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L. CHEVROLET

MOTOR HEAD

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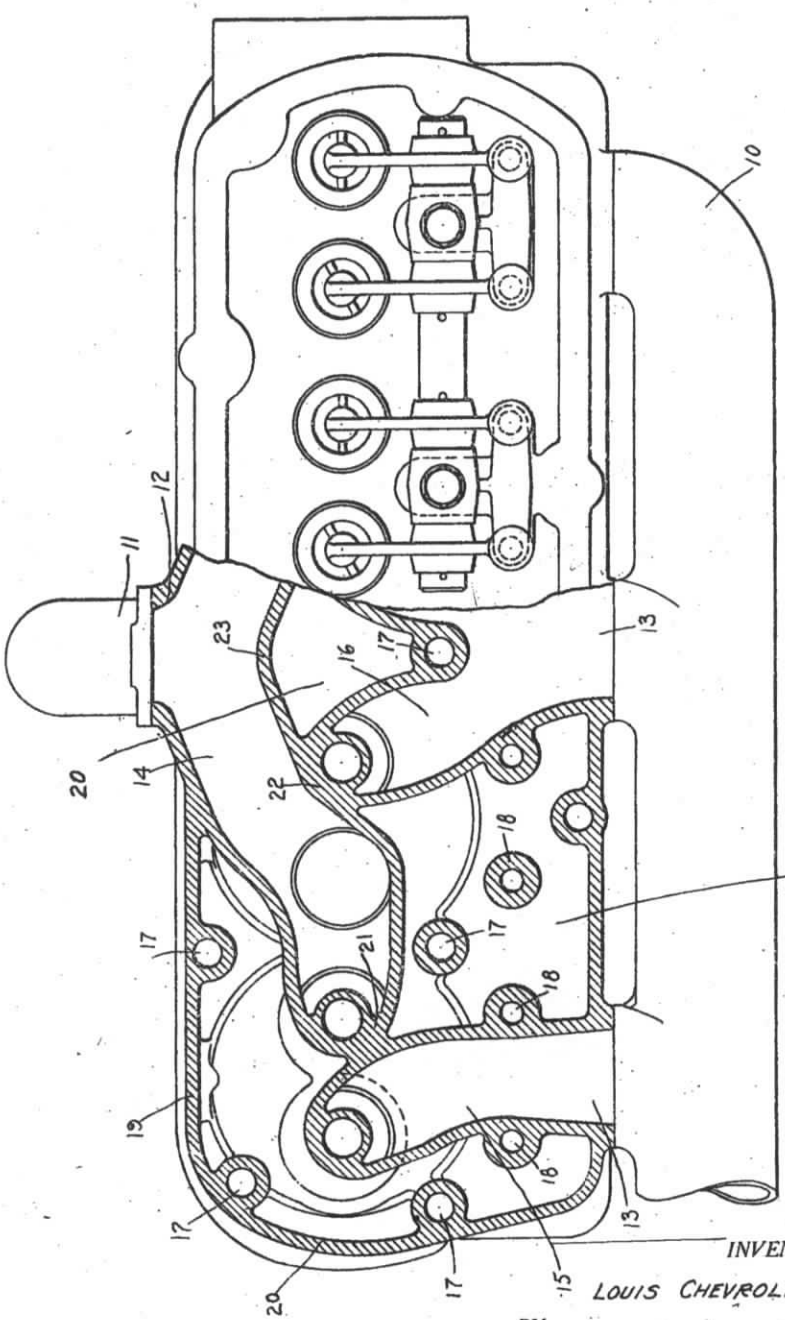

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UNITED STATES PATENT OFFICE.

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MOTOR HEAD.

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To all whom it may concern:

Be it known that I, LOUIS CHEVROLET, a citizen of the United States, and a resident of Indianapolis, county of Marion and State of Indiana, have invented a certain new and useful Motor Head; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like numerals refer to like parts.

This invention relates to a detachable head to replace a detachable head of a multi-cylinder combustion engine of the L-type, wherein the engine is self-governed by the same having restricted valve areas and restricted valve supply passages and transform the engine into a valve-in-the-head type without interference with or from the securing bolt openings in the engine block and wherein the usual valve push rod openings are utilized.

The chief object of this invention is to provide for a multi-cylindered L-type internal combustion engine, a removable head with valves in the same, wherein the normal valve area is increased without increasing the number of valves so as to utilize the entire cylinder capacity and the usual cam means for operating the original valves, and in providing passages within the cylinder head to and from the valves, which are of the same or greater cross sectional area as the valves associated therewith.

