Jan. 13, 1953 M. T. STEPHENS 2,625,146

SPARK PLUG COVER

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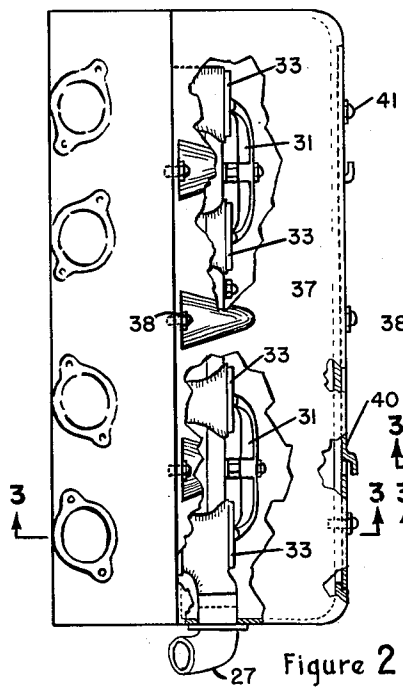



Figure 2

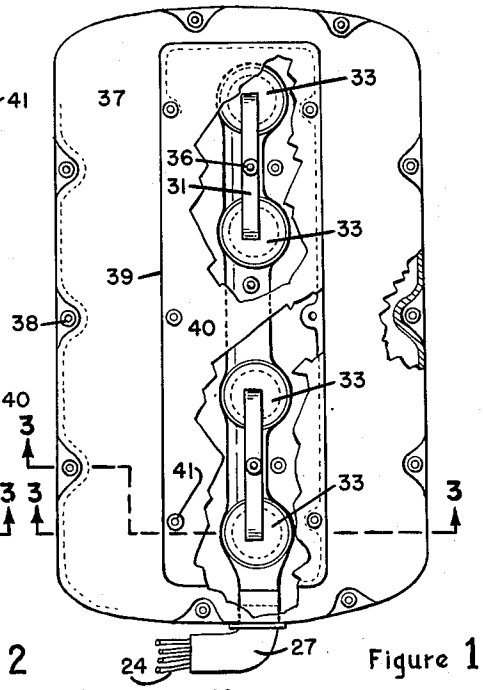



Figure 1

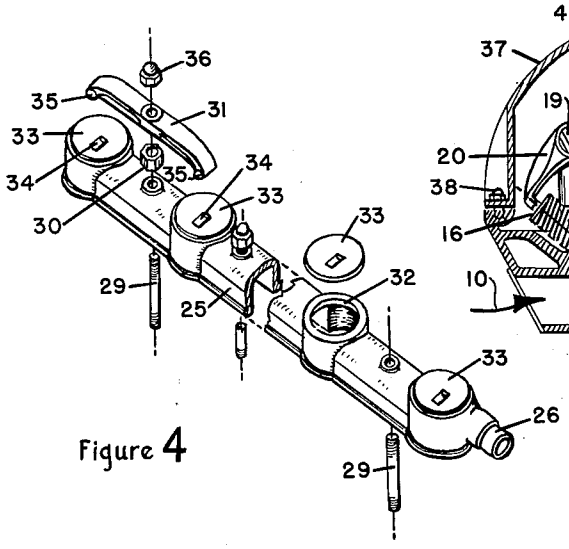



Figure 4

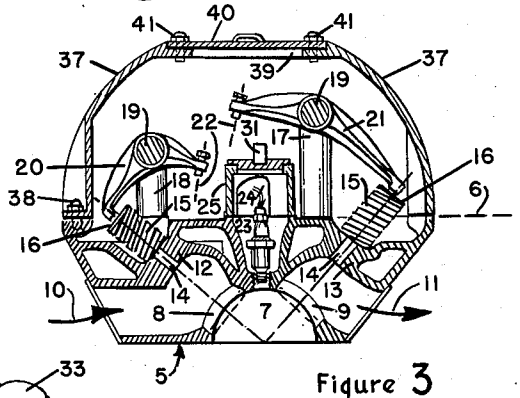



Figure 3

MILFORD T. STEPHENS, *INVENTOR.*

BY Martin E. Anderson

*ATTORNEY.*

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## SPARK PLUG COVER

Milford T. Stephens, Denver, Colo.

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1 Claim. (Cl. 123—198)

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This invention relates to improvements in cylinder heads of the overhead valve type.

