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INTERNAL-COMBUSTION ENGINE

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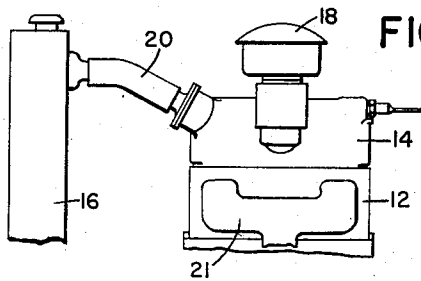


FIG. 1

FIG. 2

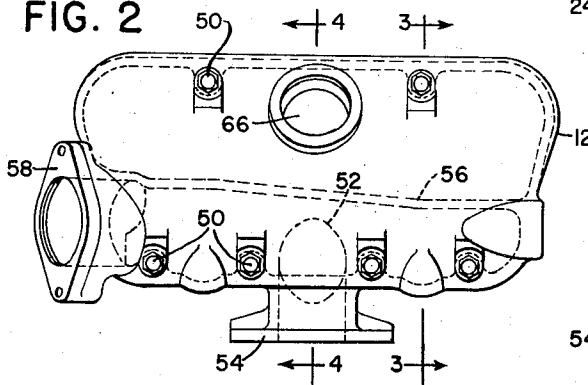


FIG. 3

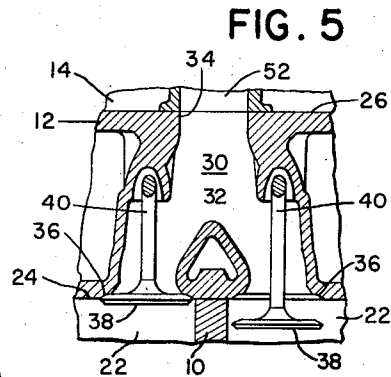
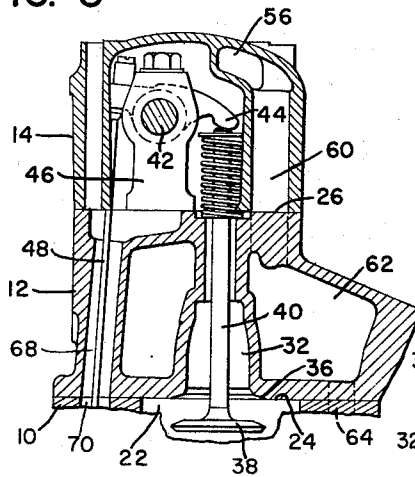


FIG. 5

FIG. 4

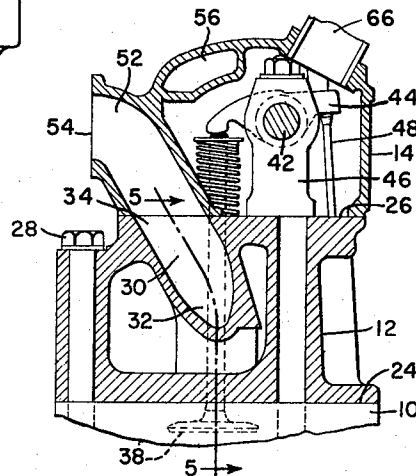
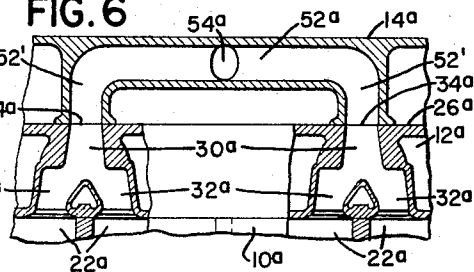


FIG. 6



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INTERNAL-COMBUSTION ENGINE

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5 Claims. (Cl. 123—41.82)

This invention relates to an internal-combustion engine and more particularly to an engine having overhead valves.

A typical overhead valve engine includes a cylinder head having intake and exhaust passages therein and valves for controlling those passages, plus valve-operating mechanism mounted above the head for operating the valves. Intake and exhaust manifolds respectively lead to the intake and exhaust passages in the head, the manifolds being conventionally provided as separate elements, in addition to which a third separate element in the form of a cover for the valve-operating mechanism is also afforded.

