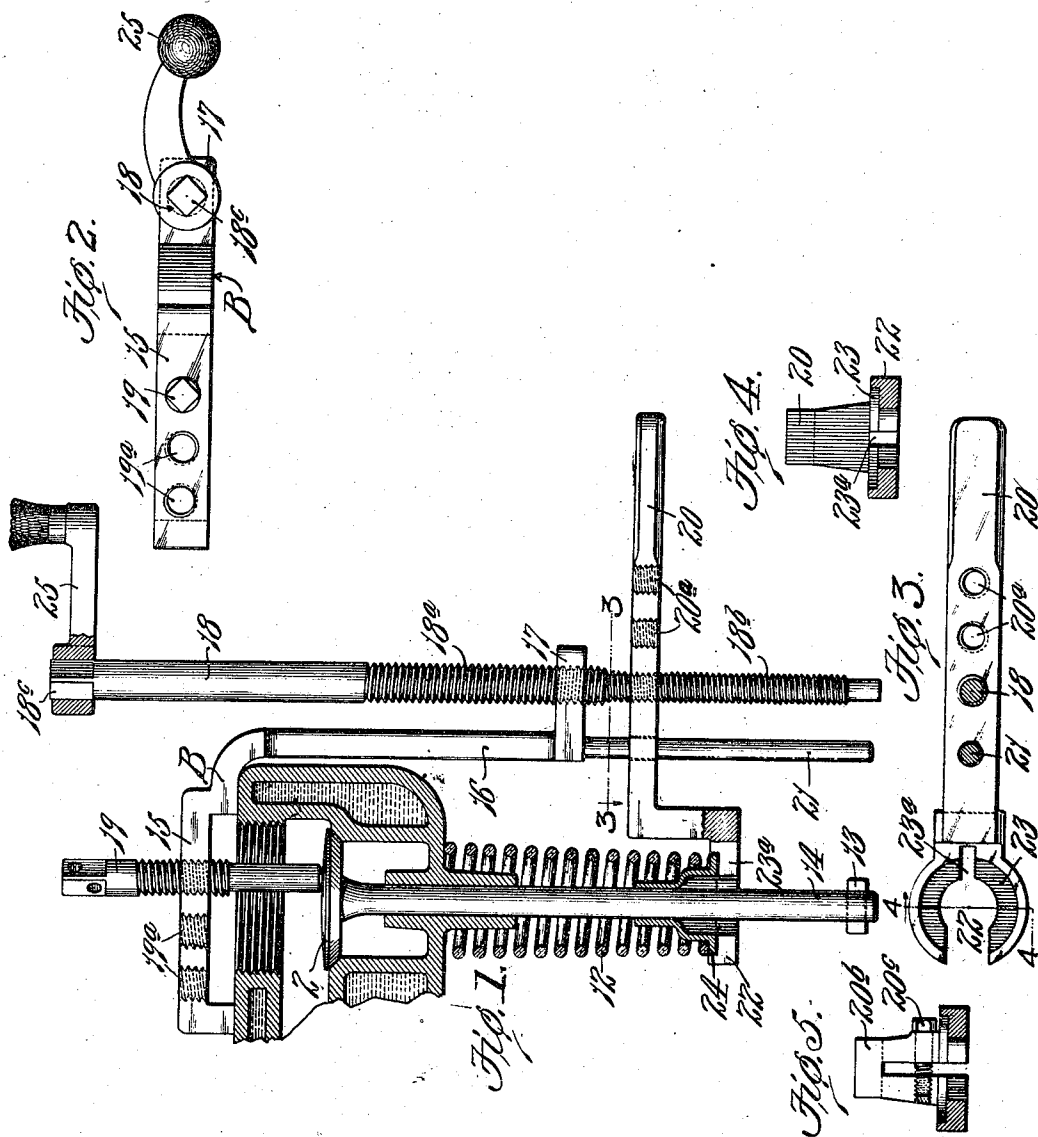


N. P. SJÖHOLM.
VALVE REMOVING APPARATUS.
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1,000,559.

Patented Aug. 15, 1911.



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UNITED STATES PATENT OFFICE.

