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ROCKER ARM ASSEMBLY FOR AUTOMOBILE ENGINES

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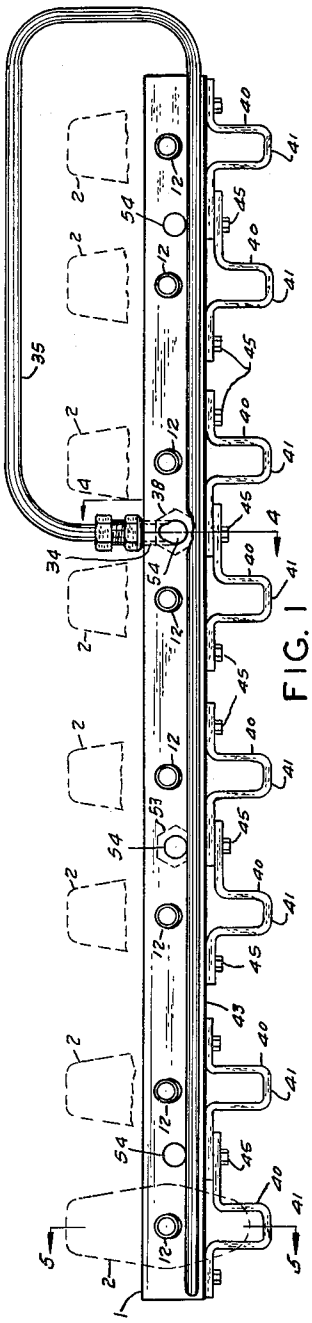


FIG. 1

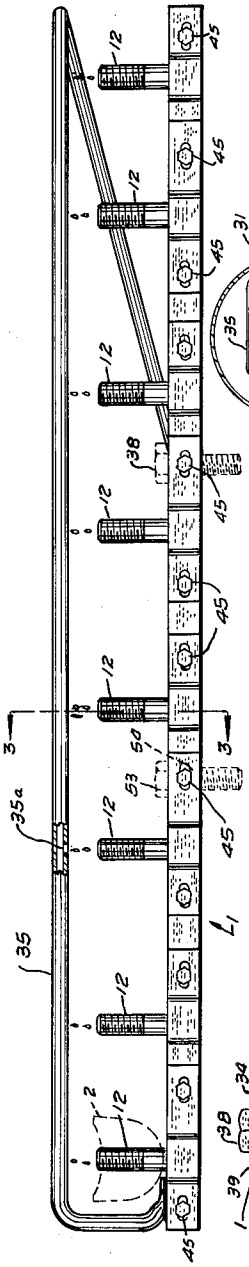


FIG. 2

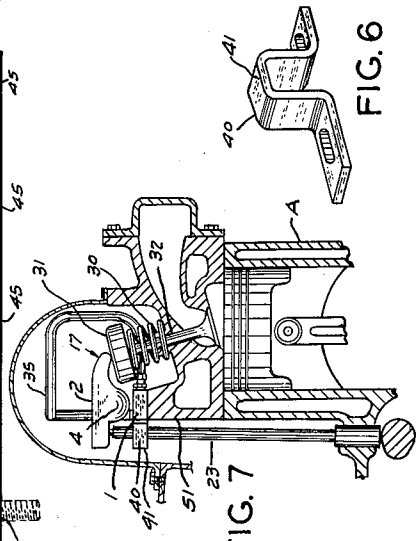


FIG. 7

FIG. 6

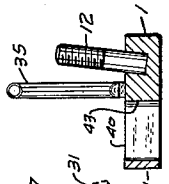


FIG. 3

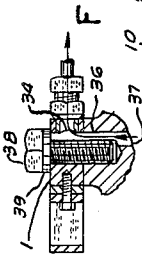


FIG. 4

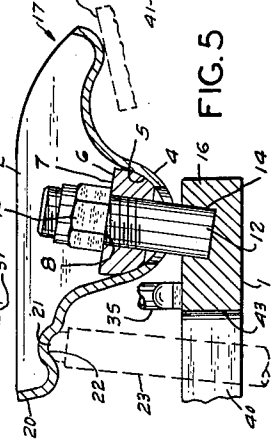


FIG. 5

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ROCKER ARM ASSEMBLY FOR AUTOMOBILE ENGINES

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This invention concerns a rocker arm adapter unit for an overhead valve engine.

