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INTERNAL COMBUSTION ENGINE VALVE ASSEMBLIES HAVING OIL SHIELDS

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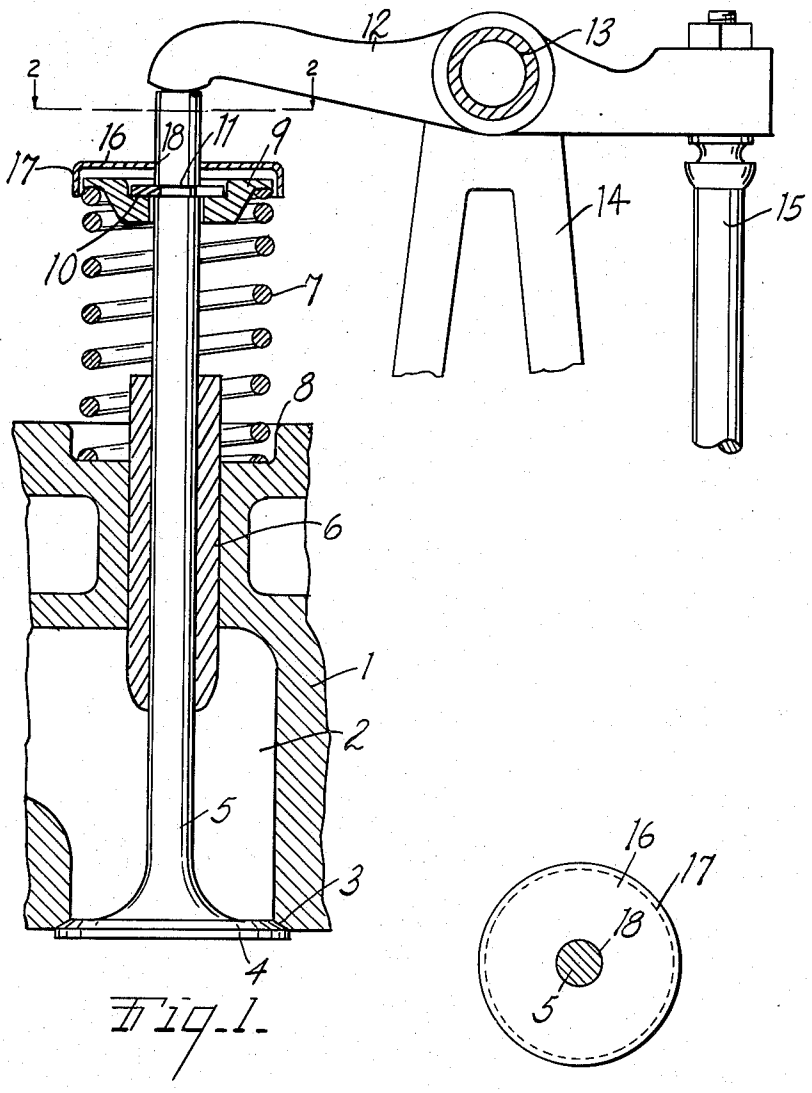


Fig. 1.

Fig. 2.

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INTERNAL COMBUSTION ENGINE VALVE ASSEMBLIES HAVING OIL SHIELDS

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3 Claims. (Cl. 123—188)

This invention relates to internal combustion engine valve assemblies having oil shields.

The main objects of this invention are:

First, to provide a valve assembly including an oil or lubricant shield which may be quickly applied to the valve stem and does not in anywise interfere with the engagement of the valve stem by an actuating member or require any adjustment in the actuating member or tappets.

Second, to provide an oil or lubricant shield having these advantages which is light in weight and does not effect the normal operation of the valve to which it is applied.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a fragmentary view partially in vertical section of an internal combustion valve assembly embodying my invention.

Fig. 2 is a plan view in section on a line corresponding to line 2—2 of Fig. 1.

In the accompanying drawings the parts are shown somewhat enlarged as compared to the parts as usually embodied in an internal combustion engine.

In the accompanying drawing 1 represents an internal combustion engine cylinder head having a passage 2 therein terminating in the valve seat 3. The valve 4 is provided with a valve stem 5 which is reciprocable in the bearing 6.

The valve spring 7 is seated in a centering recess 8 provided therefore in the cylinder head 1 and engages the thrust member 9 secured to the stem by means of the key 10 engaging the annular slot 11 in the stem which is located in spaced relation to the end of the stem.

The rocker arm 12 engages the end of the stem. This rocker arm is pivotally mounted at 13 on the support 14 and is actuated by the tappet rod 15.