There is an automobile of popular make that is widely used and sold which is provided with inlet and exhaust valves positioned in the engine block and operated by means of a camshaft and valve lifters.

For certain purposes, for example, when the engine is used for very high speeds as in connection with racing automobiles, it is desirable to have what is usually referred to as a valve-in-head or an overhead valve construction.

When the valve operating mechanism and spark plugs are positioned on top of the cylinder head as in the overhead valve construction to which this invention relates, the parts are more liable to become fouled than in the usual L-head construction.

It is one of the objects of this invention to produce a cylinder head of the valve-in-head type and provide it with means for protecting the rocker arms from the deleterious effect of dust and dirt and the spark plugs from oil.

The principal object of the invention is to produce an engine head construction in which the spark plugs are entirely enclosed in a chamber in such a way that they are positively protected against the accumulation of oil.

It is a further object of this invention to produce a closure for the spark plug recesses that is provided with openings which permit ready access to the spark plugs for replacement and for cleaning.

The above and any other objects that may become apparent as the description proceeds are attained by means of a construction and an arrangement of parts that will now be described in detail, and for this purpose reference will be had to the accompanying drawing in which the invention has been illustrated in its preferred form, and in which:

Figure 1 is a top plan view of the improved cylinder head, portions being broken away to better disclose the construction;

Figure 2 is a side view looking towards the right in Figure 1, portions being broken away to better disclose the construction;

Figure 3 is a section taken on line 3—3, Figures 1 and 2; and

Figure 4 is a fragmentary, exploded perspective view showing the spark plug housing.

Referring now to the drawing, reference numeral 5 designates the under surface of the cylinder head. This is arranged to fit against the top of an engine block or to take the place

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of a cylinder head that has been removed therefrom.

The cylinder head to which this invention relates is provided with upwardly flaring sides and terminates in plane 6, Figure 3. The semi-spherical recess 7, of which there is one for each engine cylinder, is of the proper size and diameter to fit above corresponding cylinders of the engine. The spherical walls are provided with valve openings. The one that has been designated by reference numeral 8 will be considered as the intake opening, and the one that has been designated by reference numeral 9 will be considered as the exhaust opening. The explosive mixture will, therefore, enter in the direction of arrow 10 and leave in the direction of arrow 11. By positioning the valve openings in the cylinder head in the manner shown they can be made of much larger diameter than if they were positioned in the engine block in the usual way. There is an intake and exhaust passage in communication with the intake and exhaust valve openings as shown in the drawing. The walls designated by numerals 12 and 13 are each provided with an opening 14 for the reception of a valve stem. The valve stems extend through springs 15 and are provided at their ends with removable washers 16 that hold the springs under compression. Sinnce the valves open inwardly into the cylinder, springs 15 serve to keep them in closed position. On each side of the center, the block is provided with brackets 17 and 18 that are provided at their upper ends with openings for supporting steel shafts 19 on which the rocker arms are positioned. In the drawing the rocker arm designated by reference numeral 20 will be considered as the arm that controls the inlet valve and the one designated by reference numeral 21 the one that controls the outlet valve. These arms are rocked about their pivots by the action of push rods 22 that have been indicated by dotted lines in Figure 3.

The construction, so far as it relates to the overhead valve mechanism, has been shown in prior patents, and is, therefore, not claimed to be part of the present invention. The valve operating mechanism has been shown in order to more clearly disclose the construction to which this invention relates.

Positioned at each cylinder is a spark plug. This has been designated by reference numeral 23 in Figure 3. The spark terminals are, of course, exposed within the cylinder chamber 7. High tension wires 24 connect the spark plugs with a distributer in an old and well known manner.

