Aug. 19, 1952 R. S. HARTUNG 2,607,330

MECHANICAL VALVE SILENCER

Filed Dec. 7, 1949

Fig. 5.

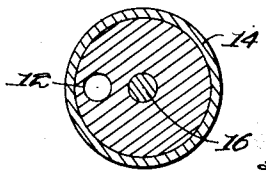


Fig. 1.

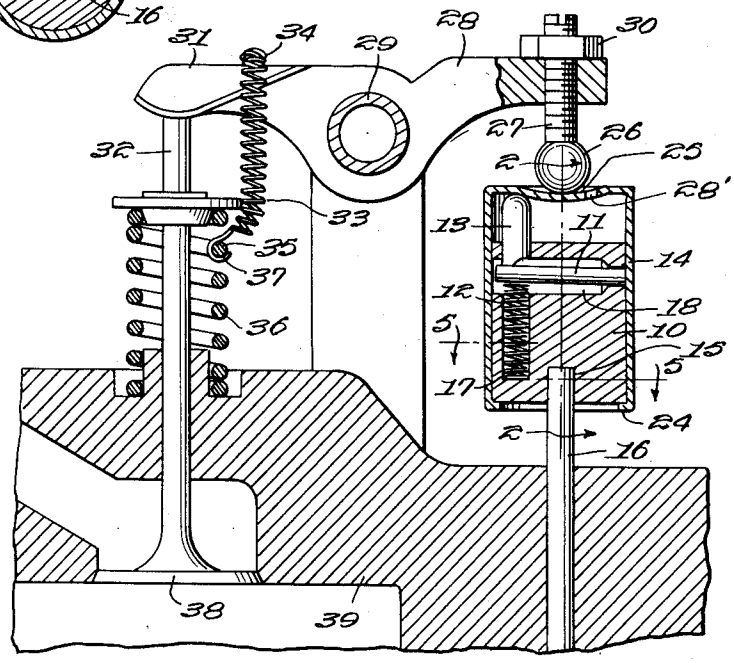


Fig. 3.

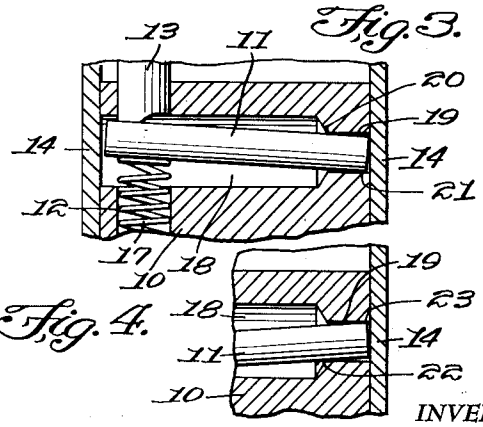


Fig. 2.

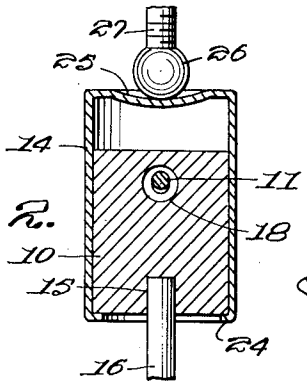


Fig. 4.

INVENTOR.

Richard S. Hartung,

BY Victor J. Evans & Co.

ATTORNEYS

Patented Aug. 19, 1952 2,607,330

UNITED STATES PATENT OFFICE

2,607,330

MECHANICAL VALVE SILENCER

Richard S. Hartung, Marietta, Ohio

Application December 7, 1949, Serial No. 131,534

2 Claims. (Cl. 123—90)

1

This invention relates to valve silencers for valves of motor vehicle engines, and in particular a device positioned between the valve tappet adjusting screw in the end of the rocker arm and a push rod in which the opposite end of the rocker arm is resiliently held against the end of the valve stem by a light spring extended from a coil of the valve spring to the rocker arm.

