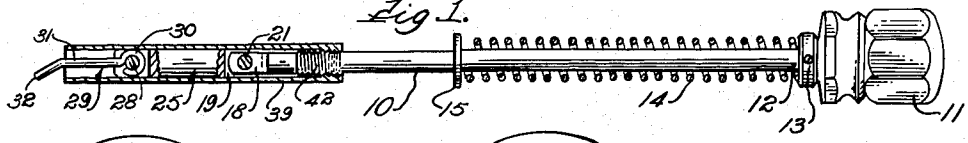
June 5, 1956 R. G. KNUDSEN ET AL 2,748,458

IMPACT SLEEVE PULLERS

Filed Jan. 2, 1953

Fig. 1.



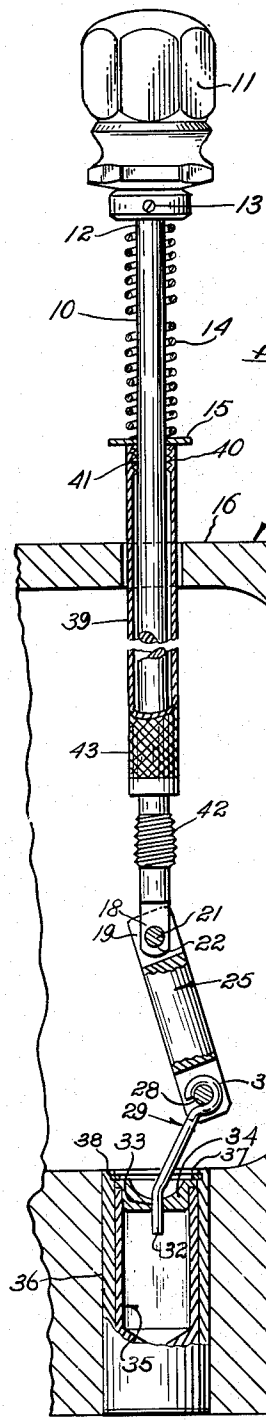




Fig. 2.

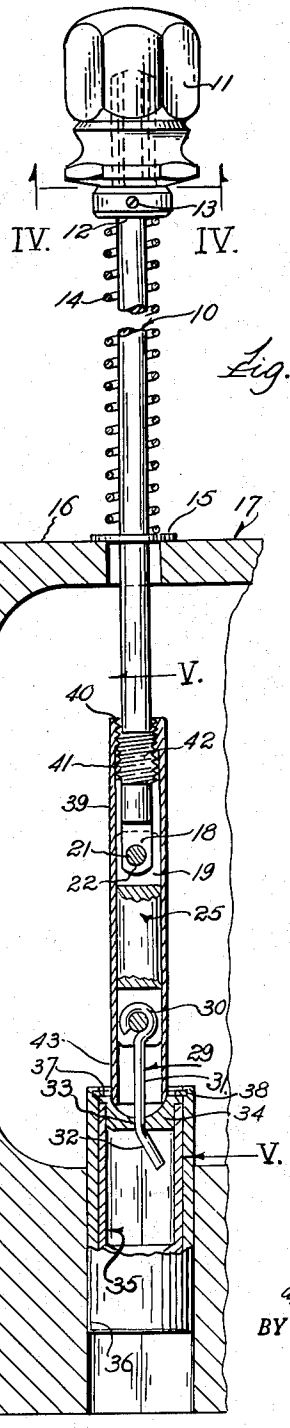



Fig. 3.

Fig. 4.

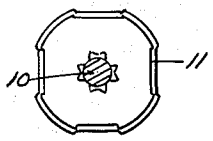
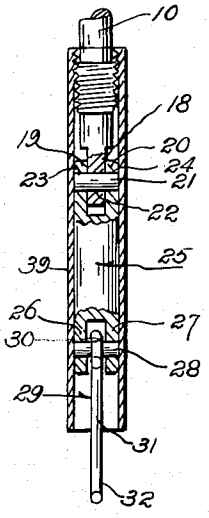



Fig. 5.




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United States Patent Office 2,748,458 Patented June 5, 1956



2,748,458

# IMPACT SLEEVE PULLERS

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Application January 2, 1953, Serial No. 329,201

3 Claims. (Cl. 29—280)

This invention relates to sleeve pullers and inserters and more particularly to hydraulic valve sleeve pullers and inserters although certain features thereof may be employed with equal advantages for other purposes.

It contemplates more especially the provision of an improved tool for rendering valve sleeve pullers and inserts readily accessible to hydraulic valve sleeves for pulling and inserting without entailing any appreciable labor or time.

