

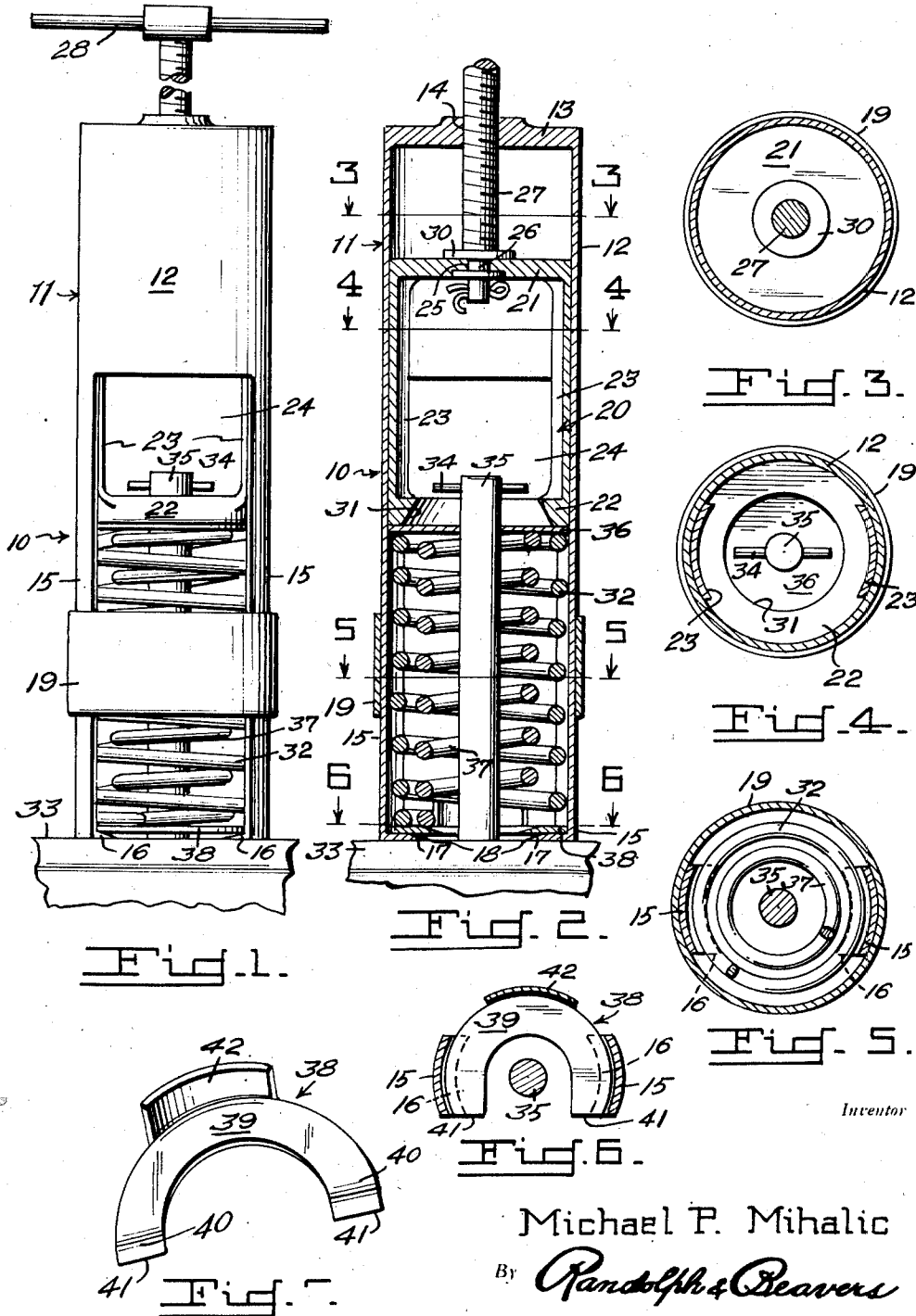
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VALVE SPRING COMPRESSING TOOL

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VALVE SPRING COMPRESSING TOOL

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2 Claims. (Cl. 29-217)

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This invention relates to a tool for removing and replacing broken valve springs on engines of the type employing overhead valves and more particularly has reference to a tool which may be utilized for replacing a broken valve spring without removing the rocker arm and shaft assembly.

