Nov. 7, 1950 J. M. LEAKE 2,529,089

ENGINE ROCKER ARM

Filed July 29, 1948

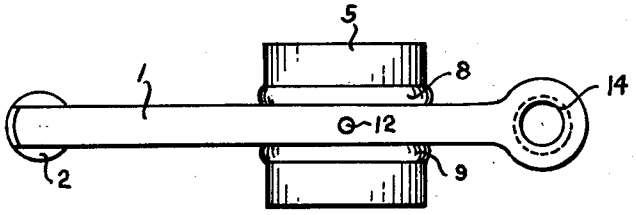

FIG. 1

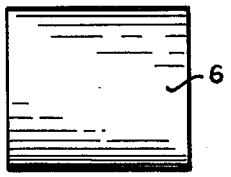

FIG. 6

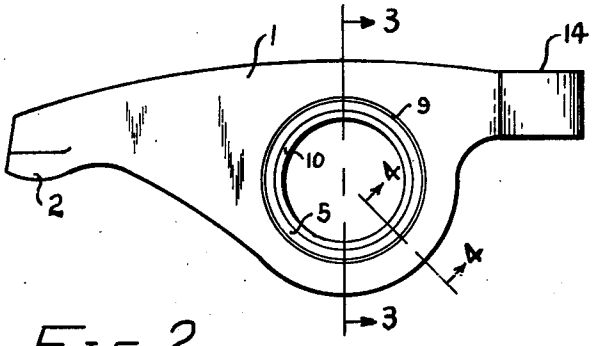

FIG. 2

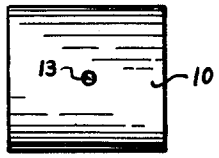

FIG. 7

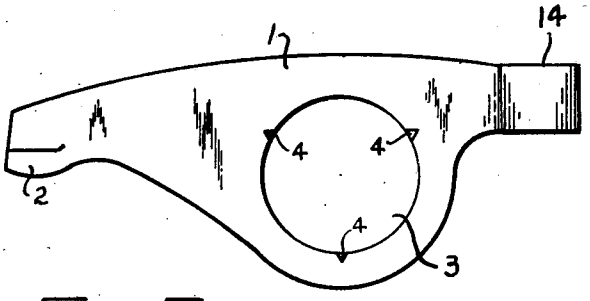

FIG. 5

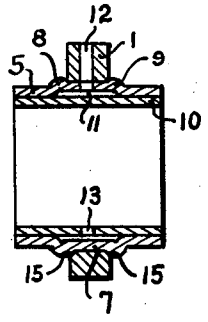

FIG. 3

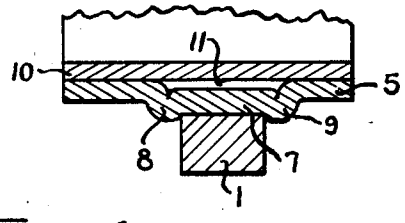

FIG. 4

INVENTOR.

James M. Leake

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ENGINE ROCKER ARM

James M. Leake, Monroe, Mich.

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5 Claims. (Cl. 74—519)

1

This invention relates to rocker arms and more particularly to the type used in the valve mechanism of overhead valve internal combustion engines.

This invention combines the improvements and advantages of my former stamped rocker arm disclosed in Patent No. 2,176,083 of the engine rocker arm disclosed in my co-pending application Serial No. 27,703 and of the old style forged rocker arm.

The purpose of this invention is to provide an engine rocker arm in which the arm member is provided by a single layer or stamping, the hub is provided by a tubular member secured in the arm member and the hub also provides a sealed annular oil passageway.

One object of my invention is to provide an engine rocker arm that is light in weight.

Another object of my invention is to provide an engine rocker arm that does not require any welding or brazing in the assembly process.

Another object of my invention is to provide an engine rocker arm with a solid sheet metal arm member.

Another object of my invention is to provide an engine rocker arm in which the hub provides a sealed oil passageway.

Another object of my invention is to provide an engine rocker arm that requires the assembly of a minimum number of parts.

Another object of my invention is to eliminate the brazing or welding process in the assembly procedure.

Another object of my invention is to construct an engine rocker arm provided with a stamped sheet metal arm member without destroying the desirable qualities of sheet metal.

Another object of my invention is to eliminate the drawing of hub members from the arm member.

Other objects of my invention reside in the novel manner of fabricating and assembling the engine rocker arm as will be more clearly brought out in the following description. With these and other objects in view my invention consists in the construction, combination and arrangements of the various parts of my device as described in the specification, claimed in the claims and illustrated in the accompanying drawings.