Each spark plug is positioned in a recess. Unless the spark plugs are enclosed in a tight housing, oil which is used to lubricate the rocker arm assemblies and valve stems, will gather in the depressions about the spark plugs and interfere with their proper functioning. In order to protect the spark plugs from the oil, they are all enclosed with a housing. The housing consists of an elongated, inverted, trough-like member 25 whose shape and construction is shown most clearly in Figure 4. The housing extends the entire length of the cylinder head and is provided at one end with a tubular projection 26 that communicates with elbow 27 as shown in Figure 1. The high tension wires from the distributer have been designated by reference numeral 24 and these extend through elbow 27 into the spark plug housing. The spark plug housing is trough-like and open along its under surface and is held in position by means of stud bolts 29 that extend entirely through the housing, having their lower ends threaded into the cylinder head and their upper ends cooperatively engaged by nuts 30. Some of the bolts are of such length that they extend a considerable distance above the spark plug housing and these serve to hold clamp bars 31 in position. It will be noticed from Figure 4 that the spark plug housing is provided at spaced intervals with openings 32, one being positioned above each spark plug. Removable caps 33 fit against the upper ends of the opening walls and are provided with depressions 34 for the reception of the downwardly turned ends 35 of clamp bars 31. The clamp bars are positioned over the upper ends of bolts 29 and are held in position by means of cap nuts 36. The spark plug housing is held in position by nuts 30 and is not removed except in exceptional cases. By removing or loosening the clamp bars and turning them about the bolt to which they are attached, or removing them entirely therefrom, caps 33 may be lifted from their seats, providing openings of sufficient size to admit a spark plug wrench. The spark plug which is positioned directly beneath or in line with opening 32 can then be inserted or removed and replaced without disturbing the cover 25.

It will be apparent from the above description that with the construction shown, the high tension wires 24 coming from the distributer to the spark plugs will be fully protected against oil and that any one of them may be readily disconnected from the spark plug to which it is connected without disturbing the rest of the high tension wires. This construction is a great convenience when this cylinder head design is employed. Secured to the top of the removable cylinder head 5 is the tappet cover 37. This is held in place by means of bolts 38 and is provided in its top with an elongated opening 39 that is normally closed by means of a removable cover 40 which is held in place by screws 41 and is readily removable for tappet adjustment and for the inspection of and/or changing of spark plugs.

In the above description the cylinder that forms the subject of this invention has been described as designed primarily for convering an L-head type engine to one of the valve-in-head type. It is to be understood, however, that the cylinder



head is equally applicable to engines originally designed for such cylinder heads.

It will be seen from the above that the cylinder head that has been described and which has been illustrated on the drawing is of a simple and substantial construction; that it is provided with removable housing forming an enclosed space for the spark plugs and the wires that are connected with them. The rocker arms and their parts are so positioned that they may be inspected by merely removing the cover 40, and if it becomes necessary to resort to any repairs, the cover member 37 may be removed, thus exposing the entire top of the cylinder head so as to permit free access to all parts thereof.

What is claimed as new is:

A cylinder head of the overhead valve type for use with an engine block having a plurality of spaced parallel cylinders, the cylinder head having its upper surface provided with a groove, the bottom wall of the groove having threaded openings for the reception of spark plugs, the groove having a length embracing all of the openings, the wall about the groove having a continuous sealing surface, a cover for enclosing the spark plugs, said cover being trough-like, the edge having a surface adapted to abut the sealing surface surrounding the groove whereby when the cover is positioned in inverted position over the groove with its edges opposing the sealing surface about the groove, a closed chamber is formed, and means attaching the cover to the cylinder head, the cover having openings in alignment with the spark plug openings in the bottom of the groove, removable caps sealing the last named openings, means for securing the cover to the cylinder head and the caps in sealing position on the cover, comprising stud bolts attached to the cylinder head between the spark plug openings of adjacent pairs of openings, the cover having openings in its top for the reception of the bolts, clamp bars for the caps covering the openings in the cover that corresponds to the spark plug openings between which the bolts are positioned, a clamp bar for each pair of caps with its ends resting on the caps, said bars having each an opening intermediate its ends through which the corresponding bolts extend and means comprising nuts in operative engagement with the bolts and with the cover for urging it into sealing engagement with the cylinder head, and similar means for urging the caps into sealing engagement with the cover.

MILFORD T. STEPHENS.


## REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 1,012,635 | Harmer | Dec. 26, 1911 |
| 1,359,291 | Tripp | Nov. 16, 1920 |
| 1,378,260 | Melton | May 17, 1921 |
| 1,712,861 | Weiss | May 14, 1929 |
| 1,933,423 | Forsyth | Oct. 31, 1933 |
| 2,028,310 | Bechman | Jan. 21, 1936 |
| 2,070,806 | Read | Feb. 16, 1937 |
| 2,082,869 | Brown | June 8, 1937 |
| 2,478,128 | Peters | Aug. 2, 1949 |