Another and important object of the invention is to provide a tool which will effectively eliminate the possibility of the valve spring from slipping out of engagement therewith while being compressed.

More particularly, it is an object of the present invention to provide a tool capable of being slipped over the valve spring, after the rocker arm has been moved to one side and provided with means for retaining the tool in an applied position while the spring is compressed for relieving pressure on the valve spring keepers so that said keepers may be removed from the valve stem, preliminary to removing and replacing the valve spring.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawing, illustrating a preferred embodiment thereof, and wherein:

Figure 1 is a side elevational view showing the tool in an applied and operative position;

Figure 2 is a longitudinal, substantially central sectional view thereof;

Figures 3, 4, 5 and 6 are cross sectional views of the tool, taken substantially along planes as indicated by the lines 3-3, 4-4, 5-5 and 6-6, respectively, and

Figure 7 is a perspective view of an attachment for the tool for use in conjunction therewith in removing and replacing small or inner valve springs.

Referring more specifically to the drawings, the improved valve spring compressing tool in its entirety is designated generally 10 and includes a body member or frame, designated generally 11 having a substantially cylindrical upper portion 12 which is provided with a head 13 at the upper end thereof having a central, threaded opening 14 extending therethrough. The tool body 11 also includes a pair of elongated spring arms 15 which may be formed integral with or suitably secured to the lower, open end of the cylindrical portion 12 and which project longitudinally therefrom. The arms 15 project from diametrically opposed portions of the open end of the cylinder 12 and are disposed substantially in diametrically opposed relationship to one another and are transversely bowed to correspond to the curvature of the cylinder 12. The resilient arms 15 are preferably formed of spring steel and are provided with inwardly projecting foot members 16 at their lower ends the upper sides of which

are beveled at 17 to form the knife-like inner edges 18, for a purpose which will hereinafter become apparent. The housing or body 11 of the tool 10 also includes a relatively wide ring or collar 19 which is slidable longitudinally thereof along the cylinder 12 and arms 15 for urging said arms 15 inwardly of one another when the collar 19 is moved downwardly thereon to or beyond its position of Figures 1 and 2.

The tool 10 also includes a cage, designated generally 20, which is slidably disposed within the cylinder 12 and between the arms 15 and which includes an upper, disc-like end wall 21, a lower disc-like end wall 22 and a pair of diametrically opposed, longitudinally extending connecting members 23 extending therebetween and formed integral with or suitably connected at their ends to the end walls 21 and 22 and which are transversely bowed to conform to the curvature of the peripheries of the end members 21 and 22, as seen in Figure 3, and for slidable engagement in the cylinder 12 and/or arms 15. The connecting members 23 are substantially of the same width as the arms 15 and are disposed in alignment therewith to form diametrically opposed openings 24 in the tool, for a purpose which will hereinafter become apparent.

The upper end or head 21 of the cage 20 is provided with a central opening 25 for receiving the restricted, unthreaded end 26 of a feed screw 27 which extends upwardly therefrom, threaded through the threaded opening 14 and which is provided with a cross handle 28 at its upper end disposed above or outwardly of the head 13. The stem 26 is journaled in the opening 25 and is retained in engagement therewith by a cotter pin or other means 29 which extends through an opening in the lower portion thereof and has a washer 30 disposed thereon and located on the upper side of the head 21 to thereby provide a swivel connection between said head 21 and the feed screw 27. The bottom disc 22 is provided with an enlarged opening 31 which is beveled on its underside.

From the foregoing it will be readily apparent that the tool 10 is readily adapted for compressing the spring of an overhead valve which is shown at 32 and which normally rests upon a cylinder head, a portion of which is shown at 33. A valve stem 35 extends reciprocally through an opening, not shown, in the cylinder head 33 and upwardly therefrom longitudinally through the spring 32 and is provided adjacent its upper end with an opening, not shown, for detachably receiving a retaining pin 34 which retains a washer 36 detachably on the stem 35. The washer 36 has the upper end of the spring 32 bearing thereagainst and is retained thereby in bearing engagement with the retaining pin 34 so that the

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pin 34 and washer 36 combine to form the valve spring keeper.

