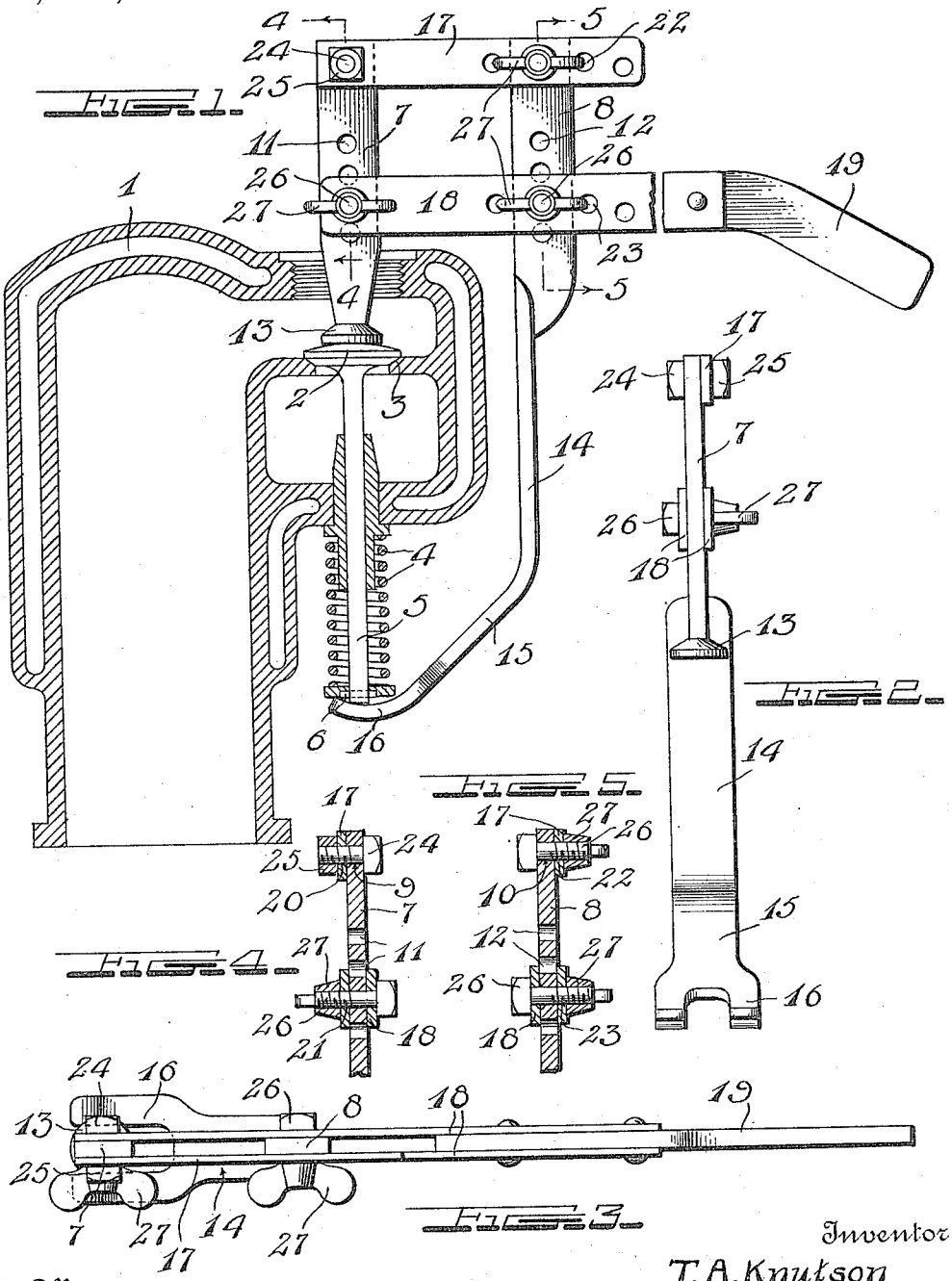
T. A. KNUTSON.

TOOL FOR REMOVING ENGINE VALVES.

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1,163,018. Patented Dec. 7, 1915.



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THOMAS A. KNUTSON, OF VERMILION, SOUTH DAKOTA.

TOOL FOR REMOVING ENGINE-VALVES.

1,163,018. Specification of Letters Patent. Patented Dec. 7, 1915.

Application filed August 19, 1915. Serial No. 46,334.

To all whom it may concern:

Be it known that I, THOMAS A. KNUTSON, a citizen of the United States, residing at Vermilion, in the county of Clay and State of South Dakota, have invented certain new and useful Improvements in Tools for Removing Engine-Valves; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to new and useful improvements in tools for removing engine valves which are retained on their seats by means of springs keyed to the valve stem, and the object of my invention is to provide a means for compressing the spring so that the key holding spring may be easily and simply removed, when it is desired to take the valve apart.

Another object of this invention is to provide a tool of this character which has its various parts adjustable so that the same may be applicable to use on different size engines.

A further object of this invention is to provide a device which is simple and durable in construction, inexpensive to manufacture, and one which will be very efficient in operation.

With these and numerous other objects in view my invention consists of the novel features of construction, combination and arrangement of parts which will be herein referred to and more particularly pointed out in the specification and claims.

In the accompanying drawings: Figure 1 is a side elevation of my improved valve remover showing the same applied to use; Fig. 2 is a front edge view of my invention; Fig. 3 is a top plan view of the same; Figs. 4 and 5 are detail vertical sections on the lines 4—4 and 5—5 of Fig. 1.

