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J. M. LEAKE

2,272,166

ROCKER ARM

Original Filed May 22, 1937

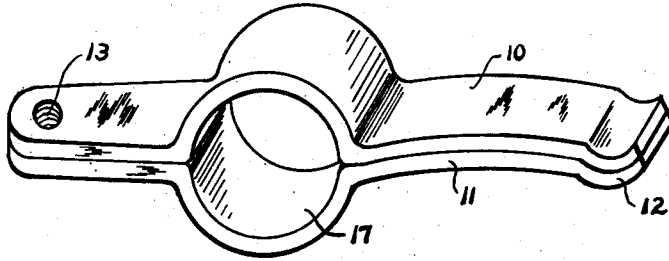


FIG. 1.

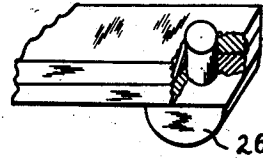


FIG. 7.

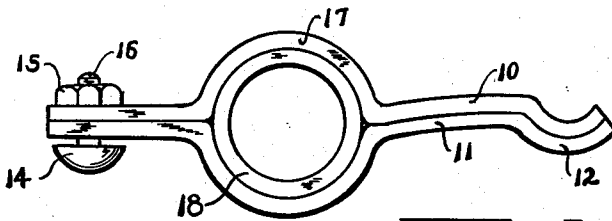


FIG. 2.

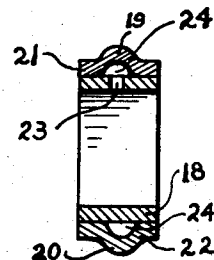


FIG. 5.

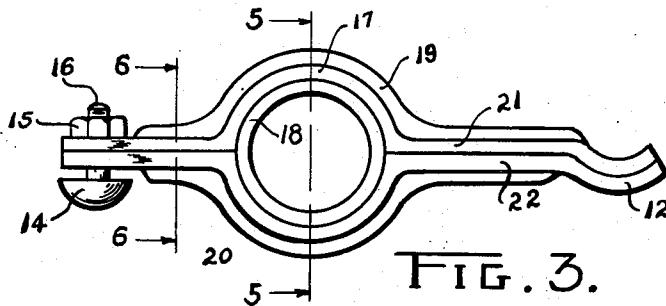


FIG. 3.

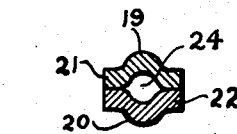


FIG. 6.

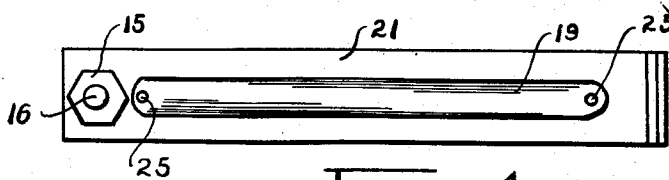


FIG. 4.

Inventor

James M. Leake

## UNITED STATES PATENT OFFICE

2,272,166

## ROCKER ARM

James M. Leake, Toledo, Ohio, assignor to Toledo Stamping and Manufacturing Company, Toledo, Ohio, a corporation of Ohio

Original application May 22, 1937, Serial No. 144,260. Divided and this application September 14, 1939, Serial No. 294,915

9 Claims. (Cl. 74—519)

My invention relates to rocker arms and particularly to the type used to operate the valves of an internal combustion engine. This application for patent is a division of my Patent No. 2,176,083, granted October 17, 1939.

Heretofore rocker arms have been made from forgings and castings but these materials do not lend themselves as readily to quantity production as do stampings. The forged or cast rocker arms require a large amount of machining and drilling. The hardening and heat treating of the cast or forged rocker arm is also an expensive process. My improved rocker arm is made of stampings which permit the use of shapes that gives the greatest strength possible for the material used. All of the expensive processes are eliminated in my novel rocker arm. These factors show that my improved rocker arm can be made lighter, that the expensive machining processes are eliminated and that the cost of producing my novel rocker arm is less than the cost of producing the present type of rocker arm.

One object of my invention is to provide a rocker arm that readily adapts itself to quantity production.

Another object of my invention is to provide a rocker arm that eliminates all expensive machining processes.

Another object of my invention is to provide a rocker arm that simplifies the heat treating process.

