Oct. 30, 1945. F. M. ASPIN 2,387,972

CYLINDER HEAD OF INTERNAL-COMBUSTION ENGINES

Filed May 19, 1943

Fig. 1.

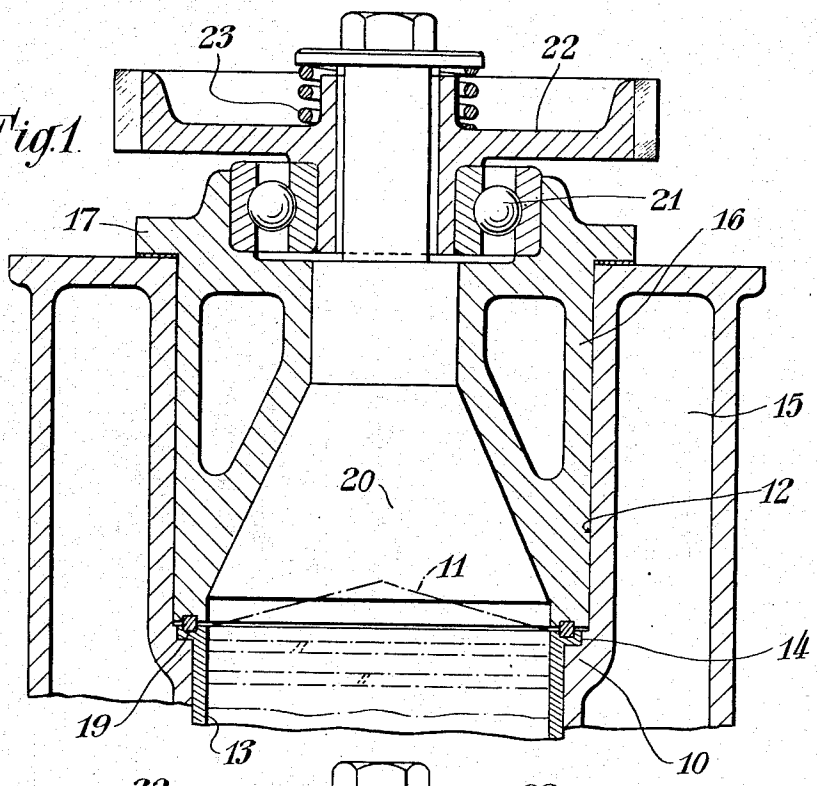
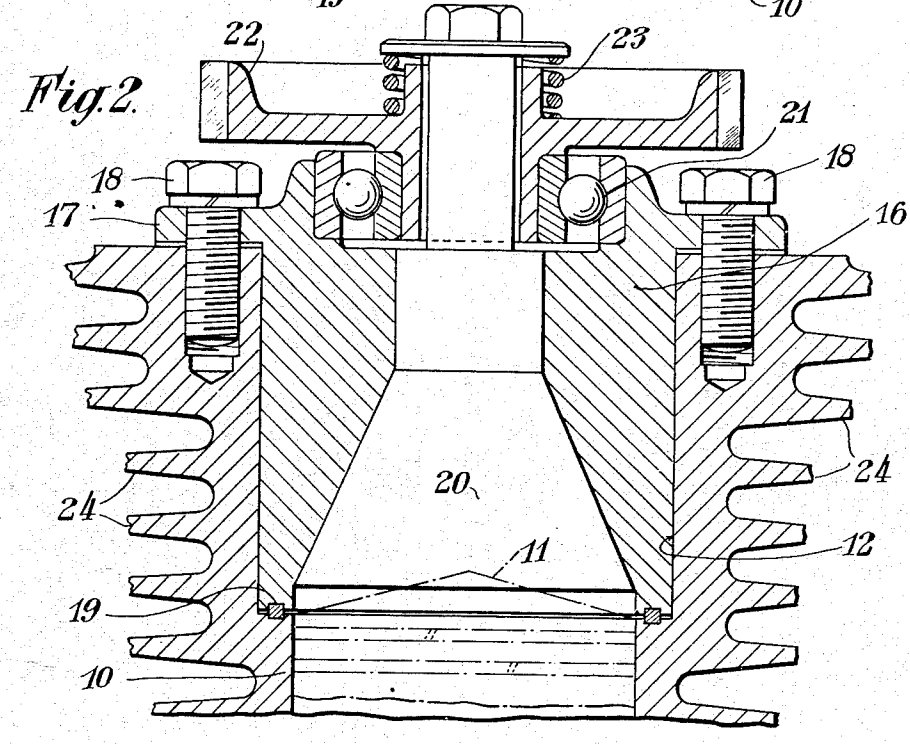


Fig. 2.