In the drawings:

Fig. 1 is a top plan view of an engine rocker arm embodying my invention.

Fig. 2 is a front elevation of the engine rocker arm shown in Fig. 1.

2

Fig. 3 is a sectional view taken along line 3—3 of Fig. 2.

Fig. 4 is an enlarged sectional view taken along line 4—4 of Fig. 2.

Fig. 5 is a front elevation of the arm member before the hub is located in position.

Fig. 6 is a front elevation of the tubular hub member before it is secured in the arm member.

Fig. 7 is a front elevation of the bushing or bearing member before it is secured in the hub.

Referring to the drawings in more detail, I have shown in Figs. 1 and 2 an assembled engine rocker arm provided with an arm member 1. The arm member 1, which is stamped from a piece of sheet metal, is shown in Fig. 5. One end of the arm member is upset to provide a fixed contacting bearing 2. The other end of the arm member is upset, pierced and threaded to provide the threaded eyelet 14. The method of forming this arm member is more fully described in my co-pending application Serial No. 27,703. The arm member 1 is provided with an aperture 3 as shown in Fig. 5. A plurality of small notches 4 are provided adjacent the aperture 3. A tubular member 6 shown in Fig. 6 is inserted in the aperture 3 to provide a hub member 5. The outside diameter of the tubular member 6 is slightly less than the diameter of the aperture 3. The tubular member 6 is inserted in the aperture 4. The tubular member is then confined so that it can not bulge inwardly and the end portions are confined so they can not bulge or expand outwardly. Pressure is then applied from both ends of the tubular member 5. The mid section of the tubular member then expands or bulges to form an expanded ring portion 7. The pressure applied from both ends of the tubular member 6 also forms annular bulges or beads 8 and 9 adjacent the walls of the arm member 1. The annular bulges or beads 8 and 9 together with the expanded ring portion 7 provide a channel on the outside of the hub extending outwardly from the normal periphery of the tubular member or hub 5. The annular expanded ring portion 7 securely fits in the aperture 3 and the annular beads 8 and 9, extending outwardly from the periphery of the hub 5, are larger in diameter than the aperture 4 and they are pressed securely against the outer walls of the arm member 1. The pressure applied to the ends of the tubular member 6 forces a portion of the metal into the notches 4 so that the hub 5 can not turn in the arm member 1. Thus radial motion of the hub member 5 is prevented by the expanded ring portion 7, axial

motion is prevented by the annular flanges 8 and 9 and rotary motion is prevented by a portion of the hub pressed into the notches 4.

A tubular bushing or bearing member 10 is pressed into the hub member 5. An annular oil passageway 11 is provided between the hub member 5 and the bushing 11, by means of the expanded ring portion 7. An oil passageway 12 extends from the annular oil passageway 11 to the top of the arm member 1. Another oil passageway 13 extends from the inner surface of the bushing member 10 to the oil passageway 11.

When the engine rocker arm is installed in an engine the arm oscillates on a hollow rocker shaft (not shown). Oil under pressure flows from the hollow rocker shaft through the passageway 13 into the annular passageway 11 then through the vertical passageway 12 to the top surface of the arm member 1. The oil then flows to each end of the rocker arm and down onto the fixed contacting bearing 2 at one end and onto an adjustable contacting bearing (not shown) which is secured in the threaded eyelet 14 at the other end of the rocker arm.

It will be noted that in my novel construction oil entering the oil passageway 13 must travel partially around the bushing in the oil passageway 11 before it can flow through the oil passageway 12 to the top of the arm member 1. This prevents the oil from spurting out the top of the arm member. In many of the present day engine rocker arms the oil passageway in the bushing and the oil passageway to the top of the arm member are in axial alignment. Oil under pressure from the rocker shaft spurts out of the top of the engine rocker arm when the oil passageways in the rocker arm shaft and the engine rocker arm are in axial alignment. The oil is then thrown away from the arm member, hence it does not flow to the ends of the engine rocker arm to lubricate the contacting bearings. In my novel construction the resistance to flow in the annular oil passageway 11 prevents the oil from spurting out of the oil passageway 12 and instead provides a substantial steady flow of oil from the oil passageway 12.

It will further be noted that my improved engine rocker arm provides a sealed oil passageway from the inlet 13 to the outlet passageway 12. In the present stamped engine rocker arms, as shown in Patent No. 2,176,083, which are formed from two layers it is necessary to hydrogen braze the layers together so that oil can not leak out between the two layers, because at this point the oil is under pressure and will leak out between the layers if they are not perfectly sealed.

In my novel structure the tubular hub 5 member is expanded and then upset on each side of the arm member 1. Thus the hub 5 is secured in position without a welding or brazing process.

