

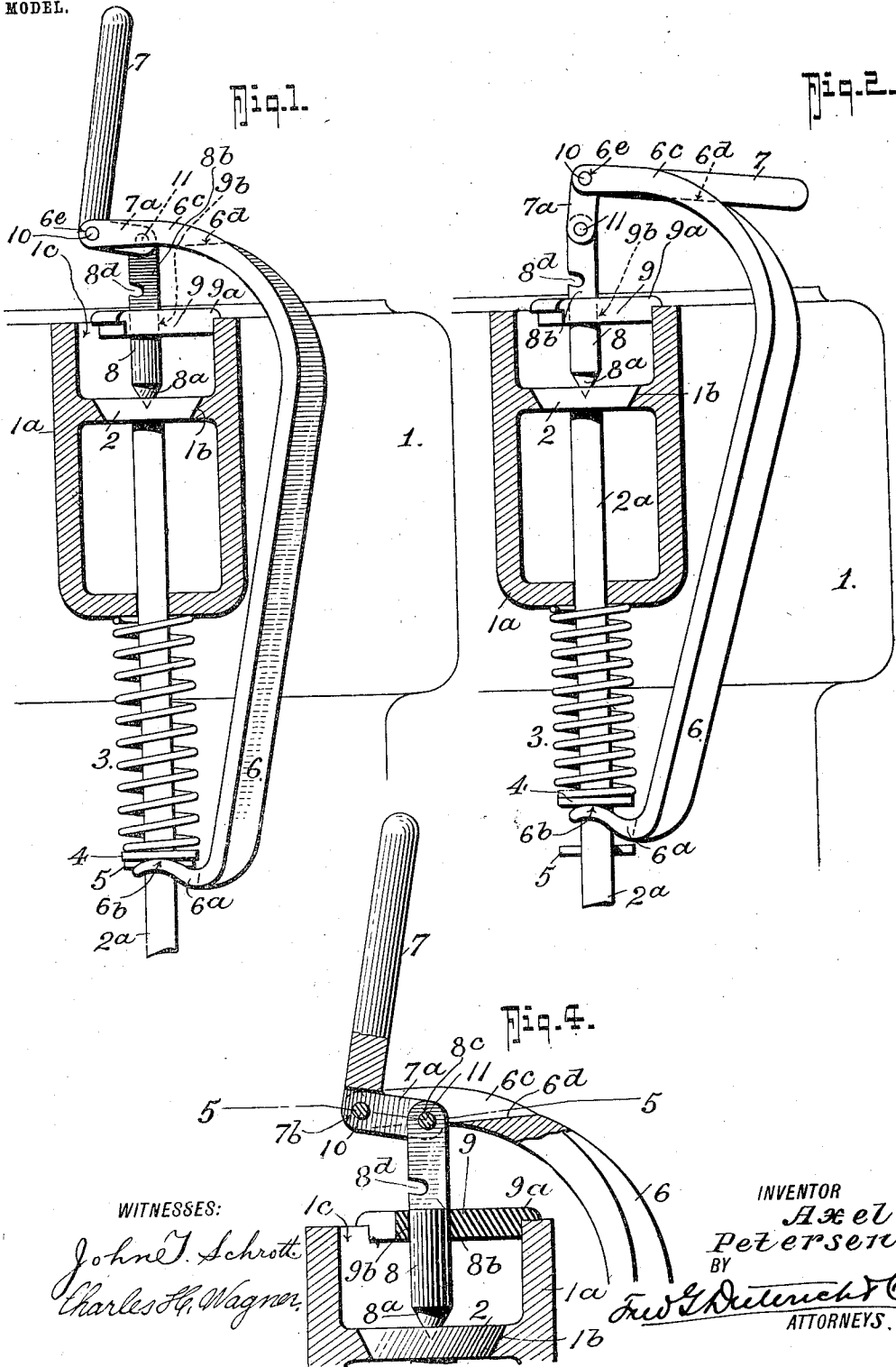
A. PETERSEN.
VALVE SPRING COMPRESSOR.
APPLICATION FILED MAR. 21, 1910.

