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VALVE STEM GUIDE

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Fig. 1

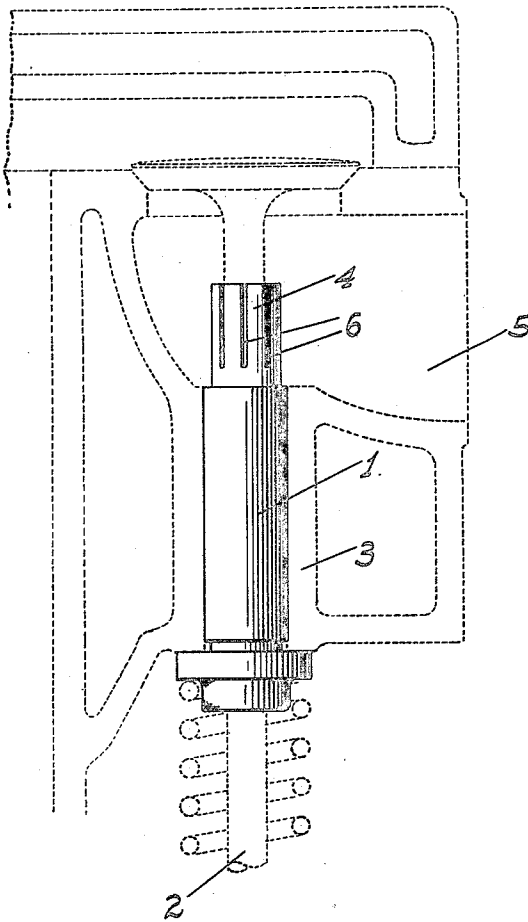


Fig. 2

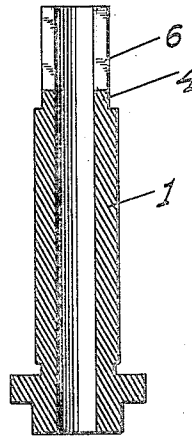


Fig. 3

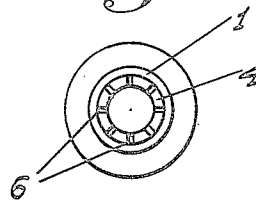
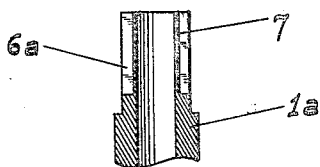


Fig. 4



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VALVE STEM GUIDE

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This invention relates to guides or bushings for the valve stems of gas engines, and particularly for the exhaust valves.

The principal object of my invention is to provide a guide of this character so constructed that the stem of the valve may have the desired closing running fit in the guide at all times without the danger of the stem sticking when it becomes enlarged by expansion due to heat or when it becomes encrusted with scale or carbon, as almost invariably occurs with long use. The proper seating of the valve is therefore insured which of course increases the period of use of the valve before regrinding of the same is necessary and maintains the efficiency of the engine as far as holding compression is concerned. Also since the stem is free in its guide at all times the valve spring tension can be reduced, thus lessening the load on the valve actuating parts of the engine.

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

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Fig. 1 is a side elevation of my improved guide as installed in an engine.

Fig. 2 is a sectional elevation of the guide detached.

Fig. 3 is a top plan view of the same.

Fig. 4 is a fragmentary section of a modified form of the device.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 denotes the body of the guide, a cylindrical member bored to slidably receive the stem 2 of the valve with the proper running fit. As usual the guide is press-fitted into the sleeve 3 provided therefor in the engine block. Formed with the inner end of the body is a cylindrical extension 4 adapted to project into the gas chamber 5 of the engine below the valve therein, and also closely

embracing the valve stem. This extension is provided with a plurality of longitudinally extending circumferentially spaced slots 6, cut through to the bore of the extension from end to end. It will be noted that the guide extension forms in effect a plurality of separate fingers, capable of flexing outwardly toward their outer ends, since the metal of which the guide is made has of course a certain amount of inherent elasticity or resiliency. In operation the portion of the valve stem which is above the extension when the valve is open is subjected to the intense heat and the carbonizing action of the exhaust gases passing through the chamber 5, and sooner or later becomes expanded or enlarged either from heat or by reason of the accumulation of scale or carbon thereon. The fingers which form the guide extension as above noted will therefore spread away from each other as said relatively large stem portion projects into the same with the closing movement of the valve, so as to conform to the enlarged size of the adjacent portion of the stem. These fingers again come together when the valve is opened, in which case the normal sized portion of the stem, and which is always concealed in the guide, moves outwardly to be engaged by the extension fingers.

Since the fingers are considerably longer than the extent of movement of the stem between the open and closed positions of the valve, the enlarged or expanded portion of the stem never extends to the bottom or rigid ends of the fingers, and the latter therefore are never engaged by such portion sufficiently close to their fixed ends to prevent the desired separation of the fingers and possibly cause the same to be fractured at their bases.

The stem, whether its normal size or enlarged, is therefore always yieldably engaged by the fingers so that it has the desired close running fit in its guide without danger of the stem sticking at any time.

In Fig. 4 I have shown a modified method of forming the guide extension. In this arrangement the slots are not cut through to the bore of the guide but are initially in the form of grooves 6a which terminate short

of the bore, leaving a very thin skin 7 between said bore and the bottoms of the grooves. It is here to be noted that the width of the grooves and the thickness of the skins has been somewhat exaggerated in the drawings in order to better illustrate the same.

With this arrangement the guide extension when new and when the valve stem is new and relatively cold remains a solid or unfractured part so that it forms an unbroken bearing about the stem. As soon as the stem becomes enlarged however the skins break and the extension then becomes in effect a plurality of fingers capable of yielding outwardly the same as in the first described type.

In both types of the device the slots will probably ultimately become filled with carbon and will become sealed up. This however does no harm since it does not affect the holding of the fingers.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

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

1. A valve stem guide comprising a body member through which a stem is adapted to project, and outwardly yieldable bearing means for the stem formed as a unitary extension of the inner end of the body.

2. A valve stem guide comprising a body member through which a stem is adapted to project, and an extension formed with the inner end of the body to surround and engage the stem, said extension comprising a plurality of outwardly yieldable fingers extending lengthwise of the body and stem.

3. As a new article of manufacture, a valve stem guide comprising a sleeve-like body member of resilient metal to surround a stem; said body being provided with circumferentially spaced grooves extending lengthwise of the body a certain distance from the outer end thereof and being cut at the time of manufacture so as to leave a thin skin of metal between the bottoms of the slots and the bore of the body, whereby with wear the skin will be eliminated and the portion of the body between the grooves will form resilient fingers.

In testimony whereof I affix my signature.
WILLIAM P. LOWTHER.