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SILENCER FOR OVERHEAD VALVES

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2 Sheets-Sheet 2

FIG. 6.

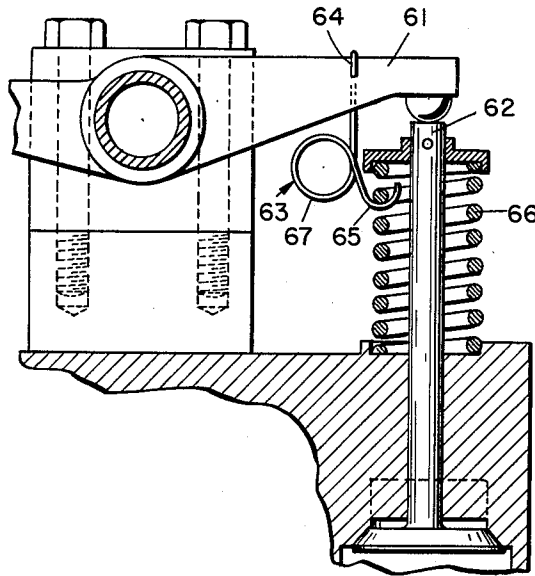
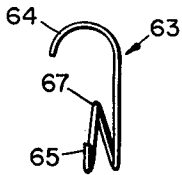


FIG. 7.



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SILENCER FOR OVERHEAD VALVES

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2 Claims. (Cl. 123—90)

This invention has to do generally with means for use in silencing or quieting the valve operating parts of internal combustion engines.

It is well known that by reason of the location of the rocker arms and the clearance that necessarily must be provided between them and the push rods, overhead valve engines are relatively noisy. I am aware that various means have been devised for reducing the noise of the valve operating parts, but so far as I know such means have been objectionable either because of complexity, cost, difficulty of installation or other reasons.

An object of my invention is to provide a simple means of reducing the noise of the valve operating parts of an internal combustion engine.

Another object of the invention is to provide a novel spring device which may be readily attached to the rocker arm assembly of an overhead valve engine for the purpose of yieldably urging the rocker arms against the ends of the valve stems to thereby maintain these parts in engagement and to prevent clearance between the rocker arm and the valve stem.

More particularly an object is to provide a simple spring device adapted to be mounted on the post-supporting structure of a rocker shaft wherein the device is provided with a pair of spring arms engageable with the two rocker arms, respectively, on opposite sides of the post structure.

Another object is to provide a device for quieting the operation of valve parts of side-valve engines.

A further object is to provide a device of the type indicated of simple construction which is easy to manufacture.

These and other objects will be apparent from the drawing and the following description.

Referring to the drawing:

Fig. 1 is a fragmentary sectional view on line 1—1 of Fig. 2 through the upper portion of a head of an internal combustion engine having overhead valves showing a rocker arm and valve assembly and the device of the invention associated therewith;

Fig. 2 is a plan view of the rocker arm and valve mechanism of Fig. 1 and an adjacent rocker arm and valve mechanism with the device embodying the invention associated therewith;

Fig. 3 is a perspective view of a device embodying the invention;

Fig. 4 is a fragmentary sectional view of a valve on a side-valve engine with a device of the invention applied thereto;

Fig. 5 is a perspective view of the device of Fig. 4;

Fig. 6 is a view similar to Fig. 1 showing a modified form of the invention; and

Fig. 7 is an elevational view of a spring at right angles to the previous view.

More particularly describing the invention, reference numeral 11 generally indicates the head of an internal combustion engine provided with overhead valves, one of which is shown and indicated by numeral 12. The valve is urged to closed position by a conventional valve spring

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14 between the head 11 and a member 15 on the stem 13 of the valve.

Mounted on the head, as by means of posts 16 and shaft supporting blocks 17, is a rocker shaft 18 on which are pivotally mounted a plurality of rocker arms such as those indicated by 20a and 20b. At their ends 21 the rocker arms bear against the ends of the stems 13 of the valves. At their opposite ends the rocker arms are provided with adjustable screws 22 which are engaged by the upper ends of push rods 23 for actuation of the arms and valves. The push rods, of course, are actuated by cams, as indicated at 24.

In order to allow for expansion and contraction of the valve operating parts under the influence of the temperature changes they undergo during operation of the engine, clearance is provided between the parts and in Fig. 1 this clearance is shown at 25 between the screw 22 and the upper end of the push rod 23. In the ordinary overhead valve construction the clearance may exist at times, depending upon the positions of the parts, between the end 21 of the rocker arm and the stem of the valve, and since these parts are ordinarily not continuously lubricated, such clearance results in a decided tappet or rocker arm noise each time the rocker arm is actuated.

