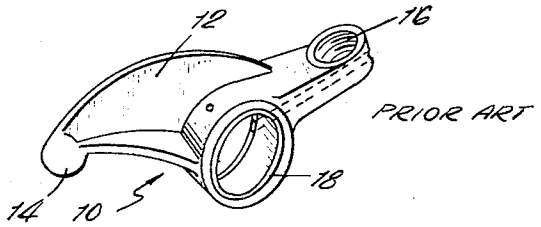
March 26, 1968 KAZUO HIROSE 3,374,690

ROCKER ARMS FOR INTERNAL COMBUSTION ENGINES

Filed Oct. 19, 1965

FIG. 1



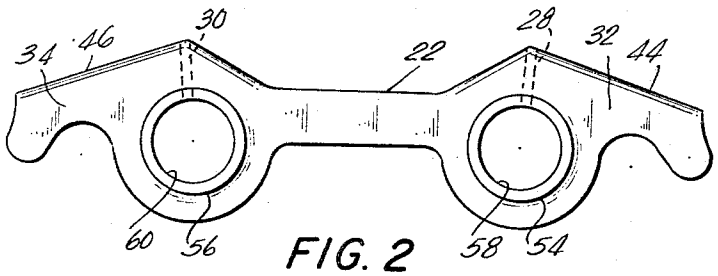


FIG. 2

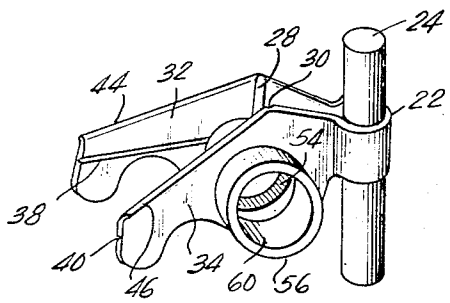


FIG. 3

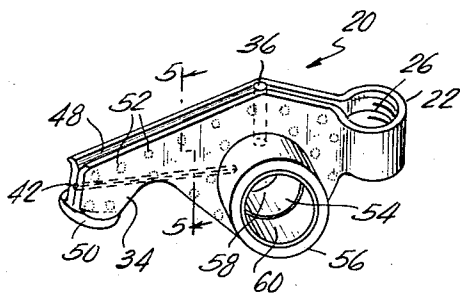


FIG. 4

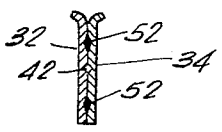


FIG. 5

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ROCKER ARMS FOR INTERNAL COMBUSTION ENGINES

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2 Claims. (Cl. 74—519)

ABSTRACT OF THE DISCLOSURE

A rocker arm constructed of sheet metal formed from a pair of complementary sheets integrally interconnected by an arcuate eye portion. The sheets have an opposite end hammered and shaped to form a hardened valve head contact. The sheets are spot welded together in a manner so that flanges surrounding bores through the sheets form flanges. The sheets have complementary grooves forming oil passages with the upper edges of the sheets and being divergently flared and communicating with the grooves.

This invention relates to a rocker arm construction for use in internal combustion engines and more particularly to a rocker arm constructed from sheet metal.

The primary object of the present invention resides in the provision of a metal rocker arm for an internal combustion engine which is especially adapted to be employed in the overhead valve type of internal combustion engine and which comprises a strip of metal bent mid-way upon itself to form a pair of complementary sheets which provides for good thermal characteristics while affording increased strength.

In the past rocker arms for internal combustion engines have been either cast or made of stamped metal. The cast type of rocker arms are generally relatively heavy, expensive to machine, and otherwise unsatisfactory for mass production. The sheet metal type of rocker arm heretofore used have employed various arrangements for providing for lubrication of the hub, but because of the construction and especially the use of complementary hub projections which form cavities adjacent the bores through the complementary sheets. This provides for portions where there is relatively little metal immediately adjacent the areas subject to wear and heat so that breakdowns at these locations often occur, and the rocker arm is otherwise unsatisfactory. In order to overcome the disadvantages of the prior art rocker arms and to provide for increased strength, the present invention conceives of spot welding the complementary sheets of the rocker arm along portions thereof spaced from the bores and projecting flanges so that the complementary sheets are secured to each other and reinforce each other while permitting a suitable flow of lubricating fluid therebetween.

Still further objects and features of this invention reside in the provision of a rocker arm construction that is strong and durable, easy to manufacture by mass production methods, and efficient in operation.