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CYLINDER HEAD OF INTERNAL-COMBUSTION ENGINES

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Application May 19, 1943, Serial No. 487,614
In Great Britain May 27, 1942

1 Claim. (Cl. 123—80)

This invention relates to internal combustion engines and is particularly, though not exclusively, applicable to engines of the kind having a rotary valve and constructed according to the specification of my earlier Patent No. 2,283,594.

The general principle of construction of a modern efficient internal combustion engine includes a detachable cylinder head and overhead valves therein, and while this form of construction has known advantages the greatest disadvantages lie in the cylinder head joint with its inherent weakness and the elaborate and necessary system of holding-down bolts. In a multi-cylinder engine in particular, the accuracy of machining required and troubles such as distortion of the cylinder head and the care and skill required to get the cylinder head bedded down with uniform pressure distribution are all serious disadvantages.

The object of the invention is an improved construction of internal combustion engine in which the above mentioned disadvantages are substantially avoided.

In the accompanying drawing:

Fig. 1 is a sectional elevation of one example of the invention.

Fig. 2 is a similar view of a modified construction.

The example of the invention shown in Fig. 1 is one cylinder of a multi-cylinder-in-line engine of unit construction wherein the cylinder and the upper part of the crankcase (not shown) are in one piece. The cylinder 10 is bored in two diameters, i. e. with one diameter for the piston 11 (shown in chain line), a larger diameter at 12 in an extension of the cylinder proper forming a recess at the cylinder head end. The cylinder is fitted with a cylinder liner 13 inserted from the outer end, and having an end flange 14 located against a shoulder formed in the said flange forming a ledge where the cylinder diameter of the cylinder bore changes for the socket, which is substantially at the end of travel of the piston 11. Such cylinder including its extension is cored at 15 for cooling fluid and extends a substantial distance above the shoulder aforesaid so as to form a deep recess in and integral with the end of each cylinder.

A plug-like unit 16 is located in such recess having a securing flange 17 at its upper end by which it is adapted to be bolted to the end of the cylinder, using suitable studs such as 18. Located between the said flange and the end of the cylinder extension is a compressible packing 17a. Each plug-like unit is an easy but good fit in its socket and at its lower end it has a groove to hold a gas-sealing ring 19, the flange 14 at the upper end of the cylinder liner 13 being formed with a complementary groove for the same purpose. The gas-sealing ring 19 is of greater thickness than the combined depths of the two grooves aforesaid. The plug-like unit 16 is shaped to house a conical rotary valve 20 having an off-set combustion volume therein which volume is not shown but constructed according to my aforesaid earlier patent.

As will also be seen, the plug-like unit is shaped to house a bearing 21 for the driving gear wheel 22, splined on the end of the valve member. A spring 23 holds the valve conical member into its complementary conical seating in the plug-like unit. Naturally the plug-like unit will have its port or ports, co-operating with the rotary valve member and in register with complementary ports in the end of the cylinder. A pin 16a is provided to locate the plug-like unit against rotation.

As shown in Fig. 2 the cylinder may be air cooled by having cooling fins 24 instead of being cored as at 15 in Fig. 1. Also, the cylinder is shown without a liner. The other parts of the construction which are the same as in Fig. 1 are given the same reference numerals.

In conclusion, it will be seen that the construction and machining of the cylinder and plug-like unit is simple. Each plug-like unit is self-contained and self-located in its cylinder and the single jointing ring is simple besides being supported against blow-out because the good but easy fit of the plug-like unit supplements the resistance of the ring to momentary high internal pressures, such as occur in an internal combustion engine.

The invention is obviously not limited to all the details of construction of the example above described as modifications other than those shown in Fig. 2, may be made without departing from the nature of the invention.

What I claim is:

An internal combustion engine comprising a cylinder having an extension provided with a cylindrical recess of larger diameter than the diameter of the cylinder bore forming a ledge at the junction of said two diameters, and provided in the ledge with a ring holding annular groove, a detachable cylinder head embodying a valve, and consisting of a plug-like unit fitting into said cylindrical recess, said unit being provided at the outer end with a securing flange and having a ring groove at its inner end face complementary to that in said ledge, the valve of the plug-like

unit terminating short of the inner end of the unit and said inner end and the complementary face of the ledge being directly exposed to the pressure of the gas of an explosive charge, a non-yielding gas-sealing ring located in said grooves and of a greater thickness than the combined depth of said grooves and maintaining the same in spaced relation, adjustable fastening means for securing said securing flange to said cylinder extension, the length of said unit up to said securing flange relative to the depth of said recess being such that the unit may be tightened down onto said ring by said adjustable fastening means with the desired pressure, and a ring of material compressed between the securing flange and the extension of the cylinder.

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