One feature of the invention consists in positioning the passages such that the bends or curves thereof are free and smooth, whereby the gases, both incoming and outgoing, will have relatively free passage to and from the valves and to shorten the length of the passages between the manifolds or pipes and the valves.

Another feature of the invention consists in replacing the original detachable cylinder head of an L-type motor whose intake and exhaust ports are on the same side, with an improved head with its intake upon one side and its exhaust upon the other side.

A further feature of the invention which is partially a corollary of that wherein the gas passages avoid the bosses of the push rod guides is that all of said guide bosses are water-cooled, and, of course, the push rods are never exposed to the gases.

Still a further feature of the invention is the positioning of the push rod guide openings in the head, so that the same will register with the original push rod guide openings in the engine block, whereby the same cam shaft and cam means may be utilized; and a further feature thereof, but which is not claimed herein, is that the valve movement is increased by eccentrically pivoting the rocker arms so that the valves have a greater travel than the push rods.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims.

In the drawings, the figure is a top plan view of the detachable cylinder head embodying the invention, showing the intake and exhaust pipes connected therewith, and with a portion of the head broken away to show in section the passages leading to the respective valves.

In the drawings, 10 indicates what may be termed the exhaust pipe of an internal combustion engine, and 11 the intake pipe, both being suitably connected to the cylinder head. In the present invention but one opening 12 is provided associated with the intake 11; while three openings 13 are provided to connect the cylinder head with the exhaust manifold 10. Thus, the exhaust opens on one side of the cylinder head and the intake upon the other which permits the gas passages to be increased in area within the head. It is to be understood that this invention is particularly adapted to replace the original cylinder head on standard L-type motors, such as the Ford.

The present invention, therefore, seeks to increase the valve area and correspondingly increase the connecting passage as well as to shorten the length of said passages, but these intentions necessarily are governed and determined by the push rods or tappet guides associated with the engine, and the bolt guides in the engine by which the original cylinder head was detachably secured thereto. Therefore, while it is relatively easy to increase the valve area of a detachable head to replace the head of an L-type motor, such as the Ford motor, it is extremely difficult to increase the cross sectional area of the connecting passages in a corresponding manner, since said passage areas necessarily are located as heretofore explained. The advantage of increasing the valve area has been recognized by many, and some constructions

have provided for a plural valve construction to replace each valve, thereby providing a sixteen valve head for an eight-valve, four-cylinder motor. Heretofore, however, the increase in valve area failed to accomplish its purpose, since the passages leading to and from those valves were not correspondingly increased, so that both the valve passages and the valves were of the proper cross sectional area to fully utilize the capacity of the cylinder connected therewith. Another difficulty which reduced and prevented the increase in power from being secured, was that if the passages to and from the valves were increased, said passages were necessarily provided with sharp and acute bends to avoid push rod and securing bolt bosses which offered obstruction to the free flow of gases to and from the valves through said passages. Thus, heretofore all detachable heads, so far as known, failed to increase the valve area and the passage area, and decrease the length of the unobstructed passage to fully develop the full efficiency of the engine; secondly, to increase the area of the passages to and from the valves such that the same was equal to or greater than the valve area; and thirdly, to provide free and smooth passages to and from the valves.

The present invention obtains the free passage of the gases through the enlarged passages to and from the valves and utilizes and the same number of valves (but these of greater area) with which the original L-type motor was provided. Thus, the same valve operating means may be utilized. However, when in a detachable head the aforesaid features are secured, the same, as heretofore explained, are governed or determined by the positioning of the tappet guides and the bolt guides in the cylinder proper, and, of course, the detachable cylinder head is necessarily provided with complementary openings registering therewith.

This invention, therefore, as clearly illustrated in the drawing provides a plurality of passages to and from the valves, which are relatively straight, or at least are provided with a minimum of bends, and these of smooth curvature. The opening 12 connects with a pair of passages 14 and said passages 14 with the opening 12 is substantially Y-shaped, and each branch of the Y-shaped passage is adapted to supply fuel to two adjacent valves in two adjacent cylinders. The extreme end cylinder in each instance is provided with a discharge passage 15, which as shown is relatively straight and of substantially uniform cross section. The two intermediate valves of the two intermediate and adjacent cylinders are connected together by means of an additional V-shaped channel 16. The ends of said V arms terminate adjacent the valves. Herein the bolt bosses are designated by the numeral 17 and the push rod bosses are designated by the numerals 18. The outer cylinder wall is designated by the numeral 19 and the water jacketing spaces thereof by the numeral 20.

