July 29, 1941. R. D. FEICK 2,250,793

VALVE CONSTRUCTION

Filed July 13, 1940

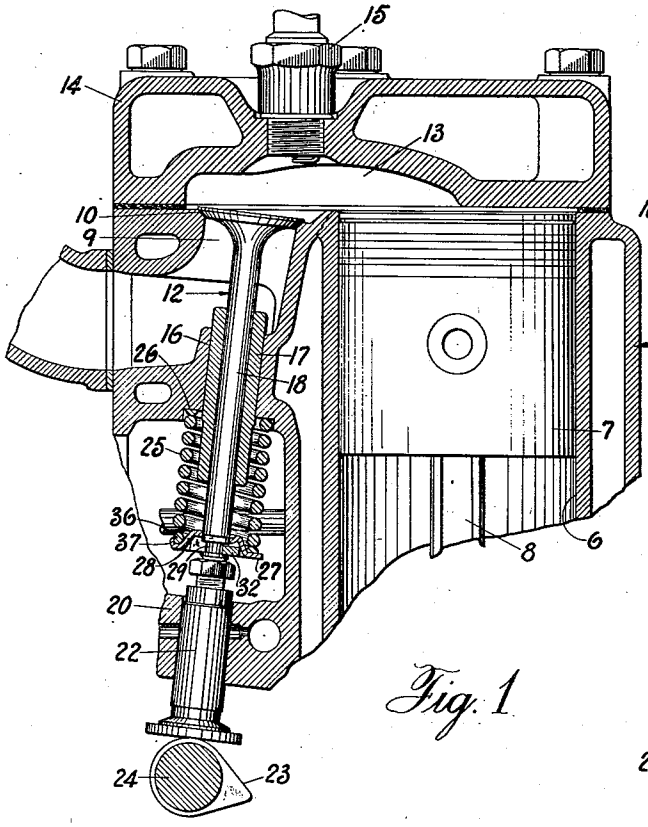


Fig. 1

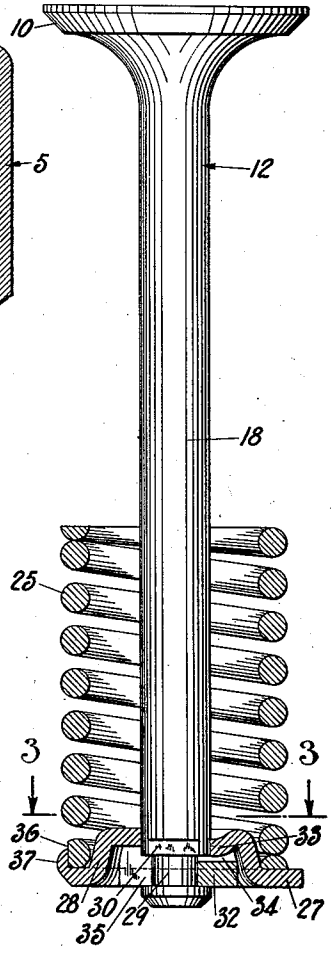


Fig. 2

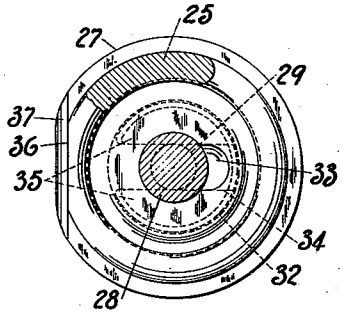


Fig. 3

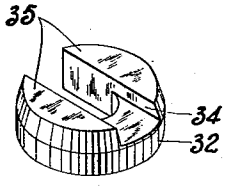


Fig. 4

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Patented July 29, 1941

2,250,793

UNITED STATES PATENT OFFICE

2,250,793

VALVE CONSTRUCTION

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Application July 13, 1940, Serial No. 345,293

3 Claims. (Cl. 251—144)

This invention relates to valve constructions and more particularly is concerned with the mounting for valves of the poppet type in an internal combustion engine or the like.

Heretofore it has been considered advisable in mounting valves for operation in such engines that the valves be arranged to have some relative rotation with respect to the valve seat. It was thought that this rotation would tend to lap the valve into the seat and provide a closer fit which would improve the operation.

However, it has been found that when a valve of this type is allowed to rotate there is a possibility of its picking up particles of hard material such as metal and the like and then rotating to grind the particles between the valve seat and valve head, producing abrasion of the seating surface and also tending to ball up and provide a gap between the valve and seat, preventing the valve from seating tightly and consequently destroying the efficiency of the engine.

The present invention is concerned primarily with modifying the standard type of valve construction so that it will not have relative rotation with respect to the valve seat. This is accomplished, in the preferred embodiment of the invention, by providing an interlock between the valve spring and valve spring retainer and then interlocking the valve spring retainer and its seat at the lower end of the valve stem so that the retainer and the spring hold the valve stem rigidly against any rotation.

This object is attained without departing in any substantial respect from present constructions except in a slight modification of the coil spring and the spring retainer, thus the same parts may be employed with such modification embodied therein and a non-rotating support for interlocking of the valve stem is provided preventing any possibility of abrading the valve seating surface and also preventing foreign particles from holding the valve away from the seat.

