Mechanical lash adjustment mechanism for use as a direct replacement for a hydraulic lash adjuster in overhead cam engines and the like. The lash adjuster includes a stud threaded into an insert and having means at one end for supporting a rocker arm. The insert is designed to fit directly into an opening provided in a conventional engine head which opening normally accommodates a hydraulic lash adjuster.

5 Claims, 6 Drawing Figures
MECHANICAL LASH ADJUSTER FOR OVERHEAD CAM ENGINES

BACKGROUND OF THE INVENTION

In the conversion of a "stock" or conventional overhead cam automobile engine to a "high-performance" engine, in addition to the replacement of the cam shaft; boring to increase valve opening, cylinders, and like parts; it is additionally sometimes advisable to replace the conventional hydraulic lash adjusters with a mechanical or "solid" adjuster. Solid adjusters are generally threadably received directly in the engine cylinder head and it is therefore necessary to completely replace the cylinder head to accommodate the solid adjuster. This, of course, adds considerably to the expense involved in such conversion. There are, additionally, those individuals who while not seeking a high-performance engine, are desirous, for one reason or another, to replace the conventional hydraulic lash adjuster with a solid adjustment mechanism. In either event, it is necessary and desirable to provide a means for quickly and simply making such replacement without unnecessary expense.

SUMMARY OF THE INVENTION

The present invention therefore provides a mechanical or "solid" lash adjustment mechanism adapted for the direct replacement of a conventional hydraulic lash adjustment mechanism in an overhead cam engine. The adjuster includes a stud member having means at one end thereof for pivotally supporting a rocker arm. The opposite end is threadably received in a tapped sleeve or insert for relative adjustable movement between the sleeve and the stud. The sleeve is adapted for direct placement in the engine head in the opening normally provided for a hydraulic lash adjuster. Locking means are also provided for holding the sleeve to prevent rotational movement when lash adjustments are made.

Accordingly, it is an object of the present invention to provide a solid lash adjustment mechanism for use in an overhead cam engine.

It is another object of the present invention to provide a solid lash adjustment mechanism for direct replacement of a hydraulic lash adjuster.

It is a further object of the invention to provide a lash adjustment mechanism which is inexpensive and simple in its construction.

It is a further object of the invention to provide a holding means for such lash adjustment mechanism to facilitate adjustment thereof.

Other important objects, advantages, and features of the present invention will become readily apparent to those skilled in the art upon reading the following specification and with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described with reference to the accompanying drawings in which:

FIG. 1 is a cross-sectional, somewhat schematic, representation of an overhead cam valve train incorporating a lash adjuster according to the invention;

FIG. 2 is a partial top plan view of the apparatus shown in FIG. 1 with the rocker arm removed;

FIG. 3 is a view illustrating a pair of adjacent lash adjustment mechanisms having retaining means for preventing movement of the adjuster in the cylinder head;

FIG. 4 is a side view of the retaining means shown in FIG. 3;

FIG. 5 is a view similar to FIG. 3 illustrating an alternate retaining means; and

FIG. 6 is a partial side view of the retaining means shown in FIG. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIGS. 1 and 2 of the drawings, a valve 2 having a spring 4 and a retainer 6 is actuated by rocker arm 8 through a cam shaft 10 and cam 12. The rocker arm 8 pivots about a socket 14 on a lash adjuster 16. A cross sectional portion of the cylinder head of a conventional engine is illustrated by the numeral 20. An opening 22 is provided in the cylinder head 20 and normally accommodates a hydraulic lash adjuster (not shown). Oil is conventionally supplied to the hydraulic lash adjuster through an oil gallery 24 opening into one of the side walls of the recess 22 for operation in a conventional manner well known to those skilled in the art.

The adjuster assembly 16 of the present invention includes a threaded sleeve member or insert 26 adapted for insertion in the opening 22 in the cylinder head 20. The sleeve member 26 has a diameter slightly less than the diameter of the opening 22 such that the sleeve may be easily slipped into place. The sleeve is internally threaded throughout the greatest portion of its length 28 to receive an adjusting screw 30, preferably a self-locking screw. The lower end of the screw 30 is threaded as indicated at 32 for adjustable setting within the threaded portion 28 of the sleeve 26. The upper portion of the screw is provided with a rounded head 34 for rotational engagement with the socket 14 on the rocker arm 8. Below the head and above the threaded portion 32, the screw has machine flat surfaces 36 preferably in the shape of a hexagon for engagement with an open-end wrench during the adjustment thereof.

A flat surface 38 is also machined in the outer diameter of the sleeve 26 near the top or opened end portion 40 for engagement with retaining means as will be more fully described hereinafter.

