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[54] **VALVE ROCKER ARM**
3 Claims, 4 Drawing Figs.

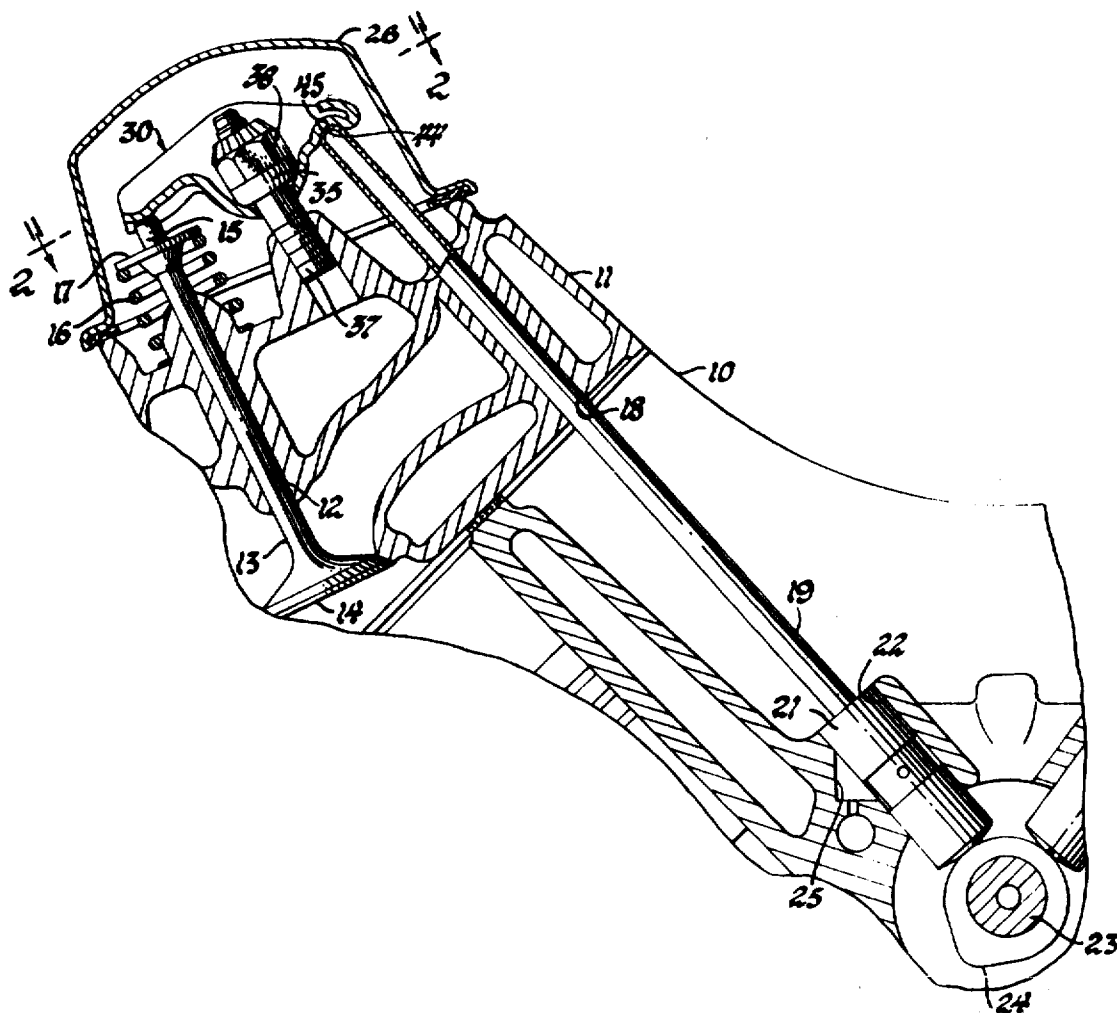
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123/90.33, 90.34, 90.35, 90.36, 90.37, 90.39,
90.41, 90.42, 90.61, 90.62, 90.63, 90.56; 74/519

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ABSTRACT: A valve rocker arm for transmitting reciprocatory movements between a poppet valve and its push rod, the rocker having surfaces on one side adjacent its opposite ends adapted to engage the driving and driven ends of the push rod and valve, respectively, an oppositely presenting pivotal bearing surface for the rocker on its opposite side intermediate the ends thereof and adapted to journal on a cooperating seat, the rocker arm being provided with an integral oil deflector at one end thereof in the form of a tab bent back over an oil hole extending through the surface seat for the push rod to catch oil delivered from the push rod and deflect it inwardly toward the pivotal bearing surface to lubricate the ball seat on which the rocker arm is pivotally mounted.



