Nov. 11, 1952 J. M. LEAKE 2,617,178

METHOD OF MAKING ENGINE ROCKER ARMS

Filed June 23, 1949

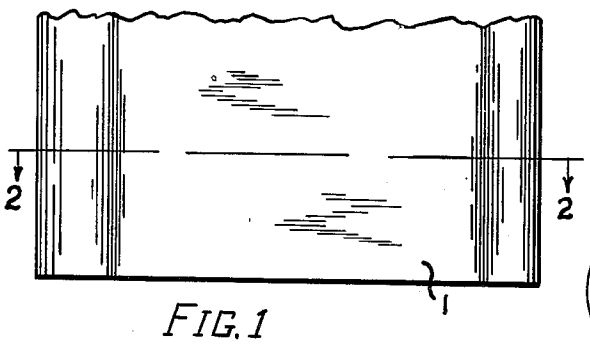


FIG. 1

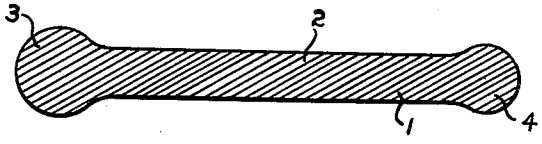


FIG. 2

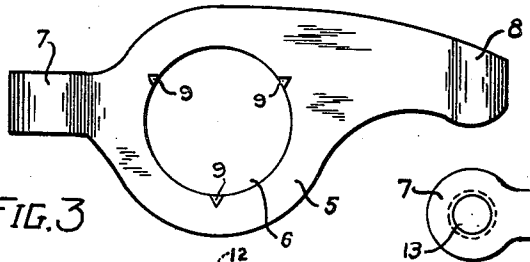


FIG. 3

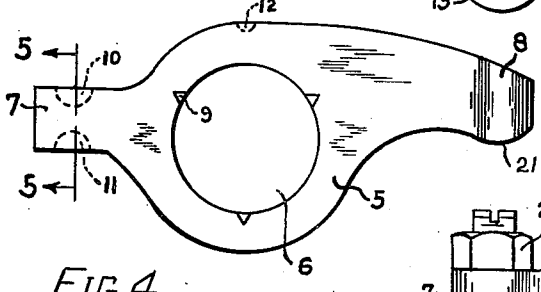


FIG. 4

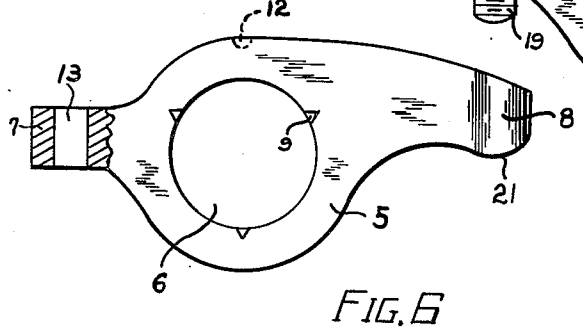


FIG. 6

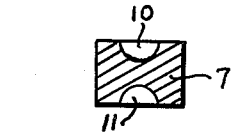


FIG. 5

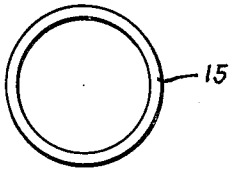


FIG. 7

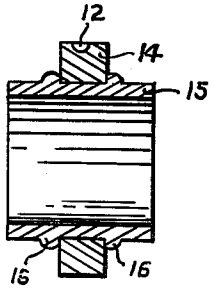


FIG. 9

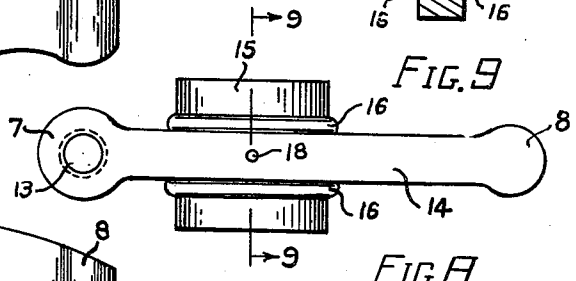


FIG. 8

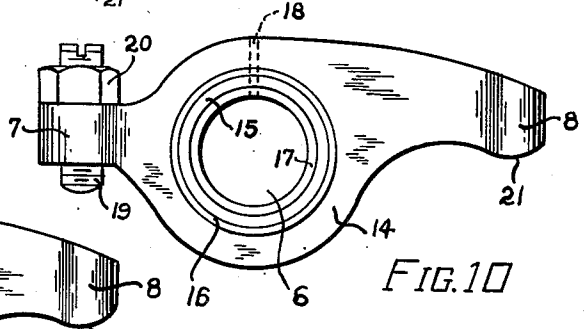


FIG. 10

INVENTOR.

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Patented Nov. 11, 1952

2,617,178

UNITED STATES PATENT OFFICE

2,617,178

METHOD OF MAKING ENGINE ROCKER ARMS

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Application June 23, 1949, Serial No. 100,925

2 Claims. (Cl. 29—152)

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The object of this invention is to make a rocker arm out of plate metal. The particular rocker arm to which the invention is directed is the one employed in connection with the valve operating mechanism in an internal combustion engine.

My former stamped engine rocker arm disclosed in Patent No. 2,176,083 provided many advantages over the old style cast and forged rocker arms. This rocker arm provides an arm member consisting of layers welded together. In this type of construction some of the desirable qualities of the sheet metal are lost in the welding process.

My improved engine rocker arm provides a single layer arm member formed from a strip of preformed plate metal. My improved engine rocker arm combines the advantages of the old style cast and forged engine rocker arms with the advantages of the stamped sheet metal rocker arm without losing any of the desirable qualities of the sheet metal.

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 provides a solid one piece arm member made of plate metal.

Another object of my invention is to provide an engine rocker arm that eliminates any welding or brazing in the arm assembly.