Referring now to FIGS. 3 and 4, a pair of adjacent adjusters are illustrated. The sleeve members 26 are turned within the opening 22 such that flat areas 38 of each sleeve extend along one side thereof in alignment with the flat areas on the adjacent sleeve. A retaining member 42 having outwardly extending U-shaped arm members 46 thereon is secured to the cylinder head between the adjacent sleeves 26 by means of a screw 44. The arm members extend outwardly and slightly upwardly from the screw 44 and are adapted to engage the machined flat surface 38 on the sleeves 26. Rotational movement of the sleeves within the openings 22 is prevented because of the abutting relationship between the machined flat surfaces 38 and the arm members 46.

Referring briefly to FIGS. 5 and 6, an alternate retaining means 50 is shown positioned between a pair of adjacent sleeve members 26. In this embodiment, a machined flat surface 38 need only be provided at one side of the sleeve 26 and the sleeves are positioned so that the flat areas are parallel to each other. The retaining member 50 in the shape of a T is positioned centrally between the sleeves 26 such that its outer surfaces
contact the machined flat areas of each sleeve to prevent rotation of the sleeve while adjustments are made.

Lash adjustment of the rocker arm with respect to the valve stem is accomplished in a conventional manner by utilizing a feeler gauge between the rocker arm and the cam shaft. The adjustment itself is accomplished by placing a wrench over the hexagon-shaped portion of the sleeve and turning the screw within the sleeve to change the effective length of the screw thereby adjust the valve lash between the rocker arm and the cam shaft. The retaining means illustrated in FIGS. 3 through 6 prevents rotation of the sleeve within the opening while adjustment is made. The threaded portion of the screw is preferably self-locking so that a lock-nut is not required to keep the screw from changing its setting and to require the use of only one wrench.

From the foregoing description and drawings, it will become readily apparent to those skilled in the art that the present invention provides an extremely simple yet effective replacement mechanical lash adjuster for use in overhead camshaft engines. The mechanical lash adjuster is particularly adaptable for the replacement of a conventional hydraulic lash adjuster in the construction of and conversion to a high-performance engine. In addition, the present invention provides a unique retaining means for a lash adjuster wherein relative movement will not occur between the sleeve or insert portion of the adjuster and the cylinder head of the engine. The lash adjuster of the present invention is simple in its construction, inexpensive to manufacture, and consequently, relatively inexpensive to the consumer. Its ease of assembly and insertion within an existing engine effects even greater savings in labor costs alone.

While the preferred embodiment of the invention has been illustrated in detail, it will be recognized by those skilled in the art that other modifications incorporating the teachings hereof may be readily made in light of this disclosure. Accordingly, all modifications embodying the principles thereof are to be considered as included in the appended claims unless these claims by their language expressly state otherwise.

We claim:

1. A mechanical lash adjuster for replacing a hydraulic lash adjuster in an internal combustion engine having an overhead cam, a rocker arm forming a socket, and a lash adjuster mounted in a smooth surfaced cylindrical opening formed in the cylinder head of the engine supporting said rocker arm at said socket, said replacement mechanical lash adjuster comprising: a free-fitting insert axially slideable into and freely rotatable in said cylinder head opening, said insert having a threaded opening therein; a screw member threadably received in said insert, said screw member having means at one end thereof for supporting said rocker arm; said insert and said screw member forming cooperative adjustment means for varying the effective length of said lash adjuster to take up slack in the valve train of said engine; and locking means for said insert to prevent rotation of said insert during adjustment of the valve lash.

2. The lash adjuster as defined in claim 1 and further including self-locking thread means on one of said screw and said insert.

3. The apparatus as defined in claim 1 wherein said insert has a flat area on an outer peripheral surface thereof and said locking means includes means secured to said cylinder head abutting said flat area to prevent rotation of said insert in said cylinder opening.

4. In the conversion of a stock overhead cam internal combustion engine having hydraulic lash adjustment means positioned in a smooth surfaced cylindrical recess in the cylinder head of said engine to a high-performance engine, the improvement comprising: replacing said hydraulic lash adjuster with a mechanical adjuster having a sleeve adapted for insertion in said recess and a screw member extending from said sleeve for supporting said rocker arm, said sleeve being axially slideable and freely rotatable in said recess; adjusting the effective length of said screw with respect to said sleeve to take up slack in the valve train of said engine; and locking means for said sleeve to prevent rotation of said insert during adjustment of the effective length of said screw with respect to said sleeve.

5. Apparatus for the conversion of an overhead cam internal combustion engine having hydraulic lash adjustment means positioned in a smooth surfaced cylindrical recess in the cylinder head of said engine to an engine having mechanical lash adjustment means for taking up slack in the valve train of the engine, said engine having a rocker arm pivotally mounted for movement by said overhead cam, said apparatus comprising: an internally threaded insert member adapted for positioning in said recess formed in the cylinder head of the engine, said insert member being axially slideable and freely rotatable in said recess; a threaded screw member received in said insert, said screw member having means at one end thereof pivotally supporting said rocker arm, wherein relative movement between said screw member and said insert member varies the effective length of said lash adjuster to thereby take up the slack in the valve train of said engine; and locking means for said insert member to prevent rotation of said insert during adjustment of the valve lash.

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