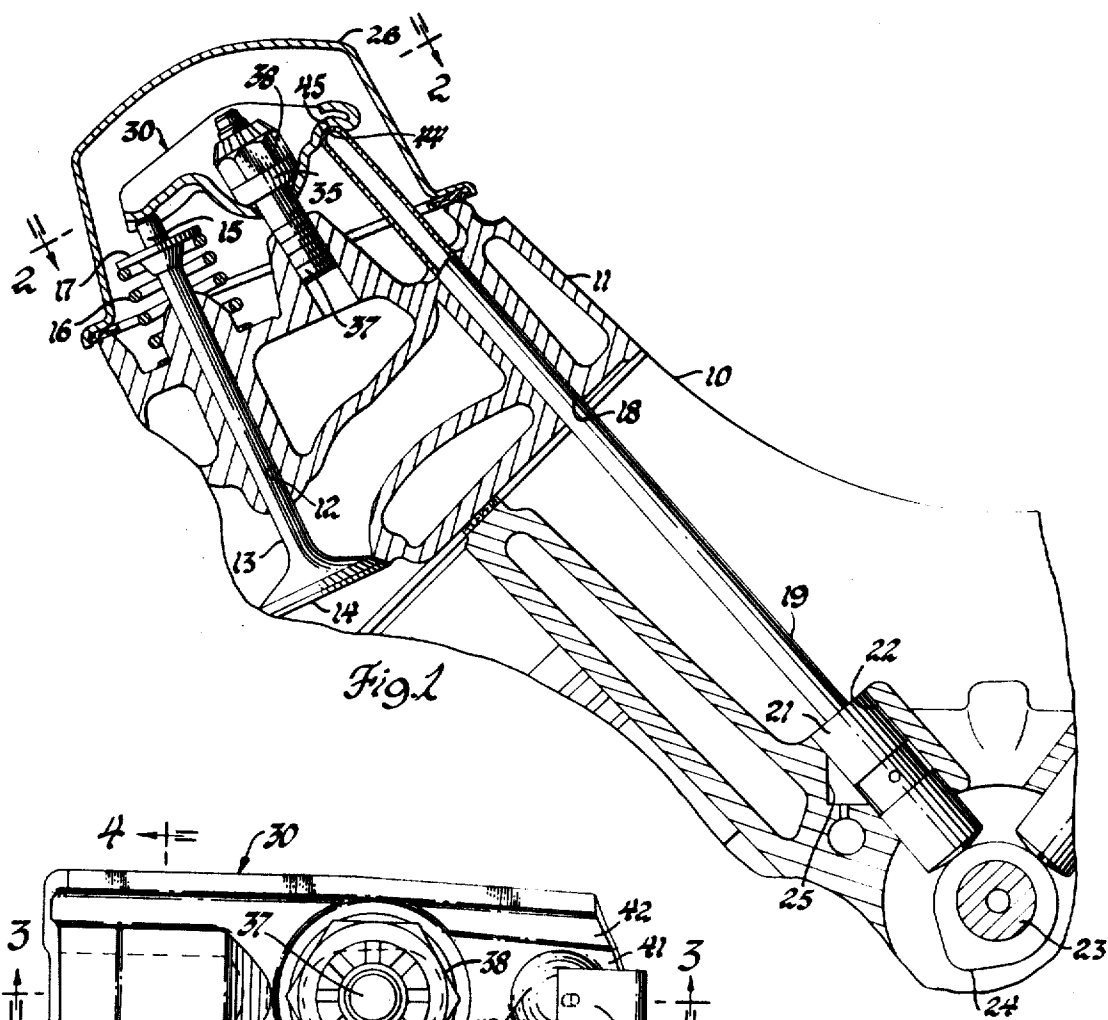


Fig. 1

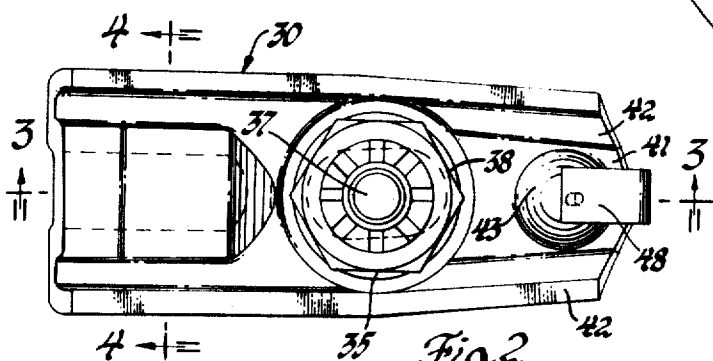


Fig. 2

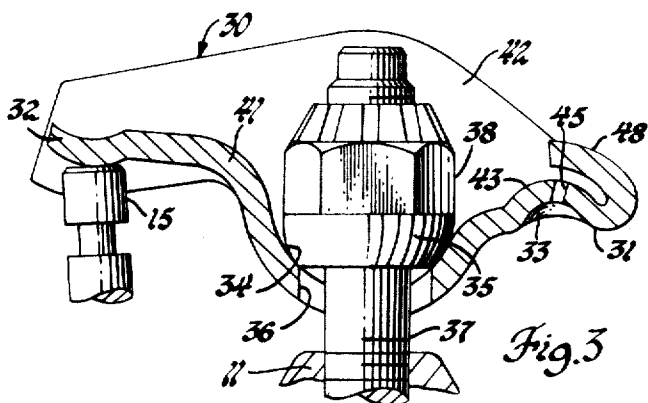


Fig. 3

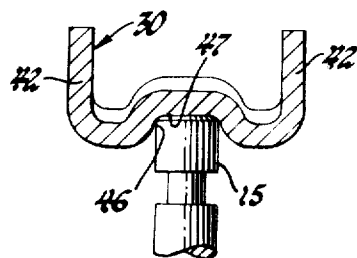


Fig. 4

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VALVE ROCKER ARM

This invention relates to a valve rocker arm and, particularly, to a formed sheet metal valve rocker arm of the type used in the overhead valve gear of an internal combustion engine.

In the typical overhead type valve operating mechanism used in internal combustion engines, various forms of valve rocker arms have been proposed and used to effect suitable mounting of the rocker arm for transmitting reciprocatory movement between a poppet valve and its push rod while still permitting an arrangement for lubrication of the rocker arm, with the aid of various forms of baffles and guides associated, for example, with the rocker cover of the engine to direct the oil to the pivotal elements of the rocker as needed. Each of these prior valve rocker arm arrangements requires the use of separate parts or extensive machine operations to effect the desired results.

Accordingly, an object of this invention is to improve valve rocker arms whereby mounting and lubrication of the rocker arm is facilitated without the use of extra parts.

Another object of this invention is to improve valve rocker arms whereby the rocker arm can be fabricated as a unitary structure of sheet metal.

These and other objects of the invention are obtained by means of a unitary valve rocker arm of sheet metal having surfaces on one side adjacent its opposite ends adapted to engage the driving and driven ends of the push rod and valve, respectively, and having an oppositely presenting pivotal bearing surface for the rocker on its opposite side intermediate the opposite ends thereof, with the push rod end of the valve rocker arm having a bent over tab positioned above the lubricating oil aperture in the seat for the push rod to direct oil to the pivotal surface of the rocker arm and its pivotal support.

For a better understanding of the invention as well as other objects and further features thereof, reference is had to the following detailed description of the invention to be read in connection with the accompanying drawings, wherein:

FIG. 1 is a cross-sectional view of a portion of an internal combustion engine incorporating a valve rocker arm in accordance with the invention;