Internal combustion engines are now equipped with hydraulic valve lifters and these entail mechanisms such as sleeves and valves that are normally inaccessible to the usual and customary tools. These hydraulic valves and sleeves require replacement and their removal as well as insertion has presented many difficulties. The hydraulic valves are usually equipped with an axial opening in the end thereof, but aside from this opening there are no expedients that enable the attachment of a tool thereto. This has presented many problems to the mechanic in servicing hydraulic valve lifters, and in order to enable these valves to be serviced with minimum labor and time a novel hydraulic valve lifter has been provided which embodies a simple but effective grasping expedient that is readily accessible and can be remotely adjusted to grasp the hydraulic valve for lifting as well as inserting purposes.

One object of the present invention is to simplify the construction and improve the effectiveness of lifting tools that are ordinarily required for normally inaccessible engine parts.

Another object is to provide a simple tool for a knee-type joint which can be utilized in conjunction with a valve engaging element for the ready insertion and remote adjustment to effectively grasp a valve assembly.

Still another object is to provide a valve lifting and inserting tool which embodies a knee-type joint and angularly shaped rod-like engaging element which can be readily inserted and adjusted to grasp a valve assembly for pulling or insertion.

A further object is to provide a knee-type joint in conjunction with a sleeve for use with an angularly bent rod-like valve engaging member so that it can be readily inserted into a hole or adjusted for effective engagement therewith to pull or insert a valve assembly or the like.

A still further object is to provide an elongated sleeve member in conjunction with a knee-type joint having a valve engaging element which can be readily inserted or adjusted therewith to engage or disengage a valve assembly for the removal or insertion thereof.

Other objects and advantages will appear from the following description of an illustrative embodiment of the present invention.

In the drawing,

Figure 1 is a front view in elevation of a valve lifting and inserting tool embodying features of the present invention, parts thereof being broken away and shown in section to clarify the illustration.

Figure 2 is an enlarged sectional view in elevation of the tool shown in Figure 1 as applied to an engine block and shown at the position for insertion in a hydraulic valve preparatory to effecting the grasp thereof.

Figure 3 is an enlarged front sectional view in elevation of the tool shown in Figures 1 and 2 adjusted for effectively grasping the hydraulic valve assembly and shown in the position wherein the valve has partially been lifted therewith.

Figure 4 is a sectional view taken substantially along line IV—IV of Figure 3.

Figure 5 is a fragmentary sectional view taken substantially along line V—V of Figure 3.

The structure selected for illustration is not intended to serve as a limitation upon the scope or teachings of the invention, but is merely illustrative thereof. There may be considerable variations and adaptations of all or part of the teachings depending upon the dictates of commercial practice. The present embodiment comprises an elongated rod **10** having an enlarged head **11** attached to the upper extremity **12** thereof by means of a suitable fastening expedient such as a set screw **13** to afford the convenient and effective manual grasp thereof to manipulate the elongated rod **10** in a manner to be hereinafter described. A coil compression spring **14** envelops the elongated rod **10** beneath the head **11** thereof for contact with a washer **15** that slideably engages the elongated rod **10** to rest upon the top surface **16** of an engine block **17** when the tool is in the position for use as will appear more fully hereinafter.

The lower extremity of the elongated rod **10** is milled or otherwise shaped to provide a flat symmetrically disposed ear **18** that is complemental to spaced furcations **19—20** for pivotal connection with the ear **18** through the medium of a pin **21** that is tightly driven into an aperture **22** in the ear **18** to register with aligned apertures **23—24** of somewhat larged diameter than the pin **21** to freely permit the pivoting of a knee-type cylindrical joint member **25** with which the space furcations **19—20** are intricately formed. The other end of the knee-type cylindrical joint member is also provided with space furcations **26—27** to receive a tightly fitting pin **28** that carries a rod-like sleeve engaging member **29** that terminates in an open eye **30** for mounting on the pin **28**. The rod-like engaging member **29** freely swings on the pin **28** and has a straight shank **31** that terminates in an angularly offset free extremity **32** which is capable of free insertion in a slightly larger aperture **33** provided in the cap **34** of the hydraulic cylinder valve assembly **35** which is part of and retained in a hydraulic valve cylinder **36** that is press fitted into the engine head **17** in the vicinity of each of its cylinders. A split ring **37** is positioned in an annular groove **38** provided in the hydraulic valve cylinder **36** to retain the valve sleeve **35** in assembled relation with its cylinder **36**. In order to enable the knee-type joint **25** which pivotally carries the rod-like valve sleeve engaging wire **31** in one of two different positions for ready insertion and engagement with the hydraulic assembly **36**, an elongated open end sleeve **39** is slideably disposed over the knee-type joint **25** and its extremities having the pivotal pins **21—28** mounted thereon. As shown, the knee-type joint adjusting sleeve **39** is interiorly threaded as at **40** at its upper end **41** to engage a correspondingly threaded cylindrical shoulder **42** to provide proximate to the lower end of the elongated rod **10** for threaded engagement and disengagement therewith so that the adjusting sleeve **39** may be in one of two different positions illustrated in Figures 2 and 3. To this end, the exterior surface of the adjusting sleeve **39** is knurled as at **43** to enable its ready rotation in one direction or the other for engagement or disengagement between its internal threads **40** and the externally threaded shoulder **42** on the elongated rod **10**.

