May 16, 1933. W. F. PIOCH 1,908,785

VALVE SPRING COMPRESSOR

Filed May 27, 1932

FIG. 1

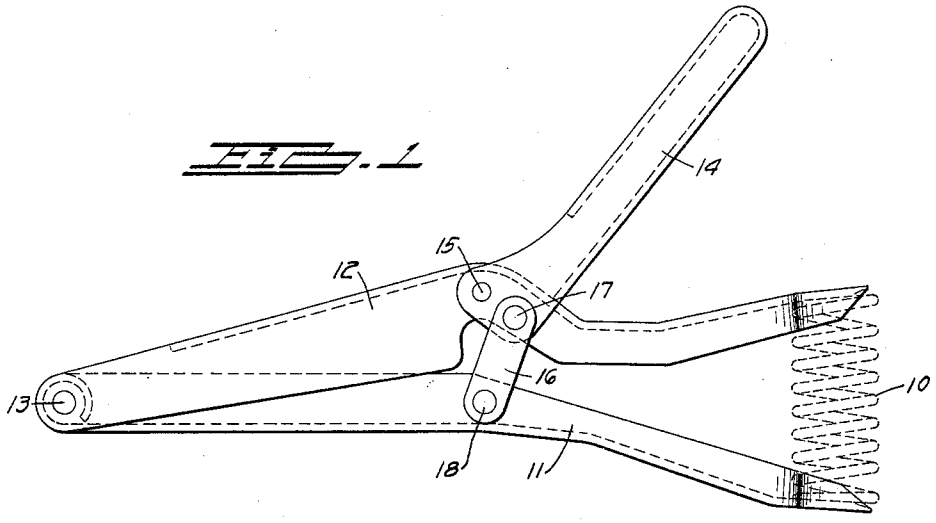


FIG. 2

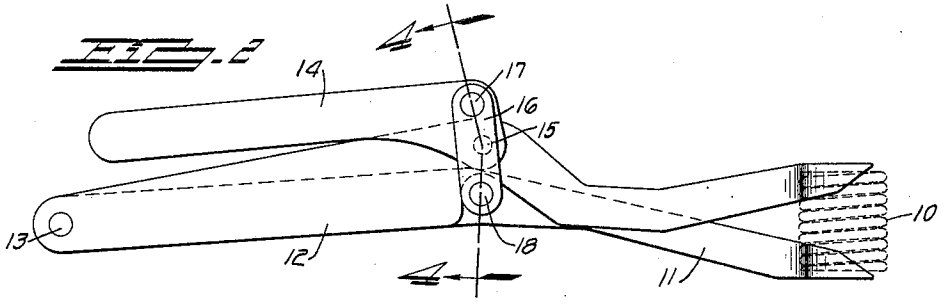


FIG. 3

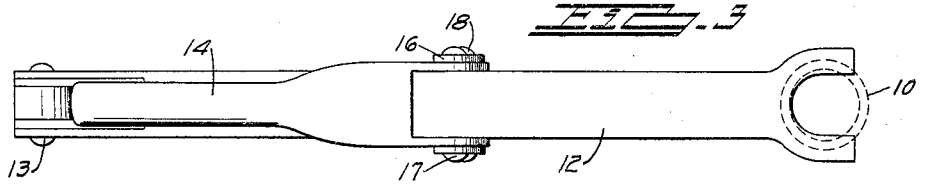


FIG. 4

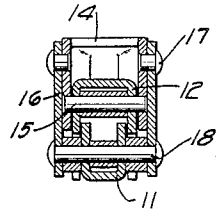
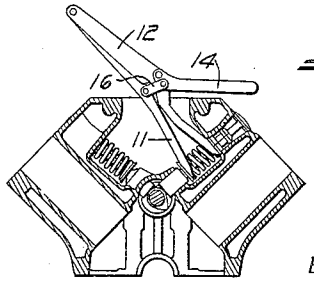


FIG. 5



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UNITED STATES PATENT OFFICE

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VALVE SPRING COMPRESSOR

Application filed May 27, 1932. Serial No. 613,977.

The object of my invention is to provide an improved tool whereby valve springs associated with internal-combustion engines can be readily compressed so that the spring retaining collar may be readily installed or removed to assemble or remove the valve from the engine. This device is especially adapted for use in connection with V-type motors wherein the valves are located in the V-shaped chamber between the two banks of cylinders. It is well known that on such types of engines the ordinary valve spring compressor is very cumbersome. My improved tool is designed so that it may be readily inserted into this narrow valve chamber and be in convenient position for operation.

A further object of my invention is to provide a valve spring compressor which is self-locking so that when the valve spring has been compressed the device will automatically lock itself in the compressed position. The compressor and valve spring may then be handled as a unit with one hand, leaving the other free to insert the valve and valve spring retaining collar.

Still a further object of my invention is to provide a valve spring compressor which will protect the operator from the injury so common with devices of this class, i. e. that of squeezing the operator's fingers between the two arms which are provided for compressing the valve spring.

With these and other objects in view, my invention consists in the arrangement, construction and combination of the various parts of my improved device, as described in the specification, claimed in my claims and illustrated in the accompanying drawing, in which:

Figure 1 shows a side elevation of my improved device in its open or inoperative position.

Figure 2 shows a side elevation of the device in its closed position.

Figure 3 shows a top view of the device in the position shown in Figure 2.

Figure 4 shows a sectional view, taken on the line 4—4 of Figure 2, and

Figure 5 shows a sectional view through a V-type motor, illustrating the convenience with which my valve spring compressor may be utilized.

