

PATENT SPECIFICATION

406,118



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PROVISIONAL SPECIFICATION.

No. 36,324, A.D.1932.

Improvements in or relating to the Cylinder Block and Crank Case of an Internal Combustion Engine.

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

It is well known to cast a plurality of cylinders for an internal combustion engine as a unitary structure, but the object of the present invention is to obtain a very rigid engine construction, an end which is attained, in accordance with this invention, by casting a cylinder block integral with the upper half of the crank case.

Preferably, the housing for reduction gear is included in this integral structure, as also may be the induction pipe and its branches, as set out in the Specification accompanying our concurrent application for Letters Patent No. 36,325, 1932, and one or more manifold pipes for the cooling water as set out in the Specification accompanying our concurrent application for Letters Patent No. 36,327 of 1932.

The invention is particularly applicable to a multi-cylinder internal combustion engine of the Vee-type as in that con-

struction the upper half of the crank case is very small as compared with an engine in which the cylinders are arranged in line, although the invention may be applied also to an engine of the latter type.

When the integral structure embodies the subject matter of our concurrent application for Letters Patent aforesaid in an internal combustion engine of the Vee-type the induction pipe may be arranged in the angle between the two lines of cylinders, the top of the crank case forming the bottom of said induction pipe, whilst a manifold pipe for each line of cylinders may be arranged at the outer sides of the lines of cylinders in the angles between their water jackets and the top of the crank case, the leads to said manifolds passing through supporting brackets integral with the sides of the upper half of the crank case.

Owing to the absence of bolted joints between the cylinders and the upper half of the crank case, a very rigid structure is presented without undue labour.

Dated the 22nd day of December, 1932.

A. M. & WM. CLARK,
Chartered Patent Agents,

53 & 54, Chancery Lane, London, W.C.2.

PROVISIONAL SPECIFICATION.

No. 36,325, A.D. 1932.

Improvements in or relating to the Induction System of an Internal Combustion Engine.

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

This invention relates to the induction system of an internal combustion engine

[Price 1/-]

Price 4s

and has for its object very simple means for pre-heating the combustible mixture to ensure that it reaches the cylinders of the engine in a thoroughly vapourized state.

5 According to this invention the induction manifold of an internal combustion engine, including the branches therefrom is cast integral with the water jacket of the cylinder block, so that the passages for the combustible mixture are maintained in a heated condition without the necessity of providing a separate water jacket for said manifold, thus ensuring complete vapourization of the fuel.

10 The construction according to this invention is particularly applicable to a multi-cylinder Vee-type engine as the manifold can be disposed at the bottom of the channel formed between the inclined rows of cylinders, whilst the

branches therefrom can run upwards at the adjacent sides of the rows of cylinders.

It is to be understood that the cylinder heads are formed with passages for leading the combustible mixture from the branches into the valve chambers, and that the induction manifold and its branches are integral with the cylinders also in cases where cylinder liners are not fitted into the cylinder blocks.

The present invention is particularly applicable where the cylinder block is integral with the upper half of the crank case as set out in the Specification accompanying our concurrent application for Letters Patent No. 36,324 of 1932.

Dated the 22nd day of December, 1932.
A. M. & WM. CLARK,
Chartered Patent Agents,
53 & 54, Chancery Lane, London, W.C.2.

PROVISIONAL SPECIFICATION.

No. 36,327, A.D. 1932.

Improvements in or relating to the Water Cooling System of an Internal Combustion Engine.

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

This invention has for its object to improve the water cooling system of an internal combustion engine by delivering the water to the water jacket of each cylinder individually instead of allowing the water to find its way past one cylinder to the next and so on. To this end and in accordance with this invention a manifold pipe cast integral with the water jacket of a cylinder block runs the length of said block and communicates with the water jacket of each cylinder through an appropriate port.

60 The manifold pipe may be connected

with a circulating pump in the system leading to any convenient part in the length of said pipe and in the case of a multi-cylinder engine of the Vee-type the connection may be made through a supporting bracket.