The purpose of this invention is to provide instrumentalities for eliminating the tapping noise of valve tappet adjusting screws and push rods without relying upon oil or other fluid pressure as is common in devices for this purpose.

Various devices have been provided for eliminating the noise caused by the clearance between valve tappets and the valve stems in internal combustion engines but where oil pressure is relied upon to actuate the devices it is difficult to positively eliminate the noise without constructing the parts with close tolerances making the engine expensive to build and maintain. With this thought in mind this invention contemplates a plug positioned between the valve tappet adjusting screw and push rod with a spring actuated transversely positioned pin therein in combination with a vertically disposed pin and a shell in which the elements are positioned, wherein, with the valve tappet adjusting screw extended into a circular recess in the upper end of the shell, freedom of movement is provided without the tapping noise.

The object of this invention is, therefore, to provide a small unit between the valve tappet adjusting screw and push rod that operates with a mechanical action and substantially eliminates the tapping noise caused by the clearance between the valve tappet and valve stem.

Another object of the invention is to provide a mechanically operating valve silencer that may be installed in engines now in use.

A further object of the invention is to provide a mechanically actuated valve silencer for valve tappets of internal combustion engines which is of a simple and economical construction.

With these and other objects and advantages in view the invention embodies a plug having a transversely disposed pin therein with one end of the pin positioned in a reduced end of an opening in which the pin is positioned, with the opposite end of the pin held between a spring and a vertically disposed pin, these elements being enclosed in a shell and positioned between the valve tappet adjusting screw and push rod of an engine.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings wherein:

2

Figure 1 is a cross section through part of an internal combustion engine showing one of the valves in combination with a rocker arm and push rod and showing the improved mechanically actuated silencer positioned between the valve tappet adjusting screw and push rod.

Figure 2 is a section taken on line 2—2 of Figure 1 looking in a direction positioned at right angles to that shown in Figure 1.

Figure 3 is a detail showing the mounting of the transversely disposed pin in the silencer on an enlarged scale and with the upper and lower parts of the device broken away.

Figure 4 is a similar detail showing the mounting of the transversely disposed pin in a plug in the silencer with the outer end of the pin moved downwardly.

Figure 5 is a cross section through the silencer taken on line 5—5 of Figure 1.

Refering now to the drawings wherein like reference characters denote corresponding parts the mechanically actuated valve silencer of this invention includes a plug 10 having a transversely disposed pin 11 freely mounted therein with the free end of the pin held between a spring 12 and a vertically disposed pin 13 and with the plug, pins, and spring held in a casing or shell 14.

The plug 10 is provided with a centrally disposed longitudinally positioned bore 15 which rests upon the upper end of a push rod of the engine as indicated by the numeral 16. The plug 10 is also provided with a longitudinally disposed opening 17, spaced from one side and in which the spring 12 is positioned. The pin 13 is also positioned in the outer end of the opening 17 and the opening communicates with a transversely disposed bore 18 through which the pin 11 is extended with the free end of the pin positioned between the spring 12 and the pin 13 and with the opposite end of the pin held in an opening 19 of a reduced size and positioned as shown in Figures 3 and 4.

With the outer end of the pin 11 in the upper position the opposite end is held between points 20 and 21 in the opening 19 and when the outer or free end of the pin 11 is forced downwardly by the valve stem through the rocker arm the opposite end of the pin is held between points 22 and 23 in the opening 19.

The plug 10 is positioned in the shell 14 and the lower edge 24 of the shell is crimped inwardly to hold the plug in position therein and, as illustrated in Figure 1 the upper end of the shell

14 is dished downwardly at the center to provide a recess 25 into which the head 26 of the valve tappet adjusting screw 27 is positioned. The upper end of the shell 14 is also provided with an opening 28 through which oil or other lubricant enters the shell for lubricating the parts.