Heretofore, where high speed and high efficiency performance is desired in an automotive type engine, the type of rocker arm heretofore used, wherein the arm is pivoted on a shaft which has bearings in a cast unit attached to the engine heads, has been replaced by rocker arms which have a centrally disposed semi-spherical depression which works on a correspondingly shaped surface attached to a stud extending from the engine head. This improved rocker arm is less likely to bind than the rocker arms supported on a fixed shaft and has more freedom of movement and less friction surfaces that need lubricating. Consequently this improved type of rocker arm, having principally rolling friction, is best suited to high speed engine performance, and is easier to lubricate and easier to keep in adjustment. The old type rocker arms journalled on stationary shafts must be supplied with oil under pressure to secure equal performance and are more likely to bind and require accurate adjustment to make allowance for expansion and contraction due to temporary change.

It is therefore desirable to use the rocker arm with the semi-spherical centrally disposed cavity which will roll or rock on a semi-spherical surface of a ring held by a nut on a stud extending upwardly from the top area of the engine head casting.

Certain engines commonly manufactured have overhead valves positioned so that they can be operated by the improved type rocker arm, but the cylinder head on which they operate is not equipped with means for using the improved semi-spherical bearing rocker arm herein concerned.

In view of the foregoing, one of the objects of my invention is to provide a structure which will permit any engine having overhead valves to be equipped with the ball type rocker arm.

Another object of the invention is to provide means for converting an engine head casting from the old type rocker arm bearing to a structure which will accept and use the spherical type rocker arm and will provide means for lubricating the various parts of the rocker arm.

Still another object is to provide a unit structure which will provide means for conversion of a fixed bearing type of rocker arm mounting to a semi-spherical rocker arm mounting and provide lubrication therefor and also means for guiding the push rod which operates the rocker arm and hold it against undesired side movement.

Still another object is to provide means for attaching the above described mechanism to the engine head casting in an efficient manner and for coupling it to an oil supply duct in the engine casting and means for directing the oil supply to the moving parts of the ball and socket type rocker arm.

Other objects will appear hereinafter.

I attain the foregoing objects by means of the devices, parts and combinations of parts shown in the accompanying drawings, in which—

FIGURE 1 is a plan view of a rocker arm bearing conversion unit embodying my improvements;

FIGURE 2 is a front elevational view thereof with portions broken away to show interior construction;

FIGURE 3 is a sectional view of the ball type rocker bar supporting base, taken on line 3—3, FIGURE 2;

FIGURE 4 is a section of the oil supply connect and ducts substantially on line 4—4, FIGURE 1;

FIGURE 5 is a mid-sectional elevational view of a portion of the unit base and a rocker arm of the type herein concerned and a bearing mounted for the rocker arm, all taken as though positioned on line 5—5 of FIGURE 1, and drawn on an enlarged scale.

FIGURE 6 is a perspective view of a push rod guide which is attached to the rocker arm base; and

FIGURE 7 is a sectional view of a cylinder and cylinder head casing and an overhead valve operated by the improved rocker arm of the type herein concerned.

Similar numerals refer to similar parts in the several views.

The rocker arms herein concerned are made from stampings of sheet metal and are pressed to the shape shown in section in FIGURE 5. The rocker arms are indicated by numeral **2**. See also FIGURE 7. This invention makes no claim to the rocker arms per se. This type of rocker arm is mounted as shown in FIGURE 5 so that its semi-spherical disposed bearing area **4** bears on the semi-spherical lower surface **5** of a stud ring **6**. Each stud ring has a flat top surface **7** which is held downwardly by the lower flat surface **8** of the hexagon type nut **10**. This nut is threaded onto the bearing stud **12**. In the base of the conversion unit, shown herewith, there are mounting studs **12** for four inlet valves and four exhaust valves—8 in all. Each stud is set into a cavity **14** formed in the top of mounting valve gear base **16**. This base is made of an elongated steel bar and has a rectangular section, as shown particularly in FIGURE 5. The stud is first set into the base and may then be welded in position or otherwise permanently fixed.

As shown in FIGURES 3 and 5, the stud is inclined at a slight angle toward the valve operating end **17** of the rocker arm **2**. Nut **10** may be locked in place by any of the conventional methods. The push rod end **20** of the rocker arm **2**, opposite end **17**, is provided with a depression **21** to receive the top end **22** of any standard push rod **23**.

This structure provides a means for holding a semi-spherical surface of the ring **6** in place on the engine head. It is to be understood that the valve spring, such as **30**, FIGURE 7, will maintain rocker arm **2** in place and bearing against the top of the push rod **23**. Optionally the push rod may have a spring to hold the end **20** of the rocker arm **2** against the top **31** of the valve stem **32** of valve **30**.

