Jan. 4, 1955 J. T. APOSTOLI 2,698,446

TOOL FOR ROTATING AND PULLING HYDRAULIC VALVE LIFTERS OUT OF MOTOR BLOCKS

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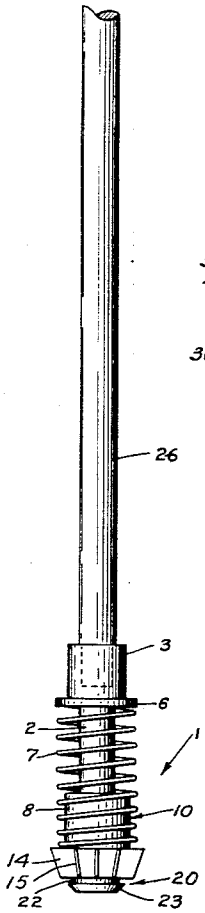


Fig. 1.

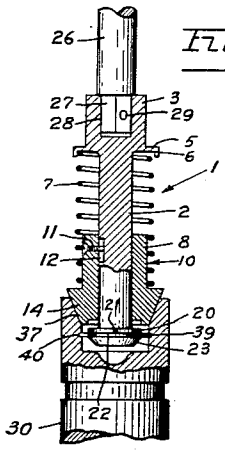


Fig. 2.

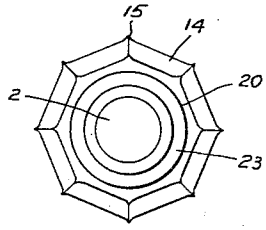


Fig. 3.

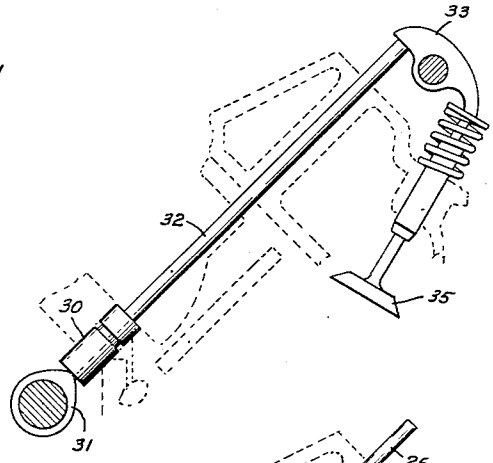


Fig. 4.

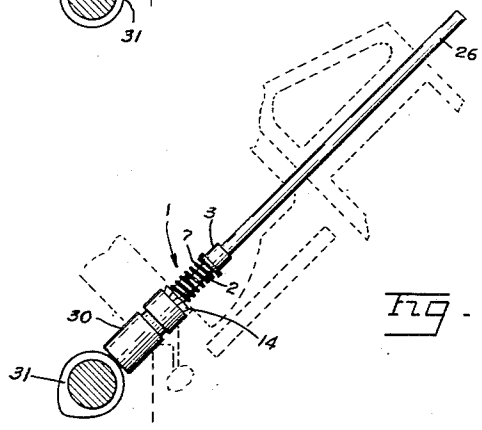


Fig. 5.

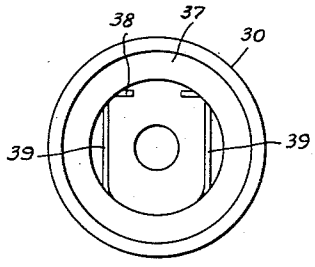


Fig. 6.

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TOOL FOR ROTATING AND PULLING HYDRAULIC VALVE LIFTERS OUT OF MOTOR BLOCKS

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2 Claims. (Cl. 7—1)

This invention relates to a tool for pulling hydraulic valve lifters out of the motor block.

In some of the more expensive automobiles the valves are operated through hydraulic valve lifters which are pushed by the camshafts and which in turn push the push rods. The latter operate rocker arms which open the valves. The function of the hydraulic valve lifter is to to take care of the wear of the push rod associated therewith. A hydraulic valve lifter slides in a motor block and has its lower end in the crankshaft compartment exposed to oil which is ever present therein. Oil settles on the exposed portion of said hydraulic valve lifters and evaporates being constantly subjected to heat developed by the motor, thus leaving a film of burnt oil which gradually increases in thickness to such extent that it becomes impossible to pull said lifter out of its place. In order to take a lifter out of its place, the film of burnt oil must first be removed and thereupon the lifter is pulled upwardly. The removal of said film is done by rotating said lifted and by holding a piece of fine sandpaper against the surface thereof covered by said film. After the film has been removed, the lifter is pulled upwardly and out.

The primary object of this invention is to provide a tool for rotating said hydraulic valve lifters and for removing the same out of the motor block.

Another object of this invention is to provide a tool of the class described which is simple, easy to operate and efficient for the purpose intended.

Other objects and advantages will appear as the specification proceeds and the novel features of the device will be particularly pointed out in the claims hereto annexed.

