Oct. 17, 1939. J. M. LEAKE 2,176,083

ROCKER ARM

Filed May 22, 1937

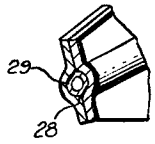


Fig-4

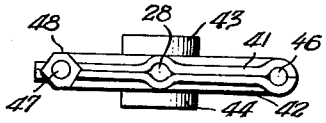


Fig-11

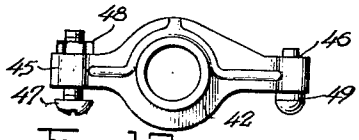


Fig-12

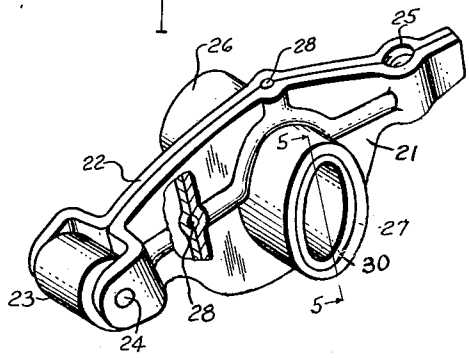


Fig-1

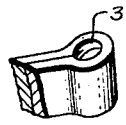


Fig-2

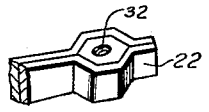


Fig-3



Fig-9

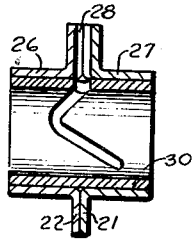


Fig-5

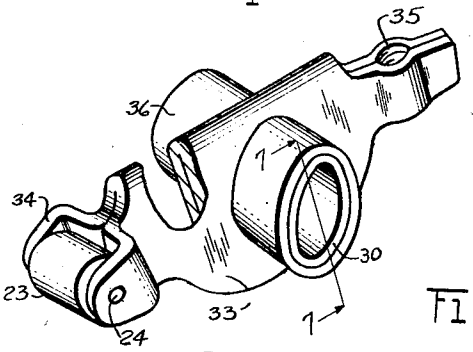


Fig-6

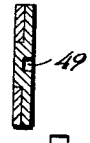


Fig-8

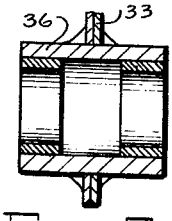


Fig-7

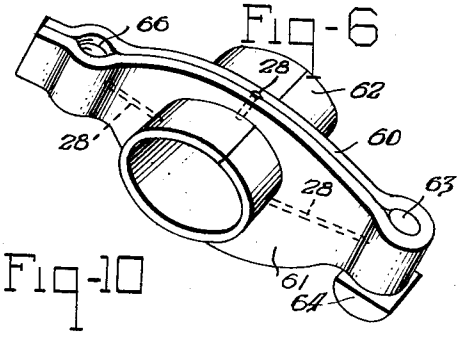


Fig-10

INVENTOR

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2,176,083

ROCKER ARM

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

Application May 22, 1937, Serial No. 144,260

4 Claims. (Cl. 74—519)

My invention relates to rocker arms and particularly to the type used to operate the valves in an internal combustion engine.

Heretofore rocker arms have been made from forgings or castings. These materials do not lend themselves as readily to quantity production as do stampings. These forgings and castings have to be machined and long oil passageways bored in them. Also with the present construction the entire rocker arm has to be heat treated. This process of manufacturing rocker arms is expensive. My improved rocker arm is made of stampings which permits the use of shapes that give the greatest strength for the amount of material used. These factors show that my improved type of rocker arm requires less machining, that the rocker arm can be made lighter and that the cost of producing my improved type of rocker arm is very much less than the cost of manufacturing 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 requires heat treatment only at the points where wear actually occurs.

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 requires less skilled help to manufacture.

Another object of my invention is to provide a rocker arm that can be made uniform in quantity production.

Another object of my invention is to provide an improved type of rocker arm that is simple, strong, durable and inexpensive.

With these and other objects in view, my invention consists in the construction, combination and arrangement of the various parts of my improved device as described in the specification, claimed in the claims, and illustrated in the accompanying drawing.

In the drawing:

Fig. 1 is a perspective view partially in section showing one embodiment of my invention.

Fig. 2 is a partial view of the rocker showing a variation of construction of the rocker arm shown in Fig. 1.