NILS P. SJÖHOLM, OF ST. LOUIS, MISSOURI.

VALVE-REMOVING APPARATUS.

1,000,559.

Specification of Letters Patent. Patented Aug. 15, 1911

Application filed June 25, 1910. Serial No. 568,900.

To all whom it may concern:

Be it known that I, NILS P. SJÖHOLM, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Valve-Removing Apparatuses, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to tools that are used for compressing the valve springs of internal combustion engines during the operation of removing the valves, and the object of my invention is to provide a tool of the type referred to that can be used on various kinds of engines and which enables the valves to be removed quickly and easily.

Figure 1 of the drawings is a vertical sectional view of a portion of the cylinder of an internal combustion engine showing my improved valve spring compressing tool arranged in operative position; Fig. 2 is a top plan view of the valve spring compressing tool; Fig. 3 is a horizontal sectional view of said tool taken on approximately the line 3—3 of Fig. 1; Fig. 4 is a vertical sectional view taken on approximately the line 4—4 of Fig. 3; and Fig. 5 illustrates an adjustable jaw or member for engaging the seat of the valve spring.

The first step in the operation of removing the valve of an internal combustion engine is to take off the valve cap, and the second step is to compress the spring 12 which holds the valve seated so that the cotter pin 13 in the lower end of the valve stem 14 can be removed and thus permit the valve to be forced upwardly through the valve cap opening in the cylinder.

Referring to the drawings which illustrate my improved valve spring compressing tool, B designates the frame of the tool which is adapted to rest upon the cylinder, 15 designates a horizontally disposed portion on said frame which projects over the valve cap opening in the cylinder, and 16 designates a vertically disposed portion on said frame having a laterally projecting arm 17 in which a shaft 18 is adjustably mounted. An adjustable device 19 is arranged in the horizontally disposed portion 15 of the frame B so as to engage the valve

2, and an adjustable arm 20 is slidingly mounted on a guide 21 on the frame for compressing the spring 12, said arm having a screw-threaded opening which meshes with screw-threads on the shaft 18. Said shaft 18 is provided with two oppositely threaded portions 18^a and 18^b, the threads 18^a meshing with threads in the arm 17 of the frame, and the threads 18^b meshing with threads in the adjustable arm 20. The arm 20 is provided with a bifurcated jaw 22 which has a socket 23 for receiving the valve seat 24 against which the lower end of the spring 12 bears, and the operating shaft 18 is provided at its upper end with a non-circular portion 18^c that is adapted to be engaged by a wrench or a handle 25.

After the valve cap has been removed the frame B is arranged in the position shown in Fig. 2, and the device 19 is screwed downwardly into engagement with the valve 2, the jaw 22 of the arm 20 being arranged under the seat 24 of the valve spring. When the shaft 18 is rotated in one direction the oppositely screw-threaded portions of said shaft cause the arm 20 to move upwardly into the position shown in Fig. 1 and thus compress the valve spring so that the cotter pin 13 can be removed from the stem of the valve. After the cotter pin has been removed, the device 19 is moved upwardly so as to permit the valve to be raised from its seat and pushed upwardly through the opening in the top of the cylinder which receives the valve cap, the horizontally disposed portion 15 of the frame B being so designed that the valve can be raised above the top of the cylinder or moved into such a position that the operator can grasp same. In the embodiment of my invention herein shown, the horizontally disposed portion 15 of the frame is provided with a recess or cut-out part which aligns with the opening in the cylinder that receives the valve cap but it will, of course, be understood that the frame could be formed in various other ways without departing from the spirit of my invention. The operator then holds the valve in its raised position and rotates the shaft 18 in the opposite direction so as to permit the spring 12 to expand, the frame B being thereafter shifted laterally far

enough to enable the valve to be withdrawn from the cylinder. After the valve has been cleaned or repaired it is arranged in operative position in the cylinder and the frame B is again placed in its former position so as to permit the valve spring to be compressed sufficiently to enable the cotter pin 13 to be inserted in the valve stem.