The adjusting screw 27 is threaded in one end of a rocker arm 28 that is pivotally mounted on a shaft 29 and the screw is provided with a lock nut 30 for locking the screw in adjusted position.

The opposite end 31 of the rocker arm engages the upper end of the valve stem 32 and the end 31 is resiliently held downwardly against the upper end of the valve stem by a spring 33 that is secured to the rocker arm at the point 34 and to a coil 35 of the valve spring 36 by a hook 37, as shown. A valve 38 is provided on the lower end of the valve stem and the parts are positioned in an engine block as indicated by the numeral 39.

With the parts arranged in this manner the rocker arm adjusting screw 27 is first set for proper clearance by pushing down on the adjusting screw until the shell 14 is forced downwardly on the plug 10 as far as the pin 11 coacting with the pin 13 will permit. The pin 11 compresses the spring 12 and in this movement the spring 33 is elongated. The adjusting screw 27 is now turned until the proper clearance is obtained between the opposite end of the rocker arm and the valve stem and as the pressure is released the spring 33 pulls the rocker arm firmly against the valve stem 32 and the spring 12 forces the pin 11 and also the shell 14 upwardly until the concave recess 25 of the shell bears against the lower end of the ball 26 of the adjusting screw. The pin 11 is substantially floating, finding a neutral position in the opening 19.

With the parts arranged in this position the only point where there is a clearance between parts of the assembly is between the pin 11 and opening 19, and as the push rod 16 moves upwardly carrying the plug 10, the assembly parts 14, 13 and 11 remaining stationary until the pin 11 compresses the spring 12 and binds against the points 22 and 23 in the opening 19 wherein the entire assembly coacts for actuating the rocker arm. The length of the pin 11 is greater than that of the opening 19 and, as an example, with the length of the pin five times longer than that of the opening it is possible to have a movement of .015 inch of the push rod before the rocker arm begins to move, and at the same time the clearance between the pin 11 and opening 19 is only .003 inch. With this small clearance, which is the only clearance in the assembly substantially all noise is eliminated. As the amount of click or noise is in proportion to the metal to metal clearance this silencer substantially eliminates the sound above the usual noise of the engine, the clearance being about one-fifth of that usually required.

It will be understood that modifications may be made in the design and arrangement of the parts without departing from the spirit of the invention.

What is claimed is:

1. An internal combustion engine silencer for engines having valve stems with springs thereon, rocker arms and push rods, comprising a vertically disposed cylindrical shell having an upper end positioned between one end of the rocker arm and push rod, means resiliently connecting the opposite end of the rocker arms to the said valve spring, a plug having a transversely disposed opening therethrough and a socket in the lower end slidably mounted in the shell, a floating pin positioned in the transversely disposed opening of the plug, said plug formed to restrict movement of one end of the pin, means resiliently urging the opposite end of the pin upwardly, and means positioned between the said opposite end of the pin and the upper end of the shell for holding the pin against the said resilient means.

2. In a valve silencer for internal combustion engines having valve stems with springs thereon, rocker arms and push rods, the combination which comprises a cylindrical shell positioned between one end of the rocker arm and push rod, a plug slidably mounted in said shell, said plug having a socket in the lower end for receiving the end of the push rod, a transversely disposed opening with a reduced end extended therethrough, an offset vertically disposed opening parallel to the push rod receiving socket and extended inwardly from the upper end of the plug and intersecting the transversely disposed opening, a pin positioned in the said transversely disposed opening, a spring in the lower end of the offset opening urging the said pin upwardly, a pin in the outer end of the offset opening positioned to contact the said pin in the transversely disposed opening at one end and the shell with the other, and a spring connecting the rocker arm and valve spring urging the end of the rocker arm against the end of the valve stem.

RICHARD S. HARTUNG.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,182,632	Bruegger	May 9, 1916
2,241,821	Ludwig	May 13, 1941

FOREIGN PATENTS

Number	Country	Date
18,211	Denmark	Nov. 26, 1913