According to the present invention, the cover serves the dual function of including passage means leading to certain of the cylinder head passages. In the particular instance here disclosed, the passage means are intake passages for mixture, air etc. This arrangement eliminates the need for an additional intake manifold. Since the cover is mounted on top of the engine, and since it includes the intake or equivalent passages, a considerable saving of space in a lateral direction is achieved. It is a further object of the invention to incorporate in the valve cover coolant-conducting passages as well as lubricant-conducting passages, and to appropriately associate these passages with respective passages or chambers in the cylinder head and cylinder block. The invention features a simple and inexpensive valve cover construction accomplishing the aforesaid objects.

Other objects inherent in and encompassed by the invention will become apparent as a preferred embodiment thereof is disclosed in detail in the ensuing specification and accompanying sheet of drawings, the several figures of which are described immediately below.

Fig. 1 is an elevational view, on a reduced scale, showing an internal combustion engine incorporating one form of cover of the type referred to above.

Fig. 2 is a plan view of the cover per se.

Fig. 3 is a transverse section through the engine as typified by the line 3—3 on Fig. 2.

Fig. 4 is a section as typified by the line 4—4 on Fig. 2.

Fig. 5 is a section as seen along the line 5—5 of Fig. 4.

Fig. 6 is a sectional view showing a modified form of cover.

The engine illustrated comprises a cylinder block 10, a cylinder head 12, and a cover 14. Shown in conjunction with the engine are a radiator 16 and a charge-forming device, here typical of a conventional carburetor and designated by the numeral 18. The radiator is associated with the cooling system of the engine via a conduit 20. The numeral 21 designates a conventional exhaust manifold associated with the cylinder head 12.

The engine illustrated in Figs. 1 through 5 is of the two-cylinder type, and the block 10 has a pair of adjacent cylinders 22 opening at an upper face 24 of the block. The head 12 is mounted on the block via the mounting face 24 and itself has a head face 26 spaced from the block face 24. In the present instance, the

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faces 24 and 26 are upper faces and are parallel. The head is secured to the block in any conventional manner, as by cap screws 28.

The head is formed with passage means 30, which includes a pair of branch passages 32 leading to the tops of the cylinders 22 and forming combustion chambers therewith. The passage means 30 also includes an opening or inlet 34 which opens at the head face 26. As will be clear, the passage branches 32 open at the lower face of the cylinder head respectively as valve ports 36, one for each cylinder 22. In the present case, these are intake ports.

The valve ports 36 are controlled respectively by valve means comprising a pair of typical poppet valves 38 which have their valve stems 40 extending upwardly through the head face 26 for operation by valve-operating mechanism, here shown as comprising a rockshaft 42 and a plurality of rocker arms 44, one for each valve. The rockshaft 42 is suitably supported in rockshaft bearings 46 carried on the head face 26. The rocker arms are operated by push rods, one of which appears at 48 (Figs. 3 and 4).

The rocker arm cover is of novel construction and is mounted on top of the head 12 via the head face 26 and a plurality of mounting studs 50. The cover is internally formed with passage means 52 communicating at the bottom face of the cover with the inlet 34 for the head passage means 30 and itself having a flanged inlet opening 54 for connection to the carburetor 18. Thus, the cover serves, in addition to enclosing the rocker arms, rockshaft and associated components of the valve-operating mechanism, as intake passage means for the valve ports 36 and combustion chambers associated therewith, thus eliminating the need for a separate intake manifold.

In addition to the combustion chamber passage means 52, the cover 14 includes a fore-and-aft coolant-conducting passage 56 which has at its front end a flanged opening 58 for connection to the radiator conduit 20 and, as suggested in Fig. 3, has communication as at 60 to coolant passage means or chambers 64. The coolant arrangement is another novel feature of the rocker arm cover 14.

A still further feature is the utilization of the cover as part of the means for supplying lubricant to the engine crank case. For this purpose, the upper portion of the cover has an oil filler opening 66 which communicates via the hollow interior of the cover with a passage 68 in the head 12 and a passage 70 in the block 10, which passages also afford clearance for the push rod 48. As will be seen, the cover is simply and compactly designed to incorporate the several passages described, in addition to serving its usual function as an enclosure for the valve-operating mechanism.