FIG. 2 is an enlarge view of the valve rocker arm taken along line 2-2 of FIG. 1 with the rocker cover removed;

FIG. 3 is a sectional view taken along line 3-3 of FIG. 2; and,

FIG. 4 is a sectional view taken along line 4-4 of FIG. 2.

Referring now to the drawings, there is shown in FIG. 1 an engine frame structure, of conventional overhead valve type, including a cylinder block 10 and a cylinder head 11. Slideably guided for axial reciprocation in the bore 12 of the cylinder head is the stem 13 of a poppet valve 14, the upper end portion 15 of which projects above the cylinder head. In a conventional manner, the valve 14 is normally maintained in a closed position by spring 16 encircling the upper portion of stem 13 with one end of the spring engaging cylinder head 11 and the other end engaging a conventional retaining washer 17 secured to the stem 13 of the poppet valve. Similarly guided in the bore 18 of the head is a push rod 19 which is disposed laterally of the valve stem 13 and has its upper end also projecting above the cylinder head. The lower end of the push rod 19 abuts the upper end of a valve tappet 21 which is slideably guided for axial reciprocation in the bore 22 provided in the cylinder block 10. Suitably journaled in the cylinder block is a cam shaft 23 carrying a cam 24 which operatively engages the tappet 21 to cause it to reciprocate as determined by the profile of the cam 24.

Operatively connecting the push rod and valve stem is a valve rocker arm, generally designated 30, constructed in accordance with the invention, and formed of sheet metal, having arms 31 and 32 overlying and resting on the upper end of the push rod 19 and poppet valve 14, respectively. Adjacent to the outer end of its arm 31, the bottom surface of the rocker is

spherically dished at 33 to socketably receive the upper end of the push rod 19 in bearing relation. Intermediate the push rod and valve, the rocker is provided on the upper surface thereof with a spherically dished bearing surface 34 which socketably receives a fixed pivot support or washer 35 having a corresponding complementary-shaped bottom surface forming a seat for the rocker. Centrally of the bearing surface 34, the rocker is provided with an aperture 36 through which extends a suitable support member, herein shown as a stud 37 secured to the cylinder head 11 and provided at its upper end with a threaded nut 38 to retain the washer 35.