The structure illustrated is an overhead valve type of structure.

The shield 16 in a highly practical commercial form is formed as a sheet metal stamping from sheet stock of a gauge of the order of .015 to .030 and having a carbon content of the order of .55 to .65 and tempered after forming. The shield, after tempering, desirably has a hardness of the order of .44 to .46 Rockwell C.

The embodiment of my invention illustrated has a downturned rim 17 which adds somewhat to its efficiency as compared to a flat type of shield and also minimizes distortion in tempering.

The shield has a central hole 18 of such diameter that the shield may be driven into the stem and have a drive fit retaining engagement with the stem.

The tempering of the shield is an important factor in its drive fit retaining engagement with the stem. Desirably the stem receiving hole 18 of the shield is of

the order of .001 to .002½ smaller than the valve stem on which it is to be mounted. This results in a secure drive fit engagement of the shield with the stem and takes care of the manufacturing tolerances and also in some engines valve stems of intake and exhaust valve vary slightly in diameter. The shield is driven onto the stem and is desirably positioned relatively close to the thrust member 9 but entirely out of contact therewith and in spaced relation to the end of the sleeve.

While the shield may be very economically produced from sheet stock of uniform thickness it may be otherwise formed. It is desirable that it have a hardness of the order indicated which insures that when driven onto the stem it is effectively engaged therewith and retained thereon.

The shield of my invention may be very economically produced and quickly and easily applied and when applied does not in any wise charge or alter the operating relation of the valve actuating member such as the rocker arm 12 of the embodiment illustrated, to the stem. The applicant is familiar with certain commercial shields that are mounted on the end of the stem and require readjustment of the rocker arm or other operating or valve actuating parts. The shield formed as described is light in weight and does not materially load the valve to which it is applied.

I have illustrated and described my invention in a practical commercial embodiment thereof and as applied to an overhead type of valve for which it is particularly well adapted. While I have illustrated the valve as being actuated by a rocker arm type of actuating mechanism it should be noted the shield does not in any wise require adjustment of any type of valve actuating mechanism in which the actuating member engages the end of the stem.

I have not illustrated or described other operating mechanism as it is believed this disclosure will enable those skilled in the art to adapt my invention as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An internal combustion engine valve comprising a stem with a central guide bearing engaging portion and a head on one end of said central portion, the other end of said stem having a transverse actuating surface and cylindrical sides merging with said central portion and having a key receiving recess formed in said sides in spaced relation to said actuating surface to receive a key to withstand the thrust of a spring abutment member mounted on the stem, and an oil deflecting shield of circular shape with a down turned annular rim, said shield being formed of thin tempered steel and having a central hole receiving said other end of said stem with the shield frictionally engaged with said stem between said recess and said actuating surface and with the metal in the edge of said hole displaced and expanded within the elastic limits of the metal, said shield having a carbon content of the order of .55 to .65 and a gauge of the order of .015 to .030 and a hardness of the order of .44 to .46 Rockwell C, the size of said hole in the disassembled unstressed condition of the shield being of the order of .001 to .0025 inch smaller than the diameter of said other end of said stem with which it is engaged.

2. An internal combustion engine valve comprising a stem with a central guide bearing engaging portion and a head on one end of said central portion, the other end of said stem having a transverse actuating surface and cylindrical sides merging with said central portion and having a key receiving recess formed in said sides in spaced relation to said actuating surface to receive a key to withstand the thrust of a spring abut-

ment member mounted on the stem, and an oil deflecting shield of circular shape with a down turned annular rim, said shield being formed of thin tempered steel and having a central hole receiving said other end of said stem with the shield frictionally engaged with said stem between said recess and said actuating surface and with the metal in the edge of said hole displaced and expanded within the elastic limits of the metal, the size of said hole in the disassembled unstressed condition of the shield being of the order of .001 to .0025 inch smaller than the diameter of said other end of said stem with which it is engaged.

3. An internal combustion engine valve comprising a stem with a central guide bearing engaging portion and a head on one end of said central portion, the other end of said stem having a transverse actuating surface and cylindrical sides merging with said central portion and having a key receiving recess formed in said sides in spaced relation to said actuating surface to receive a key to withstand the thrust of a spring abutment member mounted on the stem, and an oil deflecting shield of circular shape with a down turned annular rim, said shield being formed of thin tempered steel and having a central hole receiving said other end of said stem with the shield frictionally engaged with said stem between said recess and said actuating surface and with the metal in the edge of said hole displaced and expanded within the elastic limits of the metal.

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