If desired the ports between the manifold pipe and the several water jackets may be of progressively varying size so as to ensure uniformity of distribution of the cooling water.

This arrangement of the water cooling system is particularly applicable where the cylinder block is integral with the upper half of the crank case as set out in the specification accompanying our concurrent application for Letters Patent No. 36,324 of 1932.

Dated this 22nd day of December, 1932.
A. M. & WM. CLARK,
Chartered Patent Agents,
53 & 54, Chancery Lane, London, W.C. 2.

COMPLETE SPECIFICATION.

Improvements in or relating to the Cylinder Block and Crank Case of an Internal Combustion Engine.

80 We, THE FAIREY AVIATION COMPANY LIMITED, of Cranford Lane, Hayes, in the County of Middlesex, a British Company,

and ARCHIBALD GRAHAM FORSYTH, of "Venlaw", Burdon Lane, Cheam, 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:—

It is well known to cast a plurality of cylinders for an internal combustion engine as a unitary structure, but the object of the present invention is to obtain a very rigid engine construction, an end which is attained, in accordance with this invention, by casting a cylinder block integral with the upper half of the crank case, and with the induction pipe and its branches and one or more manifolds for the cooling water. Preferably, the housing for reduction gear is included in this integral structure.

The invention is particularly applicable to a multi-cylinder internal combustion engine of the Vee-type as in that construction the upper half of the crank case is very small as compared with an engine in which the cylinders are arranged in line, although the invention may be applied also to an engine of the latter type.

One form of the invention will now be described with reference to the accompanying drawing which is a partial section transversely of the crank shaft axis of a Vee-type internal combustion engine, showing the upper half of the crank case and two of the Vee-type cylinders, parts being shown in elevation and parts being omitted.

As illustrated, cylinder liners such as *a a* are arranged within water jackets *b b* which are cast integral with the upper half *c* of the crank case. *d* is the induction manifold which is also cast integral with the water jackets *b b* and disposed at the bottom of the channel formed between the inclined rows of cylinders, whilst branches such as *e e*, from said manifold *d* which are also integral with the water jackets *b b* run upwards at the adjacent sides of the rows of cylinders and lead to corresponding passages such as *f f* cast integral with the cylinder heads such as *g g* in which are arranged inlet valves such as *h h*.

From the foregoing it will be appreciated that the passages *d e f* for the combustible mixture are maintained in a heated condition due to their close association with correspondingly adjacent parts of the water jackets *b b* thus ensuring complete vapourization of the fuel. *j j* are water manifold pipes for each line of cylinders which are arranged at the outer sides of the lines of cylinders in the angles between the corresponding parts

of the water jackets *b b* and the top of the crank case *c*, the leads, such as *k* to said water manifolds *j j* passing through supporting brackets *m m* integral with the sides of the upper half of the crank case *c*. The water manifolds *j j* run the length of the cylinder block and communicate with the spaces between the liners such as *a a* and the water jackets *b b* through ports such as *n n*. These ports, if desired, may be of progressively varying size so as to ensure uniformity of distribution of the cooling water.

The cooling water, after passing through the spaces between the liners such as *a a* and the water jackets *b b* passes through apertures (not shown) to corresponding passages such as *o* in the cylinder heads, such as *g g* and thence to a radiator (not shown), a circulating pump (not shown) being provided and connected with a convenient part in the length of the water manifold pipes *j j* by way of the leads such as *k*.

Owing to the absence of bolted joints between the cylinders and the upper half of the crank case the induction pipe and the water manifold, a very rigid structure is presented without undue labour.

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. For an internal combustion engine a cylinder block cast integral with the upper half of the crank case, with the induction pipe and its branches and with one or more manifold pipes for the cooling water.

2. In a multi-cylinder Vee type internal combustion engine as claimed in claim 1, an induction manifold arranged at the bottom of the channel formed between the inclined rows of cylinders, the branches from said manifold running upwards at the adjacent sides of the rows of cylinders.