The expanded ring portion 7 serves a dual purpose in my novel structure because it secures the hub in the aperture 3 from radial motion and also provides the annular oil passageway 11. The upset portions or annular beads 8 and 9 prevent the hub 5 from moving axially in the arm member 1, while the portions of the hub 5, that are pressed into the notches 4 as shown at 15 in Fig. 3, prevent the hub 5 from rotating or turning in the arm member 1.

It will thus be seen that I have provided a simple engine rocker arm wherein the advantages of stamped and forged rocker arms are combined. Furthermore, my novel structure eliminates the brazing or welding process and at the same time provides a sealed oil passageway. Also my improved structure provides a substantially large annular oil passageway which provides a substantially steady flow of oil to the top of the engine rocker arm.

The details and arrangements herein shown may be varied by a skilled mechanic without departing from the scope of my invention as expressed in the appended claims.

Having thus described my invention what I claim is:

1. An engine rocker arm comprising a solid stamped metal arm member, an aperture in said arm member intermediate the ends thereof, a hub member secured in said aperture, an expanded ring portion of said hub member engaging the annular wall surrounding said aperture, an annular upset flange portion of said hub member engaging each side of said arm member, and a tubular bearing member secured in said hub member, an annular oil passageway provided between said expanded ring portion of said hub and said tubular bearing member, an oil passageway extending from the inner surface of said tubular bearing member to said annular oil passageway and an oil passageway extending from said annular oil passageway to the top surface of said arm member.

2. An engine rocker arm comprising a stamped metal arm member, an aperture in said arm member intermediate the ends thereof, a plurality of notches located around the periphery of said aperture, a hub member secured in said aperture, an expanded ring portion of said hub member engaging the annular wall bounding said aperture, a pair of annular upset flange portions of said hub member, one of said flanges engaging each side of said arm member, a plurality of portions of said hub member pressed into engagement with said notches, a tubular bearing member secured in said hub member, an annular sealed oil passageway provided between said hub member and said tubular bearing member, an oil passageway extending from said annular sealed oil passageway to the inner surface of said tubular bearing member and an oil passageway extending from said annular sealed oil passageway to the top surface of said arm member.

3. An engine arm comprising; a one piece, substantially flat stamped arm member with an aperture space intermediate its ends; a fixed contacting bearing at one end thereof; a threaded eyelet at the other end thereof; a tubular hub member extending transverse of said arm member and through said aperture in said arm, said hub member comprising a tubular member provided with a plurality of annular upset flange portions spaced apart from each other and intermediate the ends of said hub, the portion of said hub member extending outwardly therefrom on the outer periphery of said hub member between said flanges forming an annular channel member, said flanges and said channel extending outwardly from the normal periphery of said tubular member contacting and securing said hub member to the peripheral edge portion of said arm member surrounding said aperture.

4. An engine rocker arm comprising; one piece, substantially flat stamped arm member with a single aperture spaced intermediate its ends, a fixed contacting bearing at one end thereof, a threaded eyelet at the other end thereof, a cylindrical type hub member extending transverse of said arm member and through said aperture, said

hub comprising a cylindrical or tubular member provided with a pair of annular flanges upset intermediate its ends and extending outwardly therefrom, said flanges engaging each side of said arm member about said aperture, the portion of said hub between said flanges forming an annular channel portion on the outer surface of said hub which extends outwardly from the hub's normal periphery and engages the peripheral edge portion of the aperture in said arm member, said flanges and said channel portion therebetween in tight engagement with said arm member for securing said hub member and said arm member together; and a tubular bushing secured in said hub member to form a suitable bearing member.

5. An engine rocker arm comprising; a single layer and substantially flat stamped arm member with an aperture intermediate its ends, a fixed contacting bearing at one end thereof, a threaded eyelet at the other end thereof, a hub member extending transverse of said arm member and through said aperture in said arm, said hub comprising a tubular member provided with annular flanges intermediate its ends and extending outwardly therefrom, said flanges forming locking means for securing said hub member to said arm member by contacting the sides of said arm member, a portion of said hub between said flanges extending outwardly from the hub's normal plane and contacting the annular edge portion of said arm forming said aperture in said arm member, a tubular bushing member secured in said hub member, said tubular bushing and the portion of said hub between said flanges forming an annular oil passageway interposed between said hub and said tubular bushing member, an oil passageway extending from said annular oil passageway to the inner surface of said tubular bushing member and an oil passageway extending from said annular oil passageway to the top surface of said arm member.

JAMES M. LEAKE.

REFERENCES CITED

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

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Number	Name	Date
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2,217,742	Gillette	Oct. 15, 1940
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