Feb. 4, 1930. W. H. MANNING 1,746,220

SPRING VIBRATION DAMPENER

Filed Sept. 20, 1928

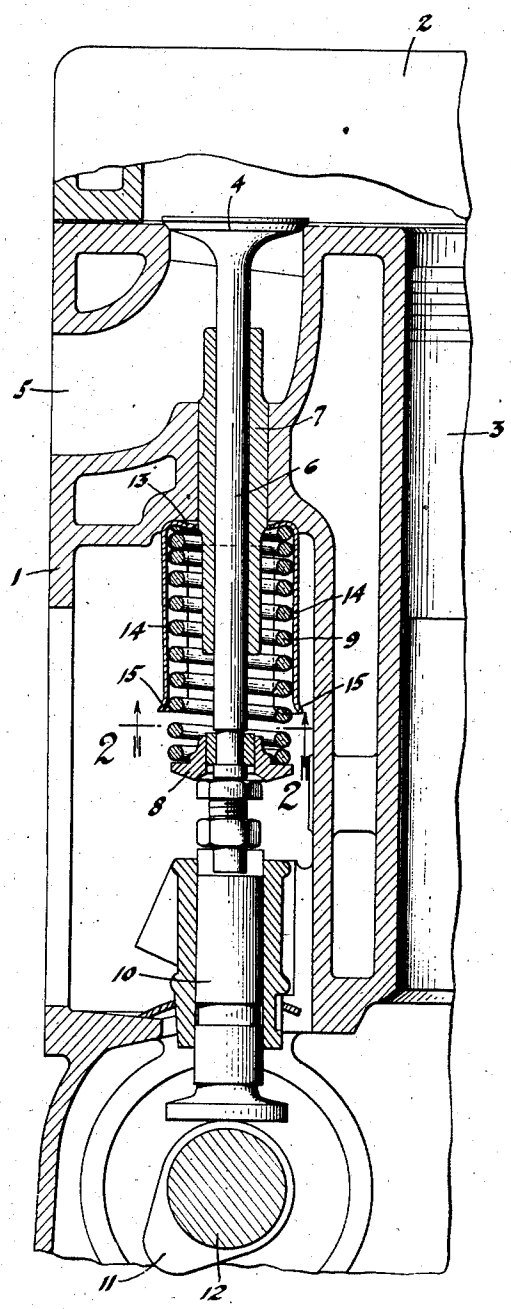


Fig. 1

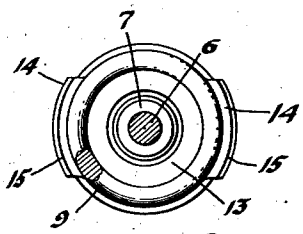


Fig. 2

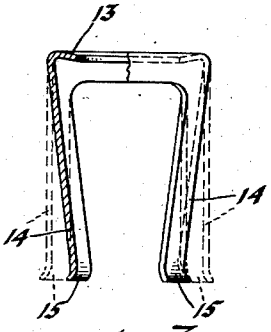


Fig. 3

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Patented Feb. 4, 1930 1,746,220

UNITED STATES PATENT OFFICE

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SPRING VIBRATION DAMPENER

Application filed September 20, 1928. Serial No. 307,252.

This invention relates to a device for dampening spring surge. In the present embodiment of the invention, there is provided a dampener comprising spring tongues which are spread outwardly by the insertion of a coil spring therebetween, so as to resiliently engage and make frictional contact with the outside periphery of the coils, to maintain them in perfect alignment, by yieldingly resisting sidewise deformation thereof, and to also restrict spring surge.

One of the objects of the invention is to provide a device that is active in the elimination of the inception of induced sympathetic vibrations by means of applied friction.

It is a further object of the invention to provide a device that may be easily and accurately manufactured at small cost and readily applied for use, and which will be efficient in action without requiring attention or adjustment and unlikely to get out of order.

Additional objects and advantages will be apparent from the following specification, taken in connection with the accompanying drawings, wherein Figure 1 is a sectional view of a portion of an internal combustion engine illustrating the application of the invention to a valve spring. Figure 2 is a sectional view taken on line 2—2 of Figure 1, and Figure 3 is a detail view partly in section of the device in which the spring is contained.