In this specification and the annexed drawing, the invention is illustrated in the form considered to be the best, but it is understood that the invention is not limited to such form; and it is also to be understood that in and by the claims following the description, it is desired to cover the invention in whatsoever form it may be embodied.

This invention is illustrated in an accompanying drawing in which:

Fig. 1 shows a side view of the tool.

Fig. 2 is a vertical cross-section of the lower portion of the tool showing it inserted in a hydraulic valve lifter.

Fig. 3 is an enlarged bottom view of the tool.

Fig. 4 is a diagrammatic representation of an arrangement of a hydraulic valve lifter, a push rod, a rocker arm and a valve in an automobile motor.

Fig. 5 shows the above described tool inserted into a hydraulic valve lifter in the motor block; and

Fig. 6 is a plan view of the lifter.

The tool **1** comprising the subject matter of this invention consists of a shaft **2** having a head **3** at the upper end thereof. The head **3** is formed with a circular margin **5** with turned down edge **6** adapted to retain an upper end of a compression spring **7**. The lower end of said spring is placed around a collar **8** of a plunger **10** slidably arranged on said shaft **2**. Means are provided to prevent rotation of the plunger **10** on the shaft **2**, such as a screw **11** carried by the plunger **10** the end of which screw protrudes into a longitudinal groove **12** on said shaft.

The lower end of said plunger **10** is in form of an inverted frustrum of a pyramid **14**. The spring **7** is confined between the circular margin **5** and the base of the pyramid **14** and constantly urges the plunger **10** downwardly.

The pyramid **14** is octagonal in plan view and has sharp raised converging edges **15**. The downward movement of the pyramid **14** on the shaft **2** is limited by a spring retaining element **20** which is secured to the lower end of

said shaft by a pin **21** or the like. The latter element is in the form of heavy washer with a circular groove **22** thereon and has the portion thereof from said groove downwardly bevelled as shown at **23**.

The tool **1** is detachably attached to a rod **26** for the purpose of rotating, pushing and pulling said tool. The rod **26** has a square end **27** which is adapted to enter a square depression **28** in the upper end of the head **3**, and be detained therein by a spring pressed ball **29**.

The tool **1** is designed to rotate and to pull hydraulic valve lifters **30** which are provided in some of automobile motors and which are slidably retained in the motor block. Fig. 4 shows diagrammatically the arrangement of the hydraulic valve lifter **30** being pushed by a cam **31** and which in turn pushes a push rod **32** also slidably retained in the motor block. The latter rod rocks a rocking arm **33** which in turn operates a valve **35**.

It is necessary to mention in order to understand the operation of this tool that the hydraulic valve lifter **30** has a conical cavity **37** in its upper portion which is entered by the lower end of the push rod **32**. A retaining spring **38** having two straight parallel sides **39** is carried in the groove **40** in said cavity.

The tool **1** is used in the following manner: The rocking arm **33** is taken off and the push rod **32** is pulled out. Thereupon the tool **1** is inserted in the hydraulic valve lifter **30** so that the pyramid **14** enters the cavity **37**. The rod **26** is pushed through the bore which was occupied by the corresponding push rod **32**, and its square end **27** is introduced into the square opening **28**. Thereupon the rod **26** is pushed downwardly until the bevel **23** forces the parallel sides **39** of the spring **38** slightly apart whereupon they spring into the groove **22**. The plunger **10** now is under the pressure of the spring **7**, and the edges **15** of the pyramid **14** are forced against the inner wall of the conical cavity **37** thus creating considerable friction therebetween which is more than sufficient for the purpose of rotating said lifter by rotating the tool **1**.

The operator thereupon attaches the upper end of the rod **26** to an electric drill. The latter rotates the rod **26**, the tool **1** and the lifter **30**, while he holds a piece of fine sand paper or emery cloth against the lower portion of said lifter exposed in the crankcase of the motor. A few revolutions of said lifter are sufficient to clean said lower end thereof of the burnt oil film which has accumulated thereon. Thereupon the rod **26** is pulled upwardly and the lifter **30** easily slides upwardly from its bearing surface. Then the tool **1** is disconnected from the rod **26** and from the lifter **30**.

I claim:

1. A tool for rotating and lifting a hydraulic valve lifter from a motor block, said lifter having a depression on one end thereof and a spring in said depression, said tool comprising an element insertable in said depression and including means engageable under the spring in said lifter and a spring pressed element biased toward said means and including means for frictional engagement with the inner surface of said depression for rotating said lifter with the tool.

2. A tool for rotating and lifting a hydraulic valve lifter from a motor block, said lifter having a depression on the front end thereof and a stop spring in said depression, said tool comprising a rod, a shaft, means detachably connecting said rod and shaft, means on the lower end of said shaft for engaging under said stop spring when the tool is pressed downwardly into said depression, a plunger slidably mounted on said shaft and including means for frictionally engaging the inner surface of said depression for rotating the lifter with said tool, and a spring on said shaft urging said plunger toward said second mentioned means.

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