Referring to the accompanying drawing, I have illustrated an ordinary helical valve spring which this tool is designed to compress by dotted lines 10. In order to compress this spring, a lower arm member 11 is provided having a channel section, and likewise a second arm 12 is provided which is also of channel shape but of somewhat greater width than the arm 11 so that the arm 11 may lie within the side members of the other second arm 12. The rear ends of each of these channels are pivotally connected by means of a pin 13, while the free ends of both of these arms are formed as forks so that they may be conveniently pushed between the ends of the spring and the valve chamber walls.

In order that these two arms may be conveniently squeezed together, I have provided a toggle arrangement comprising a handle 14 which is pivotally connected to the intermediate portion of the arm 12 by means of a pin 15 and which handle is provided with a pair of links 16 one pair of ends of which are pivotally connected by rivets 17 to the respective sides of the handle in position spaced laterally from the pivot pin 15. The free ends of these links are pivotally connected by a pin 18 to the intermediate portion of the arm 11. Thus, I have provided a toggle which upon oscillation of the handle 14 towards the pivot end of the arms 11 and 12, will rock the pivot 15 to position just beyond dead center between the pivots 17 and 18.

It will be noted from Figure 2 that that portion of the arms 11 and 12 between the toggle device and their forked ends are formed so as to enter into each other so that the space required to operate the compressor is very limited. These two arms telescoping into each other allow the tool to be maneuvered around more readily in a limited space than is possible with any other compressor with which the applicant is familiar. It will further be noted that that portion of the arm 12 between the toggle and the pivot 13 extends down over the outside of the arm 11 so that even when the device is in its open position, it

will be practically impossible for a person to squeeze his fingers in this portion of the device.

Among the many advantages arising from the use of my improved device, it may be well to mention that I have provided a valve spring compressor which may be conveniently operated in the limited space available between the cylinder blocks of V-type motors and which in its closed position will be locked so that the device may readily be manipulated with one hand.

Some changes may be made in the arrangement, construction and combination of the various parts of my improved device without departing from the spirit of my invention and it is my intention to cover by my claims such changes as may reasonably be included within the scope thereof.

I claim as my invention:

1. In a tool of the class described, a pair of arms having one pair of adjacent ends pivotally connected together and having their opposite ends forked to receive the respective ends of a valve spring, said arms being of channel shaped cross section and so arranged that the flanges thereof will overlap, a handle pivotally connected to the intermediate portion of one of said arms, and a toggle link having one end thereof pivotally connected to said handle at a point laterally spaced from the pivot of said handle and having its other end pivotally connected to the intermediate portion of said other arm, said toggle link being so located that oscillation of the handle toward the pivoted ends of said arms will swing said toggle link over center and thereby draw said arms toward each other and lock them in their closed positions.

2. In a tool of the class described, a pair of arms having one pair of adjacent ends pivotally connected together and having their opposite ends forked to receive the respective ends of a valve spring, said arms being of channel shaped cross section and each of a width different from the other so that one arm will enter within the channel of the other, a handle pivotally connected to the intermediate portion of the outer one of said arms, and a pair of toggle links pivotally connected to the respective sides of said handle at points laterally spaced from and axially aligned with the pivot of said handle and having their other ends pivotally connected to the intermediate portion of said other arm, said toggle link pivots being so located that oscillation of the handle toward the pivoted ends of said arms will swing the handle pivot across the center line of said toggle links to thereby draw the arms together and lock them in their closed positions.

3. In a tool of the class described, a pair of arms having one pair of adjacent ends pivotally connected together and having their opposite ends forked to receive the respective ends of a valve spring, one of said arms being of channel shaped cross section of such size that the other arm will lie within said channel, a handle pivotally connected to the intermediate portion of one of said arms, and a toggle link actuated by said handle adapted to swing said arms toward and from each other, that portion of the channel shaped arm between said toggle and the arm pivots having its flanges of such depth that they overlap the other arm both when the arms are separated and when they are together.

4. In a tool of the class described, a pair of arms having one pair of adjacent ends pivotally connected together and having their opposite ends forked to receive the respective ends of a valve spring, said arms being of channel shaped cross section with the arms of said channels overlapping, a handle pivotally connected to the intermediate portion of one of said arms, and a toggle link mechanism actuated by oscillating said handle toward the pivoted ends of said arms, thus drawing the arms toward each other to a closed position, the channel flanges of those portions of the arms between the toggle mechanism and the pivoted ends thereof being dimensioned so that they overlap each other when the device is both opened and closed.

5. In a tool of the class described, a pair of substantially parallel arms having one pair of adjacent ends pivotally connected together and having their opposite ends forked to receive the respective ends of a valve spring, said arms being of channel shaped cross section and each of a width different from the other so that one arm will lie within the channel of the other, a handle pivotally connected to the intermediate portion of the outer of said arms, a pair of toggle links pivotally connected to the respective sides of said handle at points laterally spaced from and axially aligned with the pivot of said handle and having their other ends pivotally connected to the intermediate portion of the other of said arms, said toggle link pivots being so located that oscillation of the handle toward the pivoted ends of said arms will swing the handle pivot across the center line of said toggle to thereby lock the device in its closed position, the channel flanges of those portions of the arms between the toggle mechanism and the pivoted ends thereof being dimensioned so that they overlap each other when the device is both opened and closed.

WILLIAM F. PIOCH.