In view of the fact that lubrication is ordinarily supplied in the region of the upper end of the push rod 23 and hence any clearance between the push rod and the rocker arm when taken up is deadened by the lubricant, I provide a spring device, generally indicated by 27, designed to yieldably urge the rocker arms into engagement with the stems of the valves and thereby prevent clearance between these parts. My device 27 comprises an elongated length of spring metal which may be in the form of wire as shown provided with a central mounting section or base in the general shape of a U. This portion of the device may be readily mounted on the rocker shaft supporting structure 16—17 by disposing the same around the conventional bolt 30.

Extending from the base or mounting portion 28 of the spring device I provide a pair of legs, each of which includes a large arcuate section 35 curved sufficiently to form substantially a reverse bend and beyond that an elongated, substantially straight portion 36. The two sections 36 terminate in laterally outwardly extending hook-like ends 37 adapted to extend over the adjacent rocker arms as shown in Fig. 2.

In the use of the device it will be apparent that the member 27 may be readily secured in place by positioning the end 28 around the head of bolt 30 after which the two ends 37 may be placed over the rocker arms as shown in the drawing. In this connection it will be noted that when the device 27 is installed it is necessary to bend the legs upwardly above their normal position against their springiness with the result that the ends 21 of the rocker arms are urged against the valve stems, thereby eliminating clearance therebetween.

I prefer to have the spring device exert only slight force on the rocker arms so as not to interfere with the normal operation of the valve springs. Also, with the device exerting only slight force on the rocker arms it does not interfere with the use of feeler gauges which are inserted between the valve stems and the rocker arms in making valve adjustments since a mechanic can easily overcome the force of my spring device by placing a screw driver on the valve adjusting screw and exerting slight pressure.

In Figs. 4 and 5, I shows a means for silencing the valve operating parts of side-valve engines. Referring to these figures, numeral 40 indicates a portion of the engine block, 41 a valve therein, and 42 the valve spring for urging the valve to closed position.

The valve is actuated by valve lifter or tappet 44 which

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is raised by a cam 45. The length of the valve lifter is adjustable by the adjustment screw 47 and lock nut 48 and during operation of the engine it is customary to have some clearance between the upper end of the valve lifter and the valve stem of the valve. I provide a spring device 50 for the purpose of preventing clearance in this region and transferring the clearance to the region of the cam and lower end of the valve lifter.

The spring comprises a base portion 51 which fits around the upper end of the valve lifter beneath the adjustment screw, the base portion being of general U shape and somewhat indented at each side at 52 so that it can be sprung around the valve lifter when installed. The remainder of the spring device comprises a pair of legs which extend from the base portion in curved sections 53 and terminate in a relatively flat engine block engaging sections 54.

It will be apparent that with this device much objectionable noise is eliminated, since no clearance is permitted between the end of the valve stem and the valve lifter, the clearance being transferred to the region of the cam where it is encased and where less noise is produced by reason of configuration of the typical cam. In this connection I prefer to provide a spring device which only exerts a relatively slight lifting force on the valve lifter such as is sufficient to maintain the lifter in contact with the lower end of the valve stem. My device does not interfere with the adjustment of the valve, since the valve lifter may readily be held down by a suitable tool against the force exerted by my spring device to permit the use of conventional feeler gauges.

In Figs. 6, 7, and 8 I show another form of the invention wherein a conventional rocker arm 61 is held lightly in contact with the valve stem 62 by a spring 63. This spring includes a large hook 64 at one end adapted to fit over the rocker arm, and a smaller hook 65 at the other end to engage one of the coils of the valve spring 66. The two hooks are disposed in planes substantially at right angles to each other and are connected by a convolute body 67. This form of the invention has the advantage that it can readily be attached to any overhead valve engine and, since it moves as a unit with the parts to which it is attached it is not sprung each time the rocker arm moves and consequently has long life.

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Although the invention has been particularly shown and described, it is contemplated that various changes and modifications may be made without departing from the scope thereof as indicated by the following claims.

I claim:

1. A silencer for overhead valves adapted to be mounted on the upper end of a rocker shaft supporting structure between two adjacent rocker arms comprising a length of spring wire formed to provide a U-shaped base section adapted to extend around a bolt against the upper end of the rocker shaft supporting structure with the closed end of the section facing the valve-contacting ends of the rocker arms, and a pair of similarly formed legs extending from said base, each of said legs being characterized by a reverse bend section connecting with the base section, an elongated substantially straight section, a diverging section, and a laterally outwardly extending end portion, said legs extending substantially beyond said base section, said end portions being adapted to fit over the two adjacent rocker arms respectively intermediate the valve-engaging ends of said arms and the rocker shaft with the legs in flexed condition whereby the valve-engaging ends of said rocker arms are yieldably urged against the valve stems.

2. A device as set forth in claim 1 in which said base section extends substantially less than one-half the overall length of the device.

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