Another object of my invention is to provide a rocker arm that requires less skilled help to manufacture.

A further object of my invention is to produce a simple and inexpensive rocker arm and yet one that will be exceedingly effective for the purpose for which it is designed.

These and other objects I accomplished by means of such structure and relative arrangements of parts as will fully appear by the perusal of the following specification and claims.

In the drawing similar characters of reference indicate corresponding parts in the several views;

Fig. 1 is a pictorial view of my improved rocker arm.

Fig. 2 is a front view of my improved rocker arm with a bushing and an adjustable contacting bearing in position.

Fig. 3 is a front view of one modification of my improved rocker arm.

Fig. 4 is a top view of the form of my improved rocker arm shown in Fig. 3.

Fig. 5 is a sectional view taken along line 5—5 of Fig. 3.

Fig. 6 is a sectional view taken along line 6—6 of Fig. 3.

Fig. 7 is a fragmentary view that is partially sectioned of another modification of my improved rocker arm.

Referring to the drawing I have shown in Fig. 1 one form of my invention. This rocker arm is made by welding or otherwise fastening together the stamping 10 and the stamping 11. Thus it will be seen that my improved rocker arm is composed of horizontal laminated stampings. The one end of the arm has a curved surface 12 adapted to be used as a contacting bearing. The opposite end of the rocker arm is provided with a vertical hole 13 which may or may not be threaded.

Fig. 2 is a front view of the rocker arm shown in Fig. 1. In this view a contacting bearing 14 is shown in the hole 13. If it is desirable to have the position of the contacting bearing 14 adjustable the stem 16 is screwed into the threaded hole 13 and is then locked in position by means of the nut 14. The parts 10 and 11 have semicircular portions stamped in them to form the hub 17. Coinciding holes are pierced in the stampings 10 and 11 to form the socket 13 near one end of the arm. Near the other end of the arm coinciding curved portions are stamped in the members 10 and 11 to form the contacting bearing 12. The two stampings 10 and 11 may be permanently fastened together by copper-hydrogen brazing, welding or any other suitable method. Thus my improved rocker arm is made of two horizontally laminated stampings without any machining.

If it is desired to have a better bearing surface within the hub 17 a bushing 18 may be pressed or brazed in the stamped hub 17. This bushing 18 may be a piece of seamless tubing or any other suitable bearing material.

In Fig. 5 I have shown a variation of the rocker arm shown in Figs. 1 and 2, in that beads 19 and 20 are stamped in the members 21 and 22. These beads 19 and 20 serve a dual purpose. They add considerably to the strength of the arm and they also serve as oil ducts. The members 21 and 22 are similar to the stampings 10 and 11 of Fig. 1 except for the stamped beads 19 and 20. The contacting bearings 12 and 14 are the same as those shown in Figs. 1 and 2. Fig. 5 shows an oil hole 23 drilled in the bushing 18. This oil hole 23 allows oil to pass into the oil duct or channel 24. This oil duct or channel 24 extends to the proximity of either end of the rocker arm following the beads 19 and 20. Holes 25 are drilled at the ends of the bead 19 into the channel 24. In actual operation the pressure, created by an oil pump of an internal combustion engine, will force oil through the oil hole 23 into the oil duct 24 and then out of the holes 25. The oil will then flow over the ends of the rocker arm down into the contacting bearings 12 and 14. In this way oil passages are provided that require very little drilling. The holes 25 may be pierced in the stamping process. In this case only the oil hole

23 has to be drilled. This form of my rocker arm can also be used with or without the bushing 18 which provides a pivot bearing when the hub 17 itself is not suitable for a pivot bearing.

In Fig. 7 I have shown another variation in my improved rocker arm. In this variation the stamped members 10 and 11 are not provided with curved portions to form the contacting bearing 12 but the members are straight and a contacting bearing 26 is riveted to the arm as shown in Fig. 7. This form is advantageous because the contacting bearings are not a part of the arm itself and therefore they can be hardened before they are attached to the arm. In this way the metal structure of the arm is not affected and the cost is reduced.

In some cases it is not desirable to lubricate the contacting bearing that operates the exhaust valve of an internal combustion engine. This can readily be taken care of in my rocker arm by not piercing or drilling the hole 25 at the end of the rocker arm that is nearest the exhaust valve.