In the modified form of the invention illustrated pictorially in Fig. 6, the engine shown has a block 10a including more than two cylinders 22a, four being shown in the drawing. In this case, the head 12a has first and second branch passage means 30a, each of which includes a pair of branches 32a which lead respectively to the combustion chambers in the cylinders 22a. The passage means 30a open at the head face 26a as first and second inlet openings 34a, and the modified form of rocker arm cover 14a has its passage means 52a in the form of a Siamese passage provided with branches 52' communicating respectively with the head inlet openings 34a. The inlet to the Siamese branch 52a is indicated at 54a. Thus, the principles developed in connection with the description of Figs. 1 through 5 are extended to the rocker arm cover 14a which affords a manifold for multiple branches 30a in the cylinder head 12a. It will be understood, of course, that appropriate branch pas-

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sages can be provided in the cover as well as in the head for cylinders in greater number than those illustrated. In other respects, the cover 14a will include the features of the cover 14.

Features of the invention in addition to those categorically enumerated will readily occur to those versed in the art, as will many modifications and alterations in the preferred embodiment of the invention disclosed, all of which may be achieved without departure from the spirit and scope of the invention.

What is claimed is:

1. In an internal-combustion engine having a cylinder block, a plurality of cylinders opening at one face thereof and a coolant passage, the improvement comprising: a cylinder head mounted on the block at said one face and forming combustion chambers respectively with said cylinders, said head having a face spaced from the block face and further having therein a plurality of passages leading respectively to said chambers and opening at said head face, and said head further having a coolant passage in communication with the block coolant passage; a plurality of valves carried by the head for respectively controlling said passages; valve operating mechanism mounted on said head face and operatively connected with the valves; and a cover mounted on said head face over and enclosing said mechanism, said cover having formed therein first passage means in communication with the combustion chamber passages in the head and second passage means in communication with the coolant passage in the head.

2. In an internal-combustion engine having a cylinder block and a plurality of cylinders opening at one face thereof, the improvement comprising: a cylinder head mounted on the block at said one face and forming combustion chambers respectively with said cylinders, said head having a face spaced from the block face and further having therein a first pair of branch passages leading respectively to one pair of cylinders and leading in common to the first opening at a head face spaced from the block face and said head having a second pair of branch passages leading respectively to another pair of cylinders and leading in common to a second opening at said head face; a plurality of valves carried by the head for respectively controlling said passages; valve operating mechanism mounted on said head face and operatively connected with the valves; and a cover mounted on said head face over and enclosing said mechanism, said cover having formed therein passage means communicating with the first and second head openings.

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3. The invention defined in claim 2, in which: the cover passage means includes a single opening leading exteriorly of the cover and a pair of branch passages connected respectively to the first and second head openings.

4. In an internal-combustion engine having a cylinder block and a plurality of cylinders opening at one face thereof, the improvement comprising: a cylinder head mounted on the block at said one face and forming combustion chambers respectively with said cylinder, said head having a face spaced from the block face and further having therein a first pair of branch passages leading respectively to one pair of cylinders and leading in common to the first opening at a head face spaced from the block face and said head having a second pair of branch passages leading respectively to another pair of cylinders and leading in common to a second opening at said head face; a plurality of valves carried by the head for respectively controlling said passages; valve operating mechanism mounted on said head face and operatively connected with the valves; and a combined manifold and valve-operating-mechanism cover mounted on said head face and having passage means communicating with the head openings.

5. In an internal-combustion engine having a cylinder block and a plurality of cylinders opening at one face thereof, the improvement comprising: a cylinder head mounted on the block at said one face and forming combustion chambers respectively with said cylinders, said head having a face spaced from the block face and further having therein a plurality of passages communicating respectively with said chambers and leading in common to a single opening at said head face; a plurality of valves carried by the head for respectively controlling said passages; said valves extending at said head face; valve-operating mechanism mounted on said head face and operatively connected with the valves; and a cover mounted on said head face over and enclosing said mechanism, said cover having formed therein passage means communicating with the aforesaid head passages.

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