In describing my invention I shall refer to the drawing in which similar reference characters designate corresponding parts throughout the several views and in which in Fig. 1, the numeral 1 designates an internal combustion engine, which in this instance is shown in section, so that the valve, to which this device is to be applied, may be clearly seen. This valve which is designated by the numeral 2 is seated as shown at 3, and is held in the said position by means of a coil spring 4 which is keyed to the stem of the valve 5 by means of a locking pin 6. When it is desired to remove this valve 2 from the engine for any purpose whatsoever, my improved valve removing tool is applied thereto as shown in Fig. 1 of the drawings. This tool comprises a pair of spaced parallel bars 7 and 8 which are disposed in the same plane, and have formed in their upper ends apertures 9 and 10. Intermediate the ends of these bars 7 and 8 are formed a plurality of longitudinally extending parallel holes 11 and 12. The lower end of the bar 7 has formed thereon a head 13 which is adapted to be seated or rest upon the top of the valve 2 and the lower end of the opposite parallel bar 8 has formed thereon an extension 14, which is disposed in a plane at right angles to the plane of the bar 8 and has its lower portion 15 bent inwardly and bifurcated as shown at 16, said bifurcated portion being adapted to engage the lower end of the coiled spring 4 on the valve stem 5. These two bars 7 and 8 are held in the aforesaid positions by means of a link 17 that extends across the tops of said bars, and a parallel spaced lever 18, which extends across the intermediate portions of said bars, and projects therefrom at one side, having a handle 19 formed thereon. The link 17 and lever 18 have their ends in contact with the valve top engaging bar 7 apertured as shown at 20 and 21, and the said apertures are adapted to aline, the aperture 21 with the aperture 9 in the top of said bar, while the aperture 20 on the end of the lever is adapted for alinement with any of the apertures 11, in the intermediate portion of said bar. This link and lever is also formed with a plurality of longitudinally extending apertures 22 and 23 formed along the portions of the same that are adapted for engagement with the valve spring engaging bar 8. These apertures 23 on the lever 18 are adapted for successive alinement with any of the apertures 12 on the intermediate portion of said bar while the apertures 22 on the link 17 are adapted for successive alinement with the aperture 10 at the upper end of the said bar. Thus it will be seen that the link 17 and lever 18 have a four point engagement with the parallel bars 7 and 8, and at three points of said engagement various angles of adjustments may be obtained owing to different alinements that may be obtained with respect to the number of apertures in the different parts.

The alining apertures 9 and 20, at the up-

per end of the bar 7, and at one end of the link 17 are pivotally connected by means of a bolt 24 extending therethrough and held thereon by means of a square nut 25. This point of contact between the bar 7 and the link 17 is not adjustable, but is adapted to spring upon movement given to either one of the parts. At the other point of contact, namely, between the intermediate portions of the said bars and the ends of the lever 18, and the intermediate portion of the same and between the upper end of the bar 8 and the opposite end of the link 17 the longitudinally extending apertures in these parts present a number of different adjustments to be obtained by shifting the alinement of said apertures, and the parts are held in contact with each other by means of bolts 26 extending therethrough and detachably connected therewith by means of wing nuts 27 on the ends of said bolts. It is obvious that nuts may be easily detached from the bolts, and the bolts withdrawn from the apertures when it is desired to adjust this device to different sizes of engines.

When the parts of this device are assembled as shown in Fig. 1 of the drawings, it will be obvious that upon the lifting of the lever 18, by means of grasping the handle 19 and exerting an upward pull thereon, the bar 8 will be raised, and the bifurcated end 16 of the lower portion of the same, will engage the bottom of the coil spring 4, and as positioned on either side of the valve stem 5, will compress and lift said spring from out of engagement with the pin 6, so that the said pin may be easily and simply removed. Upon removing the pin 6, the spring 4 will drop from the valve, and upon taking this tool from out of engagement with the same the valve may be easily removed from the engine.

The operation of replacing the valve is essentially the same as removing it as after the spring 4 has been placed upon the valve stem, upon compression of the same the locking pin 6 may be readily replaced in its normal position.

This device is applicable for use on various kinds of engines and valves by the adjustment above described, making it a very efficient and useful tool of this character.

From the foregoing description of the construction of my improved device the manner of applying the same to use and the operation thereof will be readily understood and it will be seen that I have provided a simple, inexpensive and efficient means for carrying out the objects of this invention.

I claim as my invention:

1. A tool of the character described comprising a pair of parallel bars, one of said bars having its lower end adapted to rest upon the top of a valve and the other bar having its lower portion bent for engagement with the valve seat and spring, said bars having a plurality of longitudinally extending apertures adjacent their upper ends, and apertures through said ends, a parallel link and lever extending at right angles to said bars and having pivotal and adjustable engagement with the upper end and the apertured adjacent portions of the same respectively.

2. A tool of the character described comprising a pair of parallel spaced bars and a plurality of longitudinally extending apertures intermediate their ends, the upper ends of said bars being apertured, a head on the lower end of one of the bars to engage the top of the valve, an extension on the lower end of the opposite bar having its lower portion bent inwardly and the extremity bifurcated for engagement with the valve seat spring, a spaced link and lever extending parallel and at right angles to said bars having a four-point engagement with the upper ends and the intermediate portions of the same, said link and lever having a plurality of longitudinally extending apertures therethrough and being apertured at one end, and a pivotal connection between one end of the link and the top of the valve engaging bar the other three points of engagement between the bar and link and lever being pivotally and adjustably connected with each other.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

THOMAS A. KNUTSON.

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."