3. In a multi-cylinder Vee type internal combustion engine a water manifold cast in accordance with claim 1. and connected with a circulating pump through a supporting bracket, said manifold running the length of said block and communicating with the water jacket of each cylinder through an appropriate port.

4. An internal combustion engine having a cylinder block substantially as herein described with reference to the accompanying drawings.

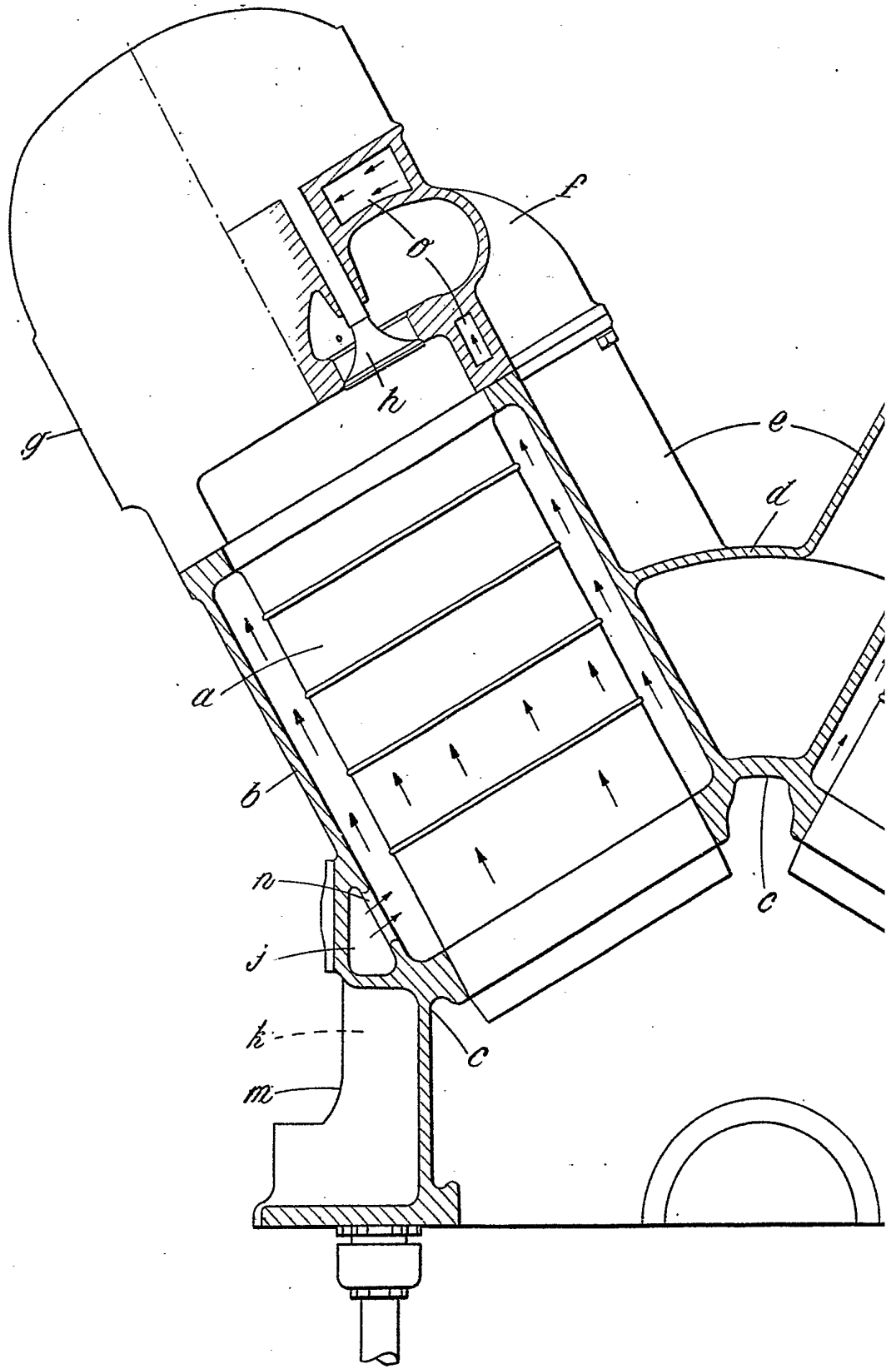
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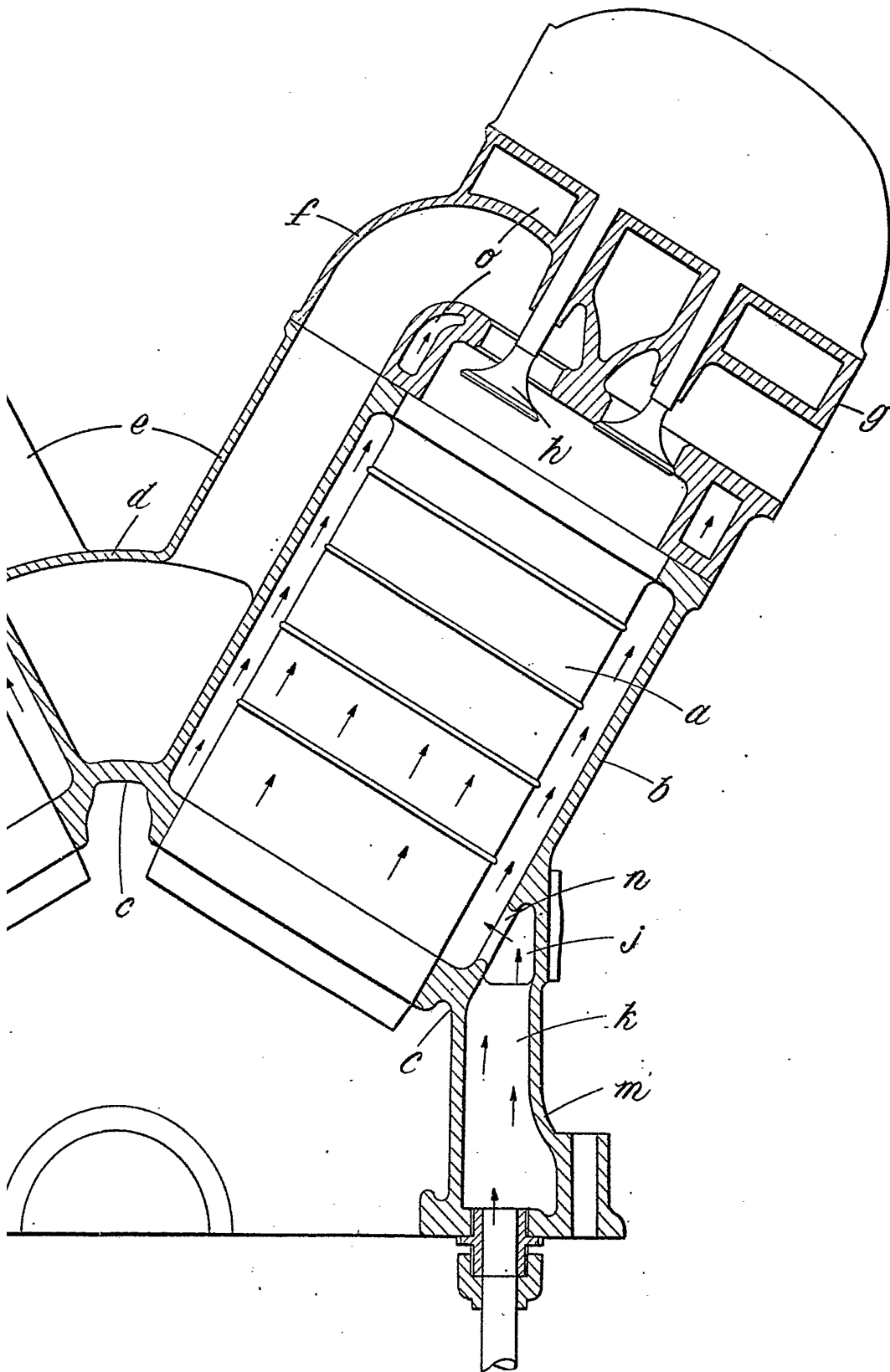
A. M. & WM. CLARK,