Fig. 3 is a partial view of a variation of the rocker arm disclosed in Fig. 1. In this arrangement a nut is inserted in the rocker arm for holding an adjustable contacting bearing.

Fig. 4 is a view showing how a tube can be placed in the groove shown in Fig. 1 for the purpose of oil distribution.

Fig. 5 is a section taken on line 5—5 of Fig. 1.

Fig. 6 is a perspective view partially in section showing another form of my invention.

Fig. 7 is a section taken on line 7—7 of Fig. 6.

Fig. 8 is a section view showing how the two symmetrical stampings shown in Fig. 1 can be held in proper contact.

Fig. 9 is a section view showing another method of holding the stampings, shown in Fig. 1, in proper contact.

Fig. 10 is a perspective view of another form of my invention.

Fig. 11 is a top view of the rocker arm showing both contacting bearings in position.

Fig. 12 is a front view of the rocker arm shown in Fig. 11.

Referring to the drawing I have shown in Fig. 1 one form of my invention. This rocker arm is made by welding together or otherwise fastening together the stamping 21 and the stamping 22. The stamping 21 and the stamping 22 are substantially symmetrical. A contacting bearing 23 is held in position by means of the pin 24. The pin 24 may be riveted at either end or it may be welded to the stamping 21 and the stamping 22. A socket 25 is formed when the two stampings of the lever arm are fastened together. This socket 25 is used to fasten a push rod contacting bearing or a valve stem contacting bearing. Near the center of the stampings are hubs 26 and 27. These hubs 26 and 27 are integral parts of the stampings 21 and 22. This can be clearly seen in Fig. 5. The oil hole 28 is formed by two corresponding indentations in the stampings 21 and 22. These stampings 21 and 22 can be hydrogen welded thus the oil hole 28 will readily retain oil. A pivot bearing 30 is fastened in the hub 26 and the hub 27 as shown in Fig. 5. A piece of tubing 29 may be placed in the oil hole as shown in Fig. 4. The tube 29 would prevent oil leakage which might occur in the construction shown in Fig. 1 if the parts were not properly welded.

Fig. 2 shows how the rocker arm shown in Fig. 1 can be made from one stamping. This stamping is folded at its axis of symmetry in such a manner that the symmetrical parts are pressed into engagement. The folding of the stamping also forms a socket 31. The purpose of the socket 31 is the same as that of the socket 25 shown in Fig. 1.

Fig. 3 shows a nut 32 fastened between the stampings 21 and 22. The nut 32 provides a

means by which the position of the valve stem contacting bearing or the push rod contacting bearing may be adjusted to any desired position.

Another method of constructing my rocker arm is shown in Fig. 6. In this construction the two symmetrical parts of the stamping **33** are folded at the axis of symmetry, which forms the upper edge of the rocker arm. The contacting bearing **23** is held in position by means of a pin **24** which passes through holes in the lugs **34** of the stamping **33**. The pin **24** may be riveted or welded to the lugs **34**. The socket **35** is formed by two semi-circular indentations in the stamping **34**. The purpose of the socket **35** is the same as the socket **25** shown in Fig. 1. A piece of tubing **36** is inserted through two coinciding apertures in the folded stamping **33**. The tube **36** forms a hub for holding a pivot bearing similar to the pivot bearing **30** in Fig. 5. The tube or hub **36** may be welded to the stamping **33** as shown in Fig. 7.

Fig. 10 shows another form of my improved type of rocker arm. Two substantially symmetrical stampings **60** and **61** are fastened together, either by welding or some other suitable process. The seamed tube **62** is inserted in the coinciding holes of the stampings **60** and **61** thus forming a hub for holding a pivot bearing or bushing. One end of the rocker arm is shaped to form a socket in which the stem **63**, of the contacting bearing, **64** is inserted and fastened. The stem **63** may be fastened to the arm by riveting or welding. The other end of the arm is shaped so as to form another socket **66**. This socket is tapped so that an adjustable contacting bearing, similar to the contacting bearing **47**, shown in Fig. 12, can be used.

The oil passageways **28** represented in Fig. 10 by means of dotted lines are formed either by coinciding indentations in the stampings **61** and **62** or they may be drilled after the stampings **61** and **62** are fastened together. In this particular construction one of the oil passageways leads from the top of the rocker arm to hub or bearing as shown in Fig. 5. Another oil passageway **28** leads from the hub or bearing to the socket **66** and a third oil passageway **28** leads from the hub or bearing to the socket in which the stem **63** of the contacting bearing **24** is fastened.