Another object of my invention is to provide oil passageways that do not require welding or brazing.

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 provide an engine rocker arm that requires a minimum of working of the plate metal of which the arm is formed.

Another object of my invention is to construct an engine rocker arm in which all of the desirable qualities of the plate metal are retained.

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

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

In the drawings:

Fig. 1 is a view of a portion of the preformed strip of plate metal from which the arm member of my improved engine rocker arm is made.

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Fig. 2 is a sectional view taken along line 2—2 of Fig. 1.

Fig. 3 is a front elevation of the blank stamped or cut from the preformed strip of plate metal shown in Fig. 1.

Fig. 4 is a front elevation showing indentations formed in the one enlarged end of the arm member.

Fig. 5 is a sectional view taken along line 5—5 of Fig. 4.

Fig. 6 is a front elevation, partially in section, showing the vertical hole pierced in the arm member.

Fig. 7 is a front elevation of the tubular hub member before it is assembled in the arm member.

Fig. 8 shows the metal plate arm member with the hub member assembled in position.

Fig. 9 is a sectional view taken along line 9—9 of Fig. 8.

Fig. 10 is a front elevation of the completely assembled engine rocker arm.

Referring to the drawings in more detail, in Fig. 1 I have shown a portion 1 of a preformed plate metal strip. Fig. 2 is a sectional view showing the flat mid section 2 and the enlarged rounded edges 3 and 4 of the preformed plate metal strip 1. In the first operation the blank 5 is stamped from the preformed metal strip 1. In the same operation the annular hole 6 is pierced intermediate the enlarged rounded end portions 7 and 8 of the blank 5. Notches 9 are formed in the edges of the annular hole 6.

The indentations 10 and 11 are pressed in the rounded end 7 of the blank 5. The indentations 10 and 11 are in axial alignment. At the same time a smaller indentation 12 is formed directly above the annular hole 6.