The horizontally disposed portion 15 of the frame B is provided with a plurality of threaded openings 19^a for receiving the valve-engaging device 19, and the arm 20 through which the screw-threaded portion 18^b of the operating shaft 18 passes is provided with a plurality of threaded openings 20^a for receiving said shaft so as to enable the tool to be used on engines in which the valves are arranged in different positions or at different distances from the side walls of the cylinders of the engine.

The tool is very narrow, as shown in Fig. 2, so that it can be arranged between the cylinder and the manifold of practically any type of internal combustion engine, and as the operating shaft 18 projects upwardly above the cylinder it can be manipulated easily and without removing the magneto or any other part of the engine as was necessary with the tools heretofore used for compressing the valve springs of an internal combustion engine.

The jaw 22 on the arm 20 which receives the spring seat 24, is preferably provided at its inner end with a slot 23^a, as shown in Fig. 3, so as to enable it to be compressed or expanded slightly to fit different kinds of spring seats, and, if desired, the depending portion 20^b of the arm 20 which carries the jaw 23, can be bifurcated, as shown in Fig. 4, and provided with an adjusting screw 20^c for compressing and expanding said jaw.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A tool for compressing a valve spring, comprising a frame that is adapted to rest on the cylinder of the engine, said frame having a recess or cut-out portion that aligns with the valve cap opening in the cylinder so as to enable the valve to be raised above the top of the cylinder, an adjustable device on said frame for engaging the valve so as to hold it seated, a valve spring compressing member carried by said frame, and means for actuating said member to compress the spring and hold it under compression.

2. A tool for compressing a valve spring, comprising a frame that is adapted to rest on the cylinder of the engine, said frame being so designed that it does not interfere with the upward movement of the valve above the top of the cylinder when said frame is arranged in operative position,

members carried by said frame for engaging the valve and the valve spring, said members being adapted to be adjusted laterally so as to permit the tool to be used on engines in which the valves are arranged at different distances from the sides of the cylinder, and means carried by the frame for actuating the member which engages the valve spring so as to compress said spring and hold it under compression.

3. A tool for compressing a valve spring, comprising a frame having a vertical portion that extends alongside of the cylinder of the engine and a horizontal portion that rests upon the top of the cylinder, said horizontal portion being so constructed that the valve can be lifted above the top of the cylinder when the tool is arranged in operative position, an adjustable device mounted in the horizontal portion of said frame for engaging the valve, said horizontal portion having a number of openings which permit said device to be arranged in different positions, and a valve spring compressing member mounted on the vertical portion of said frame and adapted to be adjusted laterally with reference to said vertical portion.

4. A tool for compressing the valve springs of internal combustion engines, comprising a frame that is adapted to rest on the cylinder of the engine, an adjustable device on said frame that is adapted to engage the valve and hold it seated, a guide on said frame, a spring-seat-engaging member slidingly mounted on said guide, and an operating shaft provided with a threaded portion which passes through a threaded opening in said frame and an oppositely threaded portion which passes through a threaded opening in said spring seat engaging member, said frame and spring-seat-engaging member being provided with a number of different openings for receiving said valve-engaging device and said operating shaft.

5. A tool for the purpose described, comprising a frame that is provided with a horizontally disposed portion which extends over the top of the cylinder and a vertically disposed portion which extends downwardly at one side of the cylinder, a vertical guide and a laterally projecting arm on the vertically disposed portion of the frame, a member slidingly mounted on said guide and provided with a bifurcated jaw which is adapted to extend under the seat of the valve spring, and an operating shaft mounted in said laterally projecting arm and passing through a threaded opening in said member.

6. A tool for the purpose described, comprising a device for engaging the valve to hold it seated, a member provided with a bifurcated jaw for receiving one end of the

valve spring or the seat against which said
spring bears, means for expanding and con-
tracting said jaw so as to accommodate dif-
ferent sized spring seats, and means for
5 moving said jaw longitudinally of the stem
of the valve.

In testimony whereof I hereunto affix my

signature in the presence of two witnesses,
this 23rd day of June 1910.

NILS P. SJÖHOLM.

Witnesses:

CORA BADGER,
GEORGE BAKEWELL.

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