For removing and replacing the spring 32, the cage or follower 20 is retracted by operation of the feed screw 27 into the upper portion of the cylinder 12 and the collar 19 is moved upwardly onto or adjacent said cylinder 12. After the rocker arm, not shown, of the valve stem 35 has been moved to one side, the spring arms 15 are disposed on the outer side of the spring 32 and the retaining collar 19 is then slid downwardly thereon to cause the spring arms 15 to yield inwardly or toward one another and toward their parallel positions of Figures 1 and 2. As the arms 15 are thus moved inwardly of one another, the knife-like edges 18 of the foot members 16 thereof will engage beneath the bottom convolution of the spring 32 for raising said bottom convolution on to the upper side of the foot members 16, said convolution sliding over the beveled surfaces 17 which function as ramps for this purpose. When the foot members 16 and arms 15 are thus applied as shown in Figures 1 and 2 and retained by the collar 19, the feed screw 27 is manually revolved in the opposite direction for moving the cage 20 downwardly and so that the annular bottom member 22 will engage and force the washer 36 downwardly relatively to the stem 35 for compressing the spring 32. The opening 31 is sufficiently large so that the upper end of the stem 35 and the retaining pin 34 can pass therethrough as the cage 20 moves downwardly. It will be readily apparent that when the spring 32 has been thus compressed, as illustrated in Figures 1 and 2, that the fingers may be inserted through the openings 24 for removing the retaining pin 34 from the stem 35, after which the cage 20 may be retracted or backed off for removing the spring 32 and replacing it with another spring.

The new spring 32 is replaced on the stem 35 after which the washer 36 is applied to the upper end of said stem and the cage 20 can then be moved downwardly of the tool 10 by operation of the feed screw 27 for compressing the new spring 32 so that the retaining pin 34 can be replaced in the upper portion of the valve stem 35 through the openings 24, after which the cage 20 is again retracted and the retaining collar 19 is then moved upwardly to allow the arms 15 to spring outwardly so that the foot members 16 will disengage the bottom convolution of the new spring. If necessary, the entire tool may be demounted before the new spring is applied to the valve stem 35.

For utilizing the tool 10 with springs of smaller diameter or in conjunction with overhead valves employing, in addition to the spring 32, an inner spring 37 of smaller diameter, as best illustrated in Figure 2, an adaptor, designated generally 38 and shown in Figure 7 is employed and which includes a substantially U-shaped member 39 formed of spring steel or the like which is substantially flat and which is beveled on its upper side and adjacent its ends at 40 to provide the knife-like edges 41 at the ends thereof, and which is provided with an upstanding arcuate flange 42 on its outer side and intermediate of its ends which is curved to conform to the curvature of said outer edge of the member 39. The adaptor 38 slips under the bottom convolution of the inner spring 37 and fits between the arms 15 and on the foot members 16 so that the lower end of

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the inner spring 37 will rest on the U-shaped member 39 so that both of the springs 32 and 37 will be compressed when the cage 20 is moved downwardly. The flange 42 is provided so that the retaining ring or collar 19 can be slid downwardly sufficiently to engage over the flange 42 for retaining the adaptor 38 in its applied position.

To insert the adaptor 38, before the tool 10 is otherwise applied, a screwdriver or thin piece of steel may be employed to raise the springs for inserting the U-shaped member 39 therebeneath.

Various modifications and changes are contemplated and may obviously be resorted to, without departing from the spirit or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. In a valve spring compressing tool for engines having overhead valves, a tool body having a cylindrical end and diametrically opposed resilient arms extending from the inner end thereof and constituting the opposite end of said tool body and formed integral with the cylindrical end, said arms having inwardly extending projections at their free ends, a collar slidably mounted on the tool body and movable from the cylindrical end into engagement with said arms toward their free ends for displacing the arms inwardly of one another into parallel relationship for moving the inwardly extending ends thereof into engagement beneath a valve spring and between said spring and an engine portion against which it normally bears, and screw follower means reciprocally disposed in the tool body and movable from the cylindrical end thereof to a projected position between the arms for engaging and compressing the valve spring to permit the removal of the spring keeper, said collar, when in engagement with the resilient arms, retaining said arms in parallel relationship whereby the arms form a guide in which the screw follower means is slidably disposed when in a projected position.

2. A tool as in claim 1, said inwardly extending portions having their upper sides beveled to form knife-like inner edges for engaging under the bottom convolution of the spring when said arms are forced inwardly of one another, and said beveled portions forming ramp surfaces over which the bottom convolution of the spring is movable into engagement with the upper sides of said intumed portions.

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