S. S. GUY.

V-TYPE INTERNAL COMBUSTION ENGINE.

APPLICATION FILED NOV. 20, 1918.

1,416,348. Patented May 16, 1922.

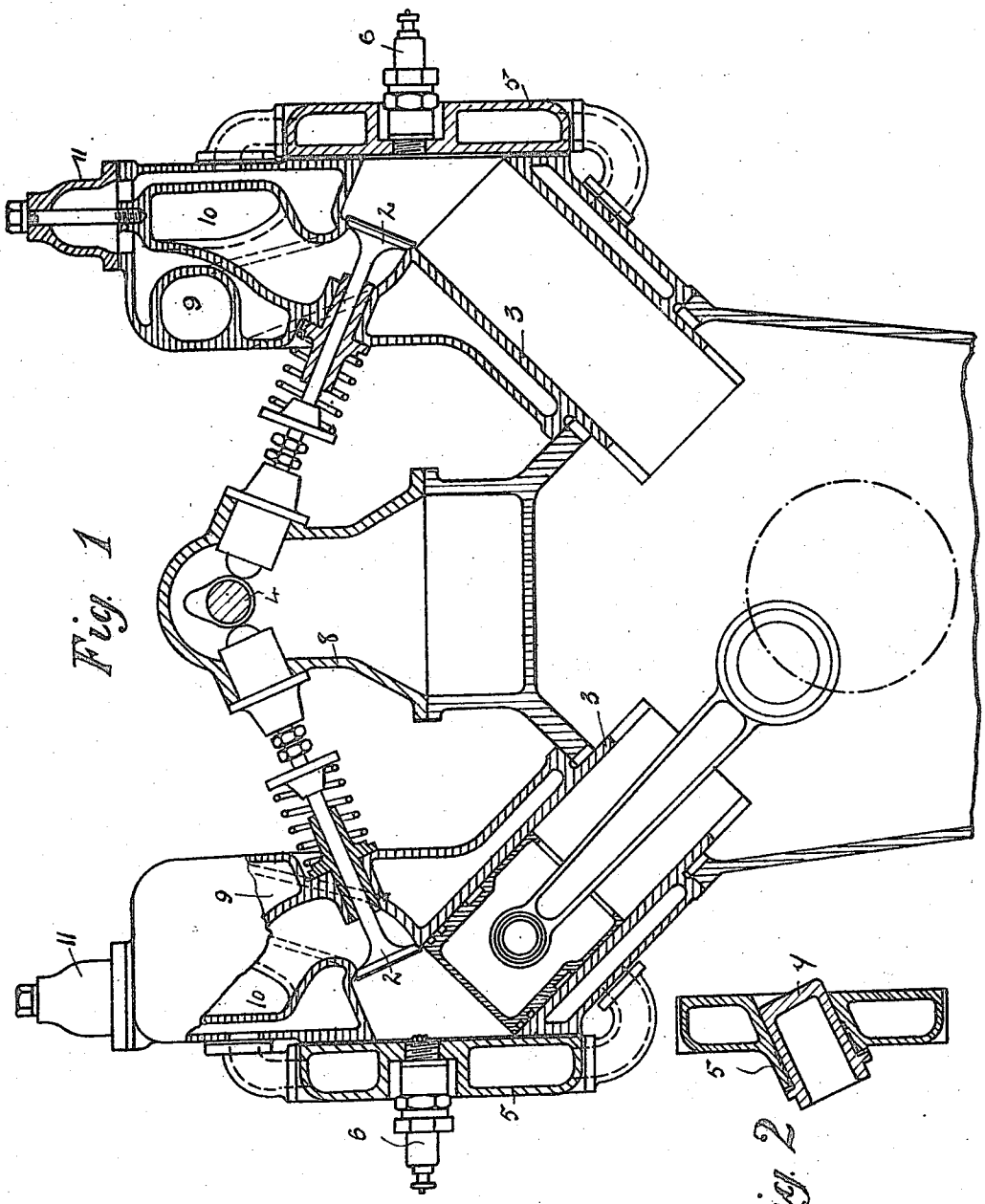

Fig. 1

Fig. 2

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UNITED STATES PATENT OFFICE.

SYDNEY SLATER GUY, OF FINCHFIELD, WOLVERHAMPTON, ENGLAND.

V-TYPE INTERNAL-COMBUSTION ENGINE.

1,416,348. Specification of Letters Patent. Patented May 16, 1922.