Other objects and advantages of the present invention will appear more fully from the following description which, taken in connection with the accompanying drawing, will disclose to those skilled in the art the particular construction and operation of a preferred form of the present invention.

In the drawing:

Figure 1 is a sectional view through an engine having a valve embodying the present invention;

Figure 2 is an elevational view, partly in section, of the valve and its spring retainer;

Figure 3 is a sectional view taken substantially on line 3—3 of Figure 2; and

Figure 4 is a perspective view of the seat for the valve spring retainer.

Referring now in detail to the drawing, an engine block is shown generally at 5 and has the usual cylinder 6 therein in which is mounted the piston 7 having a connecting rod 8 extending to the crankshaft of the engine. Disposed laterally of the cylinder 6 there is provided the valve opening 9 having a beveled upper surface adapted to be engaged by the valve head 10 of the valve member indicated generally at 12. The valve head is adapted to move into the combustion chamber 13 formed in the engine head 14, the engine head having a suitable combustion chamber formation with the conventional type of spark plug 15 located above and slightly offset with respect to the valve head.

The block 5 is also provided with a journal portion 16 adapted to receive the bushing or valve stem guide 17 which supports the valve stem 18 for reciprocatory movement. The block is also provided with an offset web portion 20 adapted to form a journal for the tappet 22 which engages the lower end of the valve stem, this tappet being reciprocated by means of the cam member 23 on the cam shaft 24.

The valve is normally urged downwardly upon the valve seat 9 by means of a relatively heavy coil spring 25 which at its upper end is biased against the under side of the journal portion 16 as indicated at 26. At its lower end the valve spring 25 engages the laterally flanged portion 27 of a valve spring retainer 28 which fits about the lower end of the valve stem and has an axially recessed or offset central portion about which the lowermost coil of the spring is centered. Below the retainer 28 the valve stem is provided with a grooved neck 29 and also with slabbed off parallel wall portions 30 immediately above the neck 29 adapted to receive a C-shaped valve retainer seat member 32. The member 32 is of sufficient height to engage the slabbed wall sections 30 of the valve stem thereby preventing rotation of the seat 32 with respect to the stem.

In order to lock the retainer 28 against rotation a portion of the latter is struck downwardly as indicated at 33 for engagement in a corresponding slotted portion in the face of the seat 32 indicated at 34. It is also possible if the retainer be rotated 180° for the inwardly struck tongue portion 33 to engage between the leg portions 35 of the member 32. It will therefore be apparent that under spring pressure the retainer 28 will be

firmly locked against rotation relative to the retainer seat **32** which in turn is locked against rotation relative to the valve stem.

In order to hold the retainer against any action which might tend to rotate it relative to the end of the valve stem, the spring **25** is provided with a slabbed off portion on its lowermost coil as indicated at **36** and the retainer itself has one portion of its periphery struck upwardly as indicated at **37** to provide a tongue parallel to and engaging the slabbed off portion of the spring. With such a construction the retainer is held against rotation relative to the spring **25** by reason of this interlock between the spring and the peripheral flange of the retainer. Thus, it will be apparent that an interlock is provided between the spring and retainer, between the retainer and the seat, and between the seat and valve stem. As a result, when the valve is assembled into position the spring pressure is sufficient, when the valve is in closed position, to maintain these interlocks in abutting engagement and thus prevent any possible rotation of the valve stem. Inasmuch as the spring pressure is increased whenever the valve is raised still greater resistance to rotation is produced between the spring and its seat **26** at this time.

It is therefore believed apparent that I have provided a novel means for locking the valve stem against rotation which requires no additional parts than are now used and requires only slight modification of these parts to adapt it to conventional types of construction.

I am aware that various changes may be made in certain details of the present construction and I therefore do not intend to be limited except as defined by the scope and spirit of the appended claims.

I claim:

1. A valve structure comprising a valve having a valve stem provided with an annular groove, a retainer seat member non-rotatably locked in said groove, a valve spring retainer having means interlocking it against rotation relative to said seat member, a spring encircling said valve stem and biased at one end against said retainer, and means for locking said retainer and spring against relative rotation comprising a flat formed on said spring intermediate its ends and a lip on said retainer directed normally to the plane of contact between the retainer and the said end of said spring engaging said flat.

2. A valve structure comprising a valve having a valve stem, a valve spring retainer on one end of said stem having a peripheral radial flange, a spring encircling said stem and engaging one face of said retainer flange for biasing said valve in one direction, a flat formed on the outer surface of the coil of the spring which engages the retainer flange, and an axially directed lip formed on the retainer flange and engaging said flat for preventing rotation of said retainer relative to said spring.

3. A valve structure comprising a valve and a valve stem, a valve spring retained on one end of said stem, a spring encircling said stem and engaging said retainer for biasing said valve in one direction, a flat formed on the coil of the spring which engages the retainer and a lip formed on the retainer engaging said flat for preventing rotation of said retainer relative to said spring, a retainer seat non-rotatably secured to said stem, a transverse channel in the upper face of said seat and an instruck tongue on said retainer engageable in said channel for interlocking said retainer and seat against relative rotation when said spring forces said retainer against said seat.

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