The enlarged rounded end 7 is then pierced to form an annular vertical aperture 13 shown in Fig. 6. The indentations 10 and 11 reduce the length of the hole that has to be pierced to form the aperture 13. The vertical aperture 13 is then threaded so that a male threaded contacting bearing can be adjustably secured in the enlarged end 7 of the arm member.

The blank 5 which has been processed as described above provides the arm member 14 of my improved engine rocker arm, as shown in Fig. 10.

A tubular member 15 of predetermined length is inserted in the aperture 6. The tubular member 15 is then upset on both sides of the arm member 14 as shown in Fig. 9. This is done by applying pressure from both ends of the tubular member 15 and at the same time confining the

inner surface of the tubular member and also confining the ends of the tubular member near the end portions. The pressure applied on both ends of the tubular member 15 causes the metal to flow. The only place the tubular member can expand is the portion near the two sides of the arm member 14 which is not confined. The tubular member 15 then expands adjacent the arm member 14 to provide annular upset flanges 16. In the upsetting process metal from the tubular member 15 is forced into the notches 9, thus preventing rotary motion of the tubular hub member 15 in the arm member 14. The annular flanges 16 prevent endwise motion of the hub member 15 in the arm member 14.

A tubular bushing or bearing member 17 is pressed into the hub member 15. An oil passageway 18 is provided by piercing or drilling a hole from the indentation 18 downward through the arm member 14, the hub 15 and the bushing 17.

An adjustable contacting bearing 19 is secured in the threaded aperture 13 and is locked in position by a lock nut 20.

The under surface 21 of the enlarged rounded end 8 of the arm member 14 is preferably hardened to resist wear. The hardening is preferably done before the hub 15 is secured in the arm member 14.

By this method of manufacture a simple plate metal rocker arm, for the purpose described, is provided. It will be noted that no brazing or welding is required in my improved process which destroys the strength, grain and other desirable characteristics of plate or sheet metal. Furthermore no upsetting, compacting or expanding is required in the processing of the arm member 14. Therefore all of the desirable qualities of the plate metal are retained.

It will be noted that oil cannot leak from the oil passage 18. Oil leakage from this oil passageway has been one of the major objections to the laminated arm member as disclosed in my Patent No. 2,176,083.

The contacting surface 21 of my improved engine rocker arm may be engaged by the valve stem and the adjustable contacting bearing 19 may engage the push rod in the valve operating mechanism of an internal combustion engine.

The details and arrangements herein shown and described may be varied by a skilled mechanic without departing from the scope of my invention as expressed in the claims. For example the hub 15 and the bushing 17 may be made of a single tubular member which has a layer of steel or

strong metal on the outside and a layer of bearing material on the inside.

Having thus described my invention, what I claim is:

1. The method of making an engine rocker arm which consists in forming a blank of predetermined shape from a strip of preformed plate metal to form an arm member, said preformed plate metal having a flat midsection of uniform thickness and rounded edge portions of substantially greater diameter than the thickness of said flat midsection, forming a vertical aperture in one of said rounded edge portions, threading said aperture, piercing a horizontal aperture in said arm member intermediate said rounded edge portions, forming a plurality of notches around the periphery of said horizontal aperture on each side of said arm member, inserting a tubular hub member in said horizontal aperture and upsetting said hub member adjacent both sides of said arm member and simultaneously upsetting portions of said hub member into said notches on each side of said arm member.

2. The method of making an engine rocker arm which consists in forming a horizontal aperture intermediate the ends of a preformed arm member adapted to provide a plurality of contacting bearings, forming a plurality of notches in said arm member around the periphery of said aperture terminating at each side of said arm member, inserting a tubular hub member in said aperture, upsetting said hub member intermediate its ends adjacent both sides of said arm member and at the same time simultaneously upsetting portions of said hub member into said notches on each side of said arm member.

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