It will readily be seen that the body of my improved rocker arm is composed of stampings. The end of the arm may be used as a contacting bearing or separate contacting bearings may be provided and then fastened to the rocker arm. The hub of the rocker arm may be used as a pivot bearing but if a better quality of pivot bearing is desired a bushing may be used within the hub. When the rocker arm is installed in an internal combustion engine a shaft goes through the pivot bearing and the rocker arm rocks on the shaft. One contacting bearing engages with a push rod and the other one engages with the valve stem. The parts engaging with or contacting the push rod and valve stem are referred to as contacting bearings in this application. In case one of these contacting bearings is adjustable it may be either the one that engages the valve stem or the one that engages the push rod.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While I have described several embodiments of my invention, I do not wish to be limited to the particular forms shown and described as it will be apparent that many modifications therein may be made without departing from the scope of my invention as set forth in the appended claims.

Having thus described my invention what I claim is:

1. A rocker arm comprising an upper stamping, a lower stamping, said upper stamping having a semi-cylindrical flange, said lower stamping having a semi-cylindrical flange, said semi-cylindrical flanges forming a hub, a pivot bearing in said hub, a means for holding together said upper stamping and said lower stamping and a contacting bearing in the proximity of either end of said rocker arm.

2. A stamped rocker arm having substantially parallel and horizontally laminated superimposed layers, a hub intermediate its ends comprising substantially semi-cylindrical portions struck in opposite directions from said layers and an oil duct formed by beads struck in opposite directions extending substantially to either end of said rocker arm.

3. A stamped rocker arm having substantially

parallel and horizontally laminated superimposed layers, a hub intermediate its ends comprising substantially semi-cylindrical portions struck in opposite directions from said layers, a contacting bearing near the proximity of both ends of said rocker arm and an oil duct formed by opposed grooves in the surfaces of said layers.

4. A stamped rocker arm comprising substantially horizontally laminated layers, a hub intermediate its ends comprising semi-cylindrical portions struck in opposite directions in the adjacent surfaces of said layers, a pivot bearing in said hub having an aperture therein, and an oil duct formed by grooves in said layers communicating with said aperture.

5. A stamped rocker arm comprising substantially horizontally laminated layers, a hub intermediate its ends comprising semi-cylindrical indentations struck in opposite directions in the adjacent surfaces of said layers, said hub having an aperture by means of which the lever may be pivotally mounted upon a shaft, a socket near one end of said rocker arm adapted to secure a contact bearing, a contact bearing in the proximity of the other end of said rocker arm comprising a curved portion of said laminated layers and an oil duct communicating with said aperture in said hub and extending to the proximity of either of said contacting bearings.

6. A rocker arm comprising in combination; an arm, said arm composed of horizontal and substantially parallel superimposed stampings; a means for permanently fastening together said stampings; a hub comprising opposed substantially semi-cylindrical indentations in the adjacent surfaces of said parallel superimposed stampings; a pivot bearing in said hub; a contacting bearing in the proximity of one end of said arm; an adjustable contacting bearing in the proximity of the other end of said arm; an aperture in said pivot bearing and an oil duct extending from said aperture to the proximity of one or both of said contacting bearings.

7. A rocker arm comprising in combination a horizontally laminated arm composed of stampings, a hub intermediate the ends of said laminated arm, said hub formed by opposed semi-cylindrical portions of said stampings, a pivot bearing in said hub, an adjustable contacting bearing near one extremity of said laminated arm, a curved contacting bearing near the other extremity of said laminated arm, an aperture in said pivot bearing and an oil duct extending from said aperture in said pivot bearing to the proximity of either or both of said contacting bearings.

8. A stamped rocker arm comprising horizontally laminated stampings, and a pivot bearing in said rocker arm formed by opposed semi-cylindrical portions in said laminated stampings, said rocker arm being provided with an oil duct extending to said bearing, said oil duct formed by opposed grooves in the adjacent surfaces of laminated stampings.

9. A horizontally laminated rocker arm provided with bearing surfaces at opposite ends, a pivot bearing or hub intermediate its ends comprising substantially semi-cylindrical portions struck in opposite directions from said laminations of said rocker arms, and an oil duct extending to the proximity of said bearing surfaces.

JAMES M. LEAKE.