These, together with the various ancillary objects and features of the invention, which will become apparent as the following description proceeds, are attained by this rocker arm for internal combustion engines, a preferred embodiment of which has been illustrated in the accompanying drawing, by way of example only, wherein:

FIG. 1 is a perspective view of the prior art rocker arm constructed from a casting;

FIG. 2 is an elevational view of a blank from which the rocker arm comprising the present invention is constructed;

FIG. 3 is a perspective view illustrating the rocker arm in an intermediate state of manufacture;

FIG. 4 is a perspective view of a completed rocker arm; and,

FIG. 5 is a sectional detail view taken along the plane of line 5—5 in FIG. 4.

With continuing reference to the accompanying drawing, wherein like reference numerals designate similar parts throughout the various views, and with initial attention directed to the prior art embodiment, as shown in FIG. 1, reference numeral **10** is used to generally designate a valve rocker arm for internal combustion engines. The rocker arm **10** is formed from a casting and includes an arm member **12**, having a contact bearing surface **14** at one end, an eye **16** at the other end thereof, preferably threaded for receiving the threaded end of a push rod, and a hub **18**. This type of rocker arm has proved to be unsatisfactory because of the weight thereof, the difficulty in machining the various parts from the casting so as to maintain the rocker arm in balance, and the imperfections resulting from casting causing bad heat distribution. Further, such castings and the required machine steps make the rocker arm **10** not as readily adaptable to mass production as the rocker arm shown in FIGS. 2 through 5, which is stamped, formed and constructed from a sheet of metal bent mid-way upon itself.

In FIG. 2 there is shown the blank from which the rocker arm, generally designated by reference numeral **20** is adapted to be constructed. This blank **22** is adapted to be bent back upon itself over a cylindrical pin **24** to form an eye at **26**, which may be then threaded or which may have been formed therein upon stamping out of the blank **22**.

At the time of stamping out of the blank **22**, arcuate shaped grooves **28** and **30** are formed in the respective halves **32** and **34** of the blank so that when the halves **32** and **34** are disposed with their adjacent surfaces in abutting relationship, they form an oil passage **36** of substantially circular cross sectional configuration. Another pair of grooves **38** and **40** of triangular cross sectional configuration are also formed at the inner confronting surfaces of the blank halves **32** and **34** so as to form a substantially diamond or square shape oil passage **42**. The upper edges of the blank halves **32** and **34** are outwardly turned at **44** and **46** to form a lubricating groove **48**, while a valve head contact **50** is formed by a header machine and is suitably hardened through a suitable hardening process. Of course, before the valve head contact is shaped by the header machine, the blank halves **32** and **34** are welded together by spot welds **52** at spaced locations along the entire dimension of the blank halves **32** and **34** with all of the welds **52** being spaced from the opposed flanges **54** and **56** and aligned bores **58** and **60** therethrough so that the material at the periphery of the bores **58** and **60** has no welded portion immediately adjacent and so that the edges of the blank halves **32** and **34** at the bores **58** and **60** are in intimate alignment whereby no hot spots or weakened portions are formed.

Of course, in lieu of providing the triangular grooves **38** and **40** in the blank spaced halves **32** and **34**, only one of the grooves **38** and **40** may be provided if such is desired.

A latitude of modification, substitution and change is intended in the foregoing disclosure and in some instances some features of the invention will be employed without a corresponding use of other features. Accordingly it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

What I claim is:

1. A rocker arm constructed of sheet metal comprising a pair of complementary sheets arranged in abutting relationship and integrally interconnected at one end by an arcuate eye portion, said sheets having at least a portion

of the end opposite shaped and hardened to form a substantially hemispherical valve head contact, said sheets having oppositely extending axially aligned cylindrical flanges, said sheets having bores therethrough in alignment with said flanges so that said flanges extend about the periphery of said bores, said sheets lying flush with each other at the peripheries of said bores, said sheets each having grooves in adjacent faces thereof, said grooves intersecting said bores, said sheets being spot welded together at locations spaced from said flanges so that said flanges form a hub and said grooves form oil passages, the upper edges of said sheets being divergently flared outwardly to form a lubricating groove, said grooves opening into said lubricating groove.

2. A rocker arm according to claim 1, wherein at least one of said grooves in each sheet is triangular in shape so that said oil passage formed thereby is square in cross section.

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