Lubrication of the contacting semi-spherical surface between the ring **6** and the depression **4** of the arm **2**, is maintained by drip holes **35***a* in the overhead lubricating pipe **35**, which extends over all studs **12**. This pipe is attached at its right end to a transverse opening **34** in the base **1**. This opening is joined to a vertical passageway **36** which communicates with an opening **37** in the head casting. This opening is supplied with oil under pressure from the working parts of the engine. A cap screw **38** and a washer **39** close the top of the passageway **36** in the base body **1**, therefore, oil supplied through the opening **37** will drip out of all of the openings **35***a* over each of the studs **12**.

Since there are no guides in connection with the above semi-spherical bearing means to prevent side motion of the rocker arm, I provide a guide means for the push rod **23**. This means includes a plurality of inverted U-shaped stirrups **40**. The hump **41** on each stirrup fits loosely over the flanks of each push rod **23** and the rocker arm is held in position by reason of its rounded upper end **22** operating in the depression **21** in the rocker arm **2**. Each of the stirrup shaped guides is attached to the side edge **43** of the unit base **1** by cap screws such as **45**.

In use it is to be understood that the rocker arms **2**

are mounted on the studs 12 as above explained, while the valve heads 31 bear on end 17 of the rocker arm and the push rods 23 bear on the end 20 of each rocker arm. This installation is best shown in FIGURE 7.

From the foregoing it will be understood that the base of the unit 1 may be mounted on the head casting 51 of the engine cylinder 52 by cap screws 53. These cap screws are positioned at any convenient position along the length of the base 1 and extend through holes, such as 54 in said base. These holes and cap screws are to be distinguished from the cap screw 38 which closes the oil passageways 36 and 37, as above mentioned.

With the base 1 mounted on the cylinder head 51 and the rocker arms mounted on the studs 12 and held in position, as above explained, the engine "A" may be operated at high speed and may make use of the efficient semi-spherical bearing, as above explained.

I claim:

1. An internal combustion engine valve operating mechanism comprising a head casting, having valves with upwardly directed stems operating in said head, and push rods operating along side of said head casting disposed laterally relative to said valve stems, a bar forming a rocker arm stud holding base, a plurality of threaded rocker arm stud bolts extending upwardly from said bar, nuts threaded onto said stud bolts and bearing rings on said stud bolts having semi-spherical lower bearing surfaces, cap screws extending through said bar and into tapped holes in said head to hold said bar down on said head, an oil supply pipe connected to an oil supply opening in said engine head and extending over said stud bolts having oil drip holes substantially above the upper end of each stud bolt, a plurality of U-shaped push rod guide stirrups attached to the side of said bar adjacent the push rods on said engine, and cap screws extending through said guide stirrups and threaded into tapped holes in the side of said bar.

2. In combination with an internal combustion engine head casting, having valves with upwardly directed stems operating in said head, rocker arms operating on said

casting having centrally disposed semi-spherical bearing depressions, and push rods operating along side of said casting disposed laterally relative to said valve stems, a rocker arm adapter comprising a bar forming a rocker arm stud holding base, a plurality of threaded rocker arm stud bolts attached to the upper face of said bar and extending upwardly from said bar, nuts threaded onto said studs, and bearing rings having semi-spherical lower bearing surfaces held down by said nuts and bearing on the upper surface of said rocker arms, cap screws extending through said bar and threaded into tapped holes in said head to hold said bar down on said head, an oil supply pipe connected to an oil supply opening in said engine head and extending over said stud bolts having oil drip holes substantially above the upper end of each stud bolt, a plurality of U-shaped push rod guide stirrups attached to the side of said bar adjacent the push rods on said engine, and cap screws extending through said guide stirrups and threaded into tapped holes in the side of said bar.

3. A rocker arm adapter for operating overhead type valves in the cylinder heads of internal combustion engines consisting of an elongated base bar having a rectangular section, a plurality of threaded studs affixed to a flat face of said bar and extending upwardly therefrom, bearing rings having semi-spherical lower faces adapted to form a bearing surface for the semi-spherical depression areas of valve operating rocker arms, nuts threaded on said studs to hold said bearing rings down in the depressions of said rocker arms, a plurality of U-shaped push rod guide stirrups attached to the side edges of said base bar, and an oil supply pipe attached to said base bar and having an elongated portion extending substantially over the tops of said studs having oil drip holes above each of said studs.

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