This enables the sleeve **43** in its disengaged position to be lifted above the knee-type joint **25** so that the latter may be readily pivoted to vertically align the angularly disposed extremity **32** of the engaging rod or wire **29** with the aperture **33** in the end cap **34** of the hydraulic valve sleeve **35**. In this position, the knee-type joint **25** is angularly disposed as illustrated in Figure 2 with the sleeve engaging end **32** in position beneath the hydraulic valve sleeve end or closure cap **34** as the sleeve is displaced downwardly to align the knee-type joint **25** with the elongated handle rod **10** for engagement of the sleeve threads **40** with the threaded shoulder **42** on the handle rod **10**. In this position, as illustrated in Figure 3, the lower extremity of the adjusting sleeve **39** engages the end or closure cap **34** on the hydraulic valve assembly to angularly dispose the grasp wire or rod extremity **32** and securely engage the hydraulic valve lifter end or closure **34** to permit the entire assembly to be manually lifted, as illustrated in Figure. 3. Upon fully lifting or pulling the valve assembly **35** from the engine head **17**, the adjusting sleeve **39** can again be detached from a handle rod **10** for displacement upwardly so that the angularly disposed engaging wire extremity **32** can be again placed in line with the opening **33** in the end or closure cap **34** for disengagement and removal.

It will be apparent from the foregoing that a very simple and effective hydraulic valve assembly lifter and inserter has been provided which is readily accessible and can be effectively engaged and disengaged therewith without entailing any appreciable time or labor.

While we have illustrated and described a preferred embodiment of this invention, it must be understood that the invention is capable of considerable variation and modification without departing from the spirit of the invention. We, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail ourselves of such variations and modifications as come within the scope of the appended claims.

We claim:

1. In a sleeve valve puller and the like, an elongated handle member including an enlarged end gripper, a valve sleeve engaging member, an end jointed member movably connected between the free end of said handle member and said sleeve engaging member, a joint sleeve slidably mounted over said elongated handle member, valve sleeve engaging member and end jointed member to preclude yielding therebetween in an operative pulling position and permit yielding in an inoperative inserting position, a ring slidable on said elongated handle member to contact an engine block in its operative position, and spring means enveloping said elongated handle member between said enlarged end gripper and said slidable ring to normally urge said handle member away from the valve sleeve to be pulled, whereby an impacting movement may be imparted to said valve sleeve member.

2. In a sleeve valve puller and the like, an elongated handle member including an enlarged end gripper, a valve sleeve engaging member, an end jointed member pivotally connected between the free end of said handle connected between the free end of said handle member member and said sleeve engaging member, a joint sleeve slidably mounted over said elongated handle member, valve sleeve engaging member and end jointed member to preclude pivoting therebetween in an operative pulling position and permit pivoting in an inoperative inserting position, a ring slidable on said elongated handle member to contact an engine block in its operative position, and spring means enveloping said elongated handle member between said enlarged end gripper and said slidable ring to normally urge said handle member away from the valve sleeve to be pulled, whereby an impacting movement may be imparted to said valve sleeve member.

3. In a sleeve puller and the like, an elongated handle member including an enlarged end gripper, a valve sleeve engaging member, an end jointed member pivotally and said sleeve engaging member, said valve sleeve engaging member comprising an angularly shaped hole inserting rod which freely enters a hole when said end jointed member is freely pivotal for insertion and is precluded from removal therefrom when said jointed member is slidably mounted over said elongated handle member, valve sleeve engaging member and end jointed member to preclude pivoting therebetween in an operative pulling position of handle sleeve displacement, a ring slidable on said elongated handle member to contact an engine block in its operative position, and spring means enveloping said elongated handle member between said enlarged end gripper and said slidable ring to normally urge said handle member away from the valve sleeve to be pulled, whereby an impacting movement may be imparted to said valve sleeve member.

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