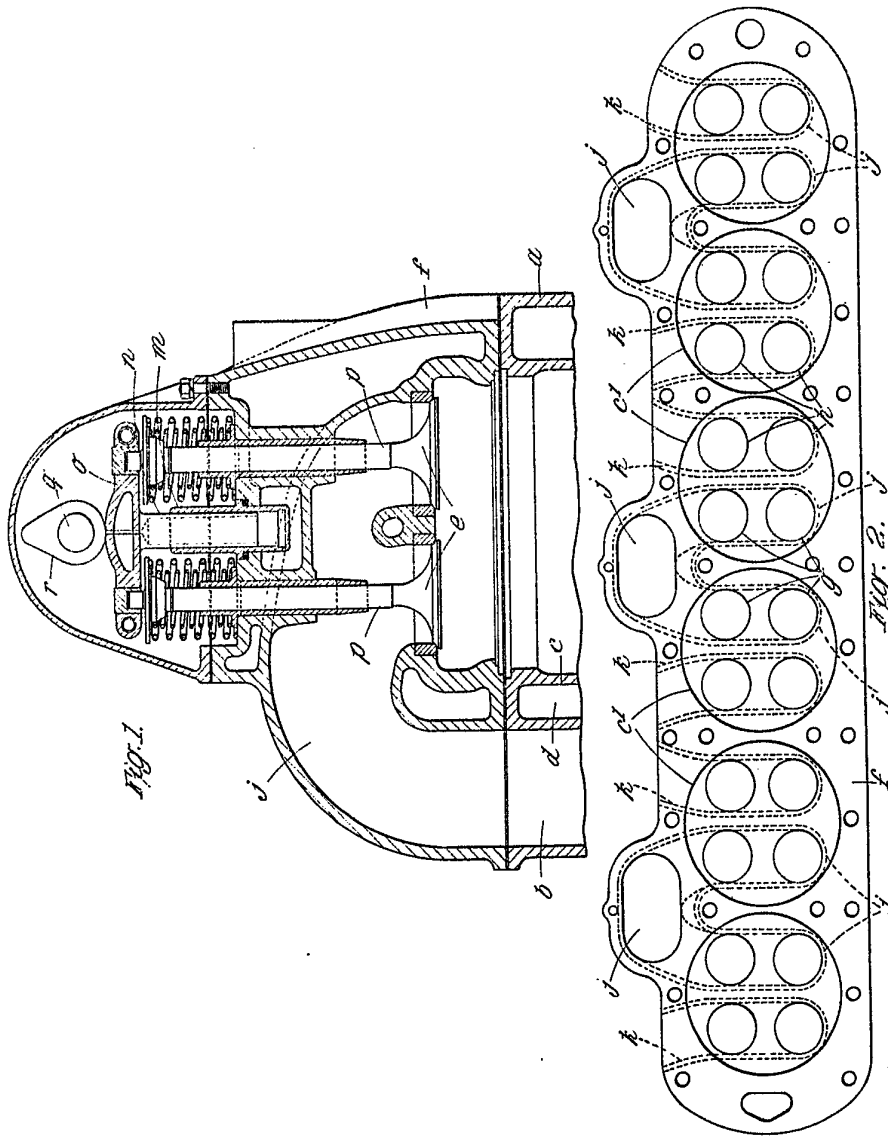
Dated this 12th day of November, 1936.

A. M. & WM. CLARK,
Chartered Patent Agents,
53 & 54, Chancery Lane, London, W.C.2.

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







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