As shown in the drawings, the rocker arm 30 is substantially U-shaped in section with a web portion 41, formed by the arms 31 and 32, and with integral sidewall portions 42 extending generally perpendicular to the web portion. The arm 31 portion of web 41 has an upwardly projecting embossment 43, the underside surface of which provides the dished portion 33 to receive the upper spherical end of push rod 19.

Push rod 19 is of hollow tubular construction and is provided with an aperture 44 at its upper spherical end which communicates with the interior of the rod. The bore of the push rod 19 is provided with pressurized lubricants, such as oil, by means of the tappet 22 from oil passage 25 in a manner well known in the art, to provide for the lubrication of the bearing surface between the spherical end of the push rod 19 and dished portion 33 and to provide oil by means of an aperture 45 in the latter dished portion 33 of arm 31 to lubricate the pivotal connection between the bearing surface 34 of the rocker arm and washer 35 in a manner to be described. The manner of supplying oil under pressure to the push rod 19 is conventional and forms no part of the present invention and, therefore, no further description is deemed necessary with respect thereto.

The valve engaging end of the rocker arm, that is, arm portion 32 of web 41, is formed with a downwardly opening groove or channel 46 having an upper curved bearing surface 47 against which the upper end 15 of the valve stem 13 rides. The sides of this channel, as seen in FIG. 4, slideably receive the upper end 15 of the valve stem and serve to locate the valve rocker arm with respect to the valve stem, thus preventing rotation of the rocker arm on its pivotal or bearing surface 34.

In accordance with the invention, the right end of arm 31 of the valve rocker arm, as seen in FIGS. 1, 2 and 3, has formed integral therewith a tab portion 48 which is bent up and then over in complementary fashion to the projecting embossment 43 to effectively cover, in spaced relation therefrom, the aperture 45. With this arrangement, as oil is forced through the aperture 44 of push rod 19 and then through the aperture 45 in the rocker arm, the oil will be directed to the pivotal connection between the washer 35 and the bearing surface 34 of the rocker arm. This arrangement will also prevent oil discharged from the aperture 45 under high pressure from spraying all over the area enclosed by the rocker cover 26 thereby preventing an excess loss of oil.

The valve rocker arm described can be easily and economically formed from sheet metal with the oil deflector formed as an integral part thereof, this structure thus eliminating rocker cover baffles or other guide elements to direct lubrication oil to the pivotal bearing surface of the rocker arm.

What I claim is:

1. A rocker arm for an internal combustion engine overhead valve gear, said rocker arm including a web and upstanding longitudinal sides integral with said web, said web having a poppet valve engaging end portion and a push rod engaging end portion, a spherical embossment in said web intermediate said end portions providing a spherical bearing surface on the upper side of said web between said sides, said push rod engaging end portion having an aperture therethrough and an integral return-bent portion overlying said aperture to deflect fluid discharged through said aperture to said spherical bearing surface.

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2. A sheet metal rocker adapted to transmit motion between laterally separated oppositely reciprocating elements, including a web portion with longitudinally vertically extending sidewalls, said web portion having longitudinally spaced portions thereof embossed to engage associated end portions of said reciprocating elements and having an intermediate portion embossed and apertured to form a spherically shaped annular bearing surface adapted to cooperate with a fixed spherical support member about which said rocker is pivoted, one of said spaced portions being embossed to socketably receive one of said reciprocating elements in oil discharge relationship, an aperture extending through said embossed portion, the end of said web portion adjacent to said embossed portion having integral therewith a bent-over deflector tab shaped complementary to said embossed portion and overlying said aperture in spaced relation thereto to deflect oil discharged through said aperture toward said bearing surface.

3. A sheet metal valve rocker arm for use in an internal combustion engine to transmit motion between a laterally separated push rod and poppet valve, the push rod having an aperture at its upper end in communication with a source of

pressurized oil in the interior of the push rod, said rocker arm being of substantially U-shaped cross section with a web portion and integral sidewall portions extending in a plane generally longitudinally and perpendicularly to said web portion, said web portion having a first end embossed to form on its undersurface a dished portion to socketably receive the oil discharge end of the push rod, and aperture through said embossed portion, said first end of said web having integral therewith a return-bent tab in conformity with said embossed portion but spaced therefrom, said return-bent tab being of a length to overlie said aperture, said web portion having a portion adjacent its other end providing a convex bearing surface for the valve tappet with depending side guide portions on opposite sides of said convex bearing surface to provide for lateral guiding of said valve rocker arm with respect to the poppet valve, said web portion having an intermediate portion embossed and apertured to form a spherical annular bearing surface adapted to cooperate with a fixed mating spherical rocker pivot support means.

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