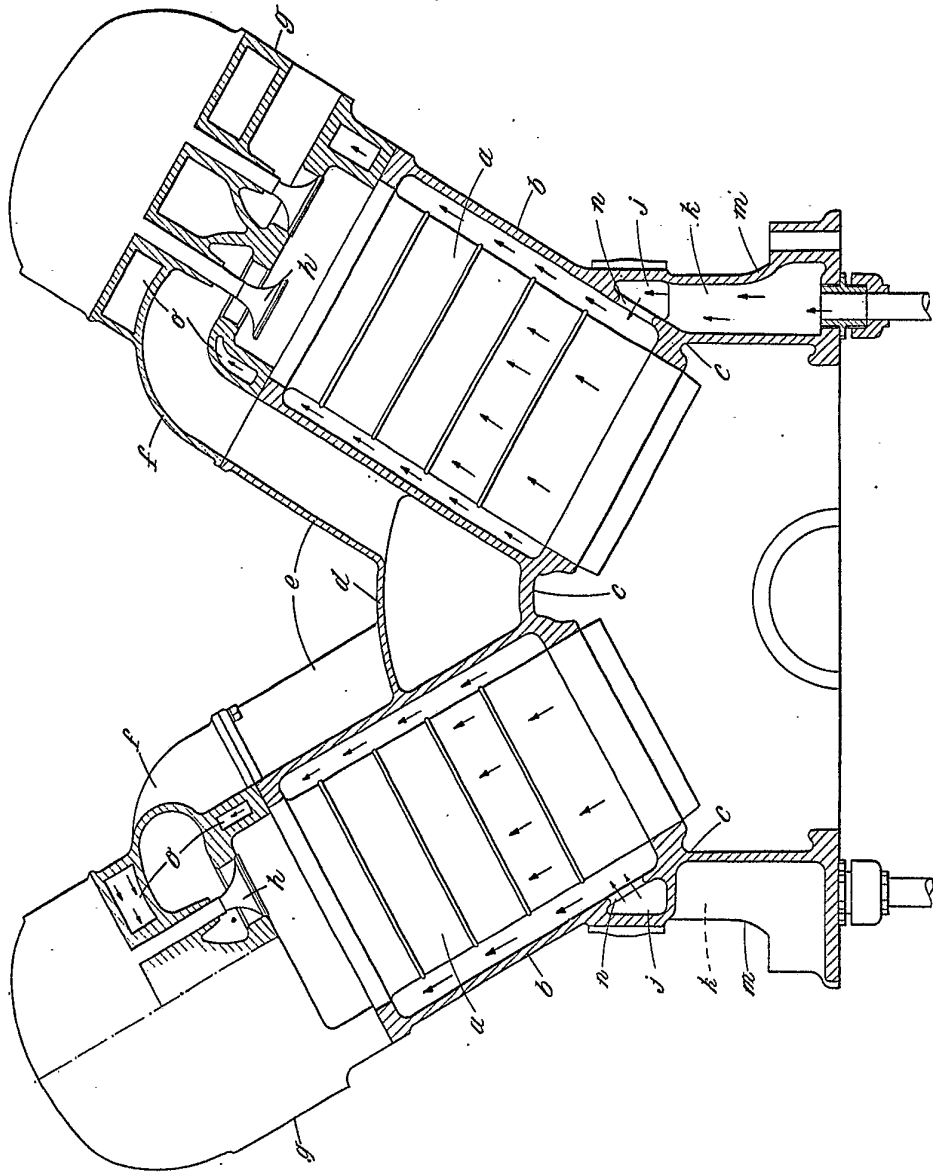
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[This Drawing is a reproduction of the Original on a reduced scale.]







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