In the drawing, the reference character 1 indicates the cylinder block of an internal combustion engine having a removable head 2 that provides the combustion chamber over the reciprocating piston 3. A valve 4, which may be either the intake or exhaust valve, controls communication between the combustion chamber and the intake or exhaust passageway 5, as the case may be, and has a stem 6 slideable through the sleeve or guide 7, and carries at its lower end a disc or washer 8, that forms a bearing or seat for the expansible coil spring 9 surrounding the valve stem. The opposite end of the spring bears or seats against a fixed part of the cylinder block 1 and the tension of the spring serves to hold the valve on its seat. The valve is moved to open position against spring tension, by conventional valve operating mechanism, comprising a tappet 10 acting on the bottom of the valve stem 6, and a cam 11 on a rotating shaft 12, that is driven off the engine crank shaft, as will be readily understood.

Surrounding the coil spring 9 is a container comprising a ring 13 interposed and held between the upper end of the coil spring and its fixed seat, and a pair of oppositely disposed arcuate limbs or dependent tongues 14 having flared extremities 15, to facilitate the introduction of the spring. The container may be formed of spring material or the like to substantially the shape illustrated by the full lines in Fig. 3. Upon insertion of the coil spring, the spring tongues 14 are spread outwardly to the dotted line position, at which time they exert their tension laterally against the sides of the coils, thereby serving to yieldingly resist any tendency for the spring to buckle or deform laterally. Furthermore, the frictional contact between the tongues 14 and coils of the valve spring, is such as to restrict movement of the coils to an advantageous extent, whereby vibratory reactions are damped out and the tendency toward spring surge and the building up of vibratory periods is eliminated. This restriction, by reason of the frictional contact, of course, is not sufficient to destroy the normal function of the spring in urging the valve head toward its seat. The resiliency of the spring tongues readily permits expansion of the valve spring when its coils are compressed by the lifting action of the valve operating mechanism.

It will be apparent that the application of the invention to a valve spring is principally for illustrative purposes, as the device may also be used to advantage with various other types of springs.

While the preferred embodiment of the invention has been described more or less specifically, it is to be understood that the invention is not limited to the exact details referred to but that such modifications may be made as come within the scope of the appended claims.

I claim:

1. In an internal combustion engine, the combination of a valve, an expansible spring adapted to act on said valve and a spring element adapted to contact with and offer a yielding resistance to the surging tendency of said valve spring.

2. In an internal combustion engine the combination of a valve having a stem an expansible spring surrounding the stem and active thereon, and a spring element exerting its tension laterally against said valve spring.

3. In an internal combustion engine, the combination of a valve having a stem, a coil spring active on said stem, and spring means bearing laterally against the coils of the valve spring to yieldingly resist sidewise deflection thereof.

4. In an internal combustion engine, the combination of a valve having a stem, an expansible coil spring surrounding the stem and active thereon, and means engaging the coils of said spring and offering frictional resistance to spring surge.

5. In an internal combustion engine, the combination of a valve having a stem, an expansible coil spring surrounding the stem and active thereon, and a member surrounding said coil spring and having contractible spring tongues for engagement with the coils of the valve spring.

6. In an internal combustion engine, the combination of a valve having a stem, an expansible coil spring surrounding said stem, a fixed bearing for one end of said spring, a bearing for the opposite end of the spring carried by said stem, and a vibration dampener for said spring including a ring secured between one end of the spring and its adjacent bearing, and integral spring tongues extending beside and adapted to yieldingly resist distortion of the spring coils.

7. In a device of the character described, the combination of a coil spring interposed between relatively movable parts and a vibration dampener therefor including a ring interposed between one end of the spring and one of said parts, and having dependent spring tongues exerting an inward pressure against the coils of said spring.

8. In a device of the character described, the combination with a coil spring interposed between relatively movable parts, and a spring element bearing laterally against the coils of said spring to yieldingly resist deflection thereof.

9. In a device of the character described, the combination of a coil spring interposed between relatively movable parts, and means to exert a yielding tension against the coils of said spring to maintain them against vibration.

10. In a device of the character described, the combination of a coil spring interposed between relatively movable parts, and a spring element extending beside the spring and against which the coils have frictional contact.

11. In a device of the character described, a member having contractible spring fingers and a coil spring located within said fingers, the coils of which frictionally contact the fingers.

In testimony whereof I affix my signature.

WM. H. MANNING.