Jan. 2, 1923.

1,440,611

N. A. LANDIS.
VALVE SPRING COMPRESSOR.
FILED AUG. 31, 1921.

Fig. 2.

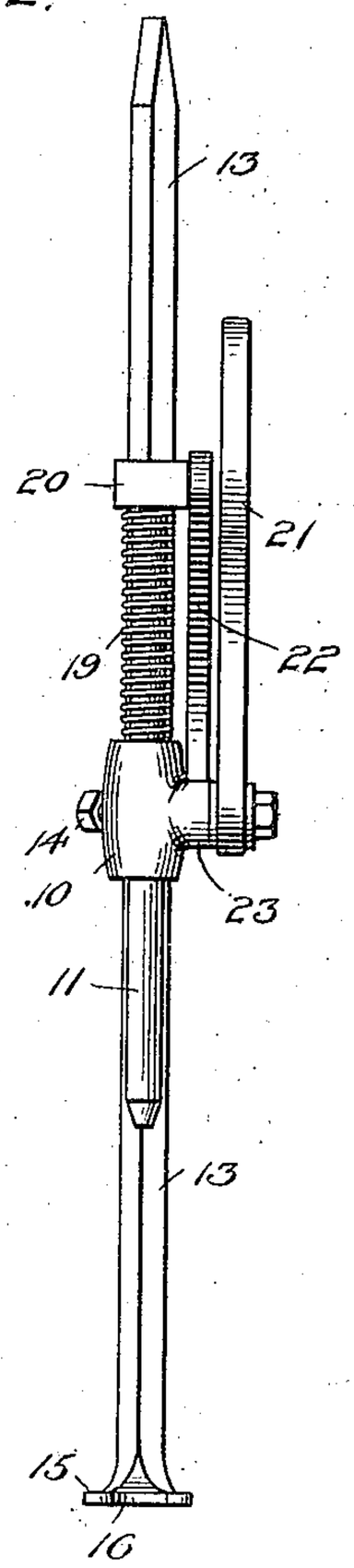

Fig. 1.

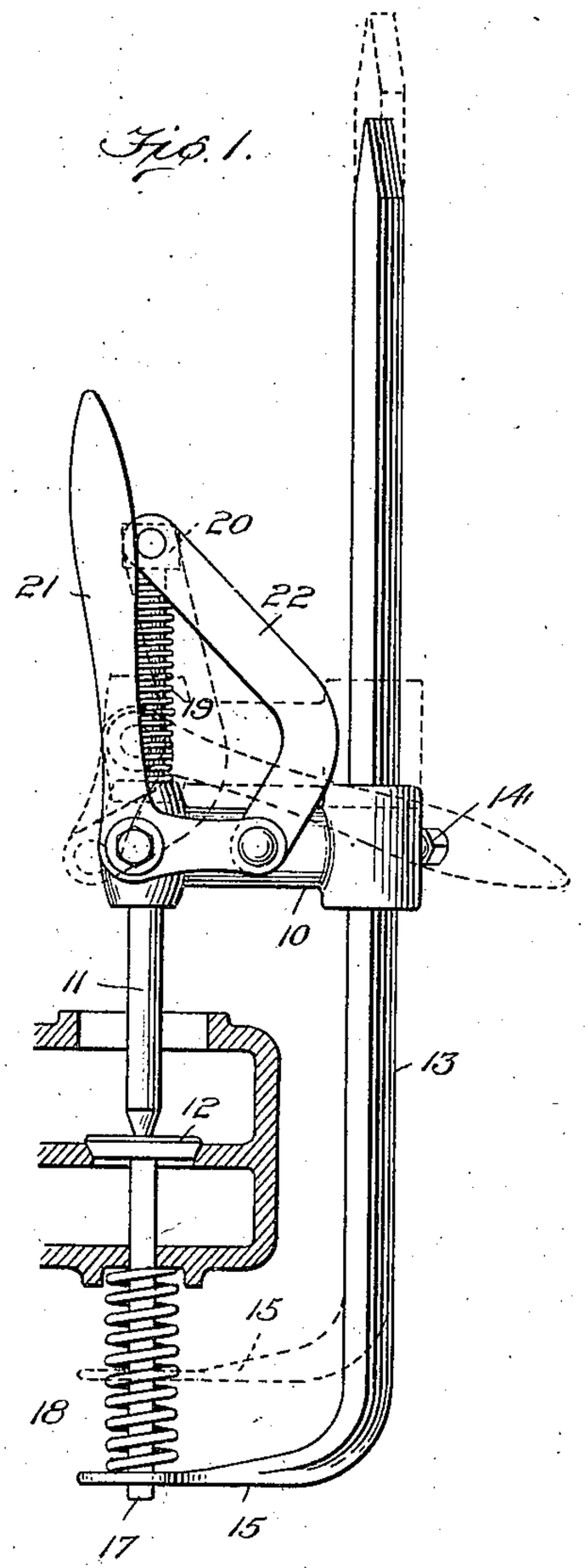

Fig. 3.

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UNITED STATES PATENT OFFICE.

NORMAN A. LANDIS, OF YORK, PENNSYLVANIA.

VALVE-SPRING COMPRESSOR.

Application filed August 31, 1921. Serial No. 497,266.

To all whom it may concern:

Be it known that I, NORMAN A. LANDIS, a citizen of the United States, residing at York, in the county of York and State of Pennsylvania, have invented certain new and useful Improvements in Valve-Spring Compressors; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to valve spring compressing tools of the type particularly adapted for facilitating the removal of engine valves.