It will be noted that whereas in the standard L-type engine, such as the Ford engine, the cylinder block is provided with gas passages which communicate with the cylinders through passages in the detachable head. The present invention not only transforms the aforesaid engine into a valve-in-the-head type engine with its resultant advantages of having the valves in the head and the increased mechanical efficiency in addition thereto, but also eliminates the use of the gas passages in the cylinder block, thereby shortening the length of the resultant gas passages, and furthermore, such a transformation permits the resultant engine to embody the desirable features of the T-type engine, wherein the gas passage openings are positioned upon opposite sides of the engine without incorporating the disadvantages resulting from said construction.

The invention claimed is:

1. A detachable head for changing a multi-cylinder L-type engine into a valve-in-the-head-type engine, said head having valve means of greater area than the original valve means, and passages within said head leading to and from said valve means, said passages throughout having areas at least equal in cross section to the areas of said aforesaid valve means.

2. A detachable cylinder head for a Ford engine otherwise described as including a cylinder block originally provided with intake and exhaust passages upon the same side, and valves controlling the same, adapted to change the same into a valve in the head type motor, said head having intake and exhaust means upon opposite sides which do not communicate with the cylinder block intake and exhaust passages, and provided with the same number of valves originally provided, relatively unobstructed passages leading to and from said valves, said valves being of greater cross section than the original valves, and said passages being of equal or greater cross section than said increased valves and of decreased length by reason of said non-communication.

3. In a detachable cylinder head for a multi-cylinder L-type motor having a detachable head and a cylinder block provided with gas passages, and registering openings in both for the push rods and securing bolts, said replacing head having registering openings and having a plural number of valves per cylinder, a common opening upon one side of said replacing head, and a plurality of openings upon the other side thereof, a Y passage communicating with said single opening and having each branch adapted to connect with a pair

of cylinders, and other passages associated with the plurality of openings and adapted to connect with the other openings of said cylinders, all of said passages being positioned within the head to avoid said openings.

4. In a detachable cylinder head for a multi-cylinder L-type motor having a detachable head and a cylinder block provided with gas passages, and registering openings in both for the push rods and securing bolts, said replacing head having registering openings and having a plural number of valves per cylinder, a common opening upon one side of said replaceable head, another opening upon the other side thereof and substantially opposite the same, a Y-shaped passage associated with the first mentioned opening and adapted to connect with the outside valves of two adjacent cylinders, and a V-shaped passage adapted to connect with the inside valves of two adjacent cylinders and communicating with said second mentioned opening, all of said passages being positioned within the head to avoid said openings.

5. In a detachable cylinder head for a Ford motor otherwise described as a multi-cylinder L-type motor having a detachable head and a cylinder block provided with intake and exhaust gas passages upon the same side and registering openings in both block and original head for the push rods and securing bolts, said original Ford detachable head being provided with intake and exhaust means opening through the cylinder block, said replacing head having registering openings for said push rod and securing bolt openings and having intake and exhaust means upon opposite sides which do not communicate with the cylinder block intake and exhaust means and provided with the same number of valves with which the cylinder was provided, relatively unobstructed passages leading to and from said valves, said valves being of greater cross section than the original valves, and said replacing head passages being of equal or greater cross section than said increased valves and of decreased length by reason of said non-communication, all of said replacing head passages being positioned within the head to avoid said openings.

6. In a detachable cylinder head for a Ford motor otherwise described as a multi-cylinder L-type motor having a detachable head and a cylinder block provided with intake and exhaust gas passages upon the same side and registering openings in both block and original head for the push rods and securing bolts, said original Ford detachable head being provided with intake and exhaust means opening through the cylinder block gas passages, said replacing head having registering openings for said push rod and securing bolt openings and having intake and exhaust means upon opposite sides which do not communicate with the cylinder block intake and exhaust means and provided with the same number of valves with which the cylinder was provided, relatively unobstructed passages leading to and from said valves, said valves being of greater cross section than the original valves, and said replacing head passages being of equal or greater cross section than said increased valves and of decreased length by reason of said non-communication all of said replacing head passages being positioned within the head to avoid said openings, said replacing cylinder head being hollow for cooling purposes and push rod guides in said replacing head having registering openings for supporting the push rods therein without exposure to the gases.

In witness whereof, I have hereunto affixed my signature.

LOUIS CHEVROLET.