Fig. 8 shows how a small embossing of the one stamping is extruded. This extruded portion fits into a hole in the adjoining stamping. Several of these may be used to align the stampings during assembly and after the rocker arms are assembled these extruded portions serve to act as dowels and eliminate any possibility of one stamping twisting apart from the other if unequal pressure is applied. Thus strains are relieved from the points that are welded.

Fig. 9 shows another method that may be used for the same purpose as the extruded portions.

From the various forms of my invention shown and described it can readily be seen that many other variations of my invention can be made.

Fig. 11 shows the top view of a rocker arm embodying one form of my invention. Fig. 12 is the front view of the same form of my invention. In this construction the rocker arm is made by welding or otherwise fastening together two substantially parallel and symmetrical stampings **41** and **42**. The hubs **43** and **44** protrude on either side of the rocker arm. At either end the stampings **41** and **42** have a substantially semicircular portion. These substantially semicircular portions coincide forming sockets **45** and **46** in which the contacting bearings are fastened. In the particular form shown the adjustable contacting bearing **47** is screwed into the socket **45** which is tapped. The contacting bearing **47** is then locked in position by means of the lock nut **48**. The cylindrical portion of the contacting bearing **49** is fastened in the socket **46** preferably by copper-hydrogen welding. The oil passageway **28** is formed by two corresponding indentations in the stampings **41** and **42**. This oil passageway **28** extends from the top of the rocker arm to hub or bearing similar to the oil passageway **28** shown in Fig. 5. The oil passageway **28** also extends from the hub or bearing to either end of the arm as shown in Figures 11 and 12.

It will readily be seen that the bodies of the rocker arms of my improved rocker arm are composed of stampings. The bodies may be composed of one, two or more stampings. The end of the arm may be used as a contacting bearing or a separate piece suitable for a contacting bearing can be fastened to the rocker arm. The other end of the rocker arm is provided with a means for fastening another contacting bearing. This contacting bearing may be either fixed or adjustable as to position. Near the center of the rocker arm are hubs on either side of the rocker arm. These hubs may be integral with the stampings forming the arms or a tube may be inserted in holes provided in the stampings thus forming a hub. The purposes of the hub of either construction is to house a pivot bearing or bushing. When the rocker arm is installed in an internal combustion engine a shaft goes through the pivot bearing and the rocker arm pivots on this shaft. The rocker arm then engages with the push rod at one end and the other end engages with the valve stem. The parts engaging with the push rod or 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.

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; a plurality of stampings, said stampings welded into an arm member; a hub; a pivot bearing in said hub; a curved contacting bearing interposed between said stamping of said arm member, an adjustable contacting bearing, an oil passageway extending from said hub to the proximity of either end of said rocker arm and an oil passageway extending from said hub to the top of said rocker arm.

2. A rocker arm comprising in combination; a vertically laminated arm composed of stampings, a hub intermediate the ends of said vertically laminated arm; a pivot bearing in said hub; an adjustable contacting bearing near one extremity of said vertically laminated arm; a curved contacting bearing provided with a stem, near the other extremity of said vertically laminated arm; said stem fastened in a vertical socket formed by coinciding, substantially semicircu-

lar portions of said stampings comprising said vertically laminated arm; an oil passageway extending from said pivot bearing to said curved contacting bearing and an oil passageway extending from said pivot bearing to said adjustable contacting bearing.

3. A rocker arm comprising in combination an arm, said arm comprising vertically laminated stampings; a hub intermediate the ends of said arm; a socket near one end of said arm; a curved contacting bearing permanently fastened in said socket; a threaded socket near the other end of said arm; an adjustable contacting bearing fastened in said threaded socket; a means for locking said adjustable contact bearing in position; an oil passageway from said hub to said socket and another oil passageway from said hub to said threaded socket.

4. A rocker arm comprising in combination; an arm, said arm composed of vertical and substantially parallel superimposed stampings; a means for permanently fastening together said stampings; a hub protruding from either side of said arms; a pivot bearing in said hub; a curved contacting bearing in the proximity of one end of said arm; said contacting bearing fastened by partially interposing said contacting bearing between the vertical and substantially parallel superimposed stampings; an adjustable contacting bearing in the proximity of the opposite end of said arm; an oil duct extending to said hub and a means for conveying a lubricant to one or both of said contacting bearings.

JAMES M. LEAKE.