Application filed November 20, 1918. Serial No. 263,331.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, SYDNEY SLATER GUY, subject of the King of Great Britain, residing at Woodview, Finchfield, Wolverhampton, Staffordshire, England, have invented certain new and useful Improvements in V-Type Internal-Combustion Engines (for which I have made an application for patent in Great Britain, No. 115,132, dated June 20, 1917,) of which the following is a specification.

This invention relates to certain improvements in V-type internal combustion engines of the kind in which overhead valves are employed operated from a cam shaft arranged within the angle formed by the opposing cylinders.

The object of the present invention is to simplify the valve operating mechanism and at the same time to arrange the valves in such a manner that the cylinder heads may be readily removed without the necessity for disturbing the valve mechanism and when so removed give free access to the valves, valve seats, combustion chambers and pistons for the purposes of inspection, valve grinding adjustments, removal and replacements of parts and cleaning.

According to the present invention the valve tappets are operated directly by the cam-shaft the use of intermediate rockers being dispensed with. In this way the valves are given a direct lift whilst a saving in weight is obtained by the elimination of the rockers and rocker shaft which in the case of multi-cylinder aero engines is in itself a feature of considerable importance.

The valves are all arranged in the inside of the cylinders with their axes making an acute angle on the crank case side with the axes of their respective cylinders. The axis of the cam shaft coincides with the points of intersection of the axes of the opposing valve stems and the shaft itself is preferably enclosed in a detachable dust and oil proof casing.

On the drawings:—

Figure 1 represents a transverse sectional view of a V-type engine constructed according to the invention.

Figure 2 is a detail sectional view of a cylinder head fitted with a removable valve cap.

Referring to the drawing the valves 2, 2 are, as will be seen, arranged on the inside of the engine with their axes making an acute angle with the axes of their respective cylinders 3, 3 and, in the example shown, are operated directly from a single cam shaft 4 which is common to both sets of valves and is arranged with its axis coincident with the points of intersection of the axes of the opposing valve stems.

Reference to Fig. 1 will show that this arrangement of the valves is particularly advantageous from the point of view of accessibility since it leaves the cylinder heads 5, 5 on each side of the engine quite clear so that where the said heads are made detachable they may be readily removed to expose the valves and other internal parts by undoing a few bolts, studs or other simple type of fastening and without in any way disturbing the valve mechanism.

The disposition aforesaid of the valves has the further advantage that it leaves no pockets in the combustion chamber whilst owing to the fact that the valves are directed towards the cylinder heads they may be ground in their sets or withdrawn in a direct manner from the cylinders without disturbing the cam-shaft, valve tappets and contiguous operating parts.

A further important feature arising from the construction above described is that one or more sparking plugs 6 may be advantageously and conveniently arranged centrally over the pistons.

Where the cylinder head 5 is formed in one with the cylinder a readily detachable valve cap 7 for each valve is provided therein as shown in Fig. 2 said valve caps may however if desired, be employed with detachable cylinder heads.

Where a single cam-shaft 4 is employed as shown the angle of the valve tappets is such that each cam may be correctly timed to operate two valves.

The cam shaft or cam shafts where more than one is employed are perfectly enclosed in a detachable casing 8 by removing which the whole of the valve tappets and cams are exposed and readily accessible.

The inlet and exhaust manifolds 9, 10 respectively at each side of the engine are preferably cast integrally with the cylinder casting and may be arranged above the cylinder heads with the top of water pipe 11,

where the engine is water cooled, running along the top of the exhaust passage 10 thereby effectually cooling the exhaust gases.

I claim:

In an internal combustion engine, a crank shaft, a crank case having upwardly convergent sides and a central support running along the top, a series of water-jacketed cylinders mounted at right angles in the opposite convergent sides of said crank case, a water pipe running along the top of each series of cylinders and communicating with the water jackets thereof, inlet and exhaust manifolds cast integrally with said cylinders, said exhaust manifolds being arranged below said water pipes, detachable water cooled cylinder covers on the outside of said cylinders, outside water connections between said covers and their respective cylinder water jackets, a self-contained detachable casing mounted on said central support of said crank-case, a cam-shaft rotatably mounted within said detachable casing, inlet and exhaust valves on the insides of said cylinders the axes of opposing valve stems intersecting on the axis of said cam shaft, and valve tappets in said detachable casing in operative relationship with said cam shaft and abutting against the outer ends of said valve stems.

In testimony whereof I affix my signature.

SYDNEY SLATER GUY.