An object of the invention is to provide a tool that can be quickly adjusted and applied for compressing the valve spring and holding the spring under compression without requiring the operator to retain his grip on the operating connections, thereby permitting the operator to have full use of both of his hands for performing any subsequent work, such as removing the key that retains the valve spring on the valve stem.

A further object is to produce a tool that not only possesses strength and durability, but is also practical and may be manufactured at a comparatively low cost due to its simplicity.

In the accompanying drawings—

Figure 1 is a fragmentary sectional view through a valve casing and a side elevational view of the tool, the several parts of the tool being shown in full lines in the positions they occupy before the valve spring is compressed and in dotted lines in the positions they occupy after said spring has been compressed.

Fig. 2 is an end elevation of the tool; and

Fig. 3 is a detail fragmentary view of the end of the valve spring engaging member.

The tool comprises a frame having means secured therein for engaging and preventing upward movement of the valve proper while a valve spring engaging member, also carried by the frame, is elevated by suitable operating mechanism for compressing said spring.

In the preferred form of tool the frame 10 is somewhat elongated to space the valve and valve spring engaging members apart as the valve engaging member projects down through the valve casing and the spring engaging member extends downwardly on the exterior of said casing. A stem 11 for engaging the top of the valve 12 is slidably secured in a guideway extending vertically through one end of said frame and the valve spring compressor arm 13 is adjustably secured in a similar opening in the opposite end of the frame. Arm 13 is retained in any desired position by a set screw 14 and the lower portion of said arm is off-set as at 15 to project inwardly beneath the valve casing. The extremity of the off-set portion beneath the casing is bifurcated as at 16 and is positioned in alinement with the stem 11 to straddle the valve stem 17 immediately below the valve spring 18.

To enable the tool to be readily applied to the valve 12 and valve spring 18, the valve engaging stem 11 is held spaced vertically from the birfurcated end 16 of arm 13 by a coil spring 19 surrounding said stem 11 and engaging the upper surface of frame 10 and an enlargement 20 formed at the upper end of the stem.

In operation, the stem 11, as will be understood, is centered on the top face of valve 12 and the bifurcated extremity of arm 13 is placed beneath valve spring 18. Arm 13, together with the frame 10 is then moved relatively to the stem 11 by operating mechanism to bring the arm and stem closer to one another and compress the valve spring.

A simple, but durable and efficient operating mechanism for this purpose consists of an operating handle 21, preferably in the form of a bell crank lever, pivoted intermediate its ends and connected to the stem 11 by a link 22. To secure a good leverage, the short arm of the handle or lever 21 is pivotally connected to one end of the connecting link 22 and the opposite end of said link is pivotally joined to the enlarged portion 20 of the stem 11. When the stem 11 is spaced from the bifurcated end 16 of arm 13 for applying the tool to the valve spring, the pivotal connection between handle 21 and link 22 is located between the stem 11 and arm 13 but as the handle is turned on its pivot towards arm 13 and downwardly, and the frame 10 and arm 13 are elevated on stem 11 to compress the valve spring, said pivotal connection passes across the center of the connection between the link and stem, thereby preventing the return of the handle.

A stop for limiting the throw of handle 21 is also provided in the form of a projection 23 on frame 10, the enlargement formed by the projection being preferably

utilized also for journaling the handle 21 on the frame. Said projection extends into the path of link 22, the latter engaging said projection and preventing a continuation of the rotation of handle 21 on its pivot immediately after the joint between said handle and link passes across the center of the connection between the link and stem 11. The several parts are thus locked in position with the valve spring compressed, leaving both of the operator's hands free to perform any work desired.

What is claimed is:

1. In a valve spring compressor, the combination of a frame, a stem slidably mounted in the frame, an arm secured in the frame and adapted to engage the valve spring, and means for moving the frame on the stem comprising a handle pivoted on the frame and a link pivotally connected to both the handle and the slidable stem, the pivotal connection between the handle and link being movable across the center of the connection between said link and stem, and means on the frame for limiting the rotation of the handle.

2. In a valve spring compressor, the combination of a frame, a stem slidably mounted in the frame, a valve spring engaging arm adjustably secured in the frame, and means for moving the stem in the frame comprising a handle pivoted intermediate its ends on the frame and a link pivotally connected to one end of the handle and to the slidable stem, the pivotal connection between the link and handle being movable across the center of the pivotal connection between the link and stem.

3. In a valve spring compressor, the combination of a frame, a stem slidably mounted in the frame, an L-shaped arm adjustably secured in the frame and adapted to engage a valve spring, and means for moving the stem in the frame comprising a handle pivoted intermediate its ends on the frame and a link pivotally connected at its ends to the handle and to the stem, the pivotal connection between the handle and link being movable transversely of the center of the pivotal connection between said link and stem.

4. In a valve spring compressor, the combination of a frame, a stem slidably mounted in the frame, an L-shaped arm carried by the frame and adapted to engage the valve spring, means for moving the stem in the frame comprising a handle pivoted on the frame and a link pivotally connected at its ends to the handle and to the stem, the pivotal connection between the handle and link being movable transversely of the center of the connection between said link and stem, and a stop on the frame co-operating with said link for limiting the movement of the handle.

5. In a valve spring compressor, the combination of a frame, a stem slidably mounted in the frame, an enlargement formed on the stem, a spring surrounding said stem and engaging the enlargement and the frame, a valve spring engaging arm carried by the frame, and means for moving the stem in the frame against the tension of said spring comprising a handle pivoted on the frame and a link pivotally connected to the handle and to the stem, the pivotal connection between the handle and link being movable across the center of the pivotal connection between said link and stem.

NORMAN A. LANDIS.