Patented Dec. 10, 1912.

2 SHEETS-SHEET 1.

1,046,638.

MODEL.



WITNESSES:

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Charles H. Wagner

INVENTOR

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Fig. 3.

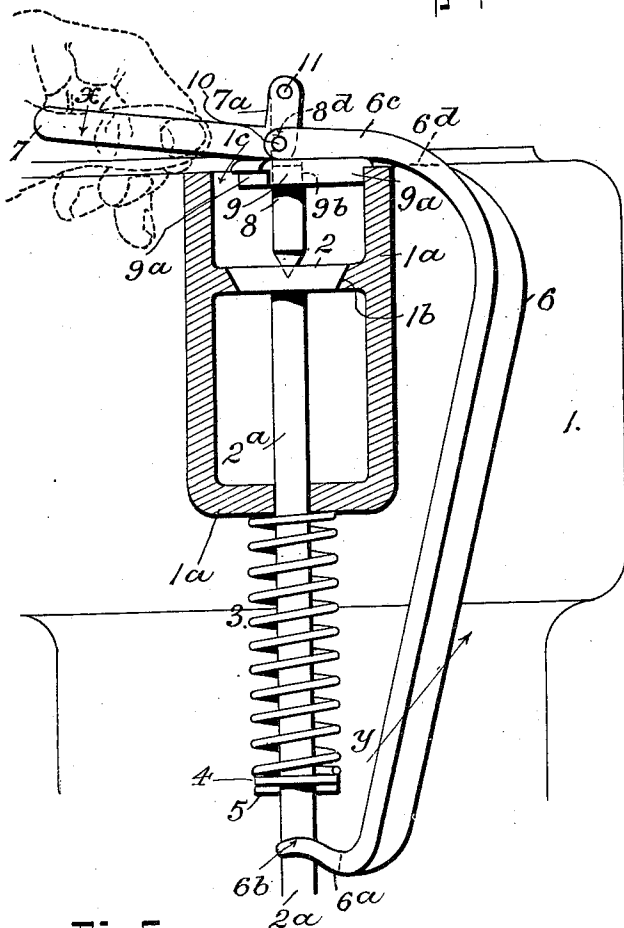


Fig. 5.

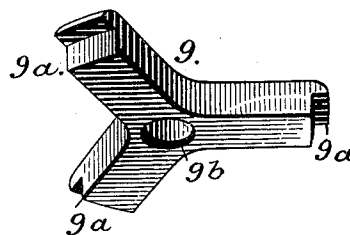


Fig. 7.

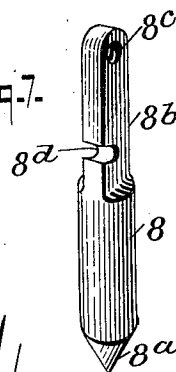
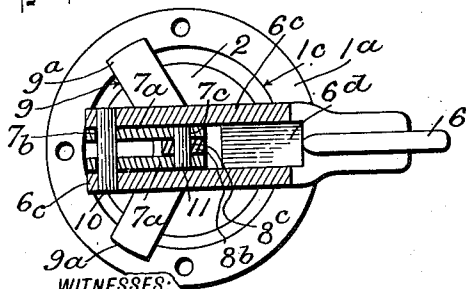


Fig. 5.



WITNESSES:

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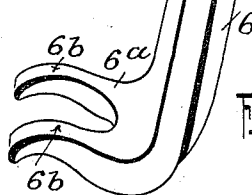


Fig. 8.

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AXEL PETERSEN, OF NEW YORK, N. Y.

VALVE-SPRING COMPRESSOR.

1,046,638.

Specification of Letters Patent.

Patented Dec. 10, 1912.

Application filed March 21, 1910. Serial No. 550,798. (Model.)

To all whom it may concern:

Be it known that I, AXEL PETERSEN, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Valve-Spring Compressors, of which the following is a specification.

My invention is a new and useful tool for use in removing or repairing the valves of internal combustion engines and other types of engines.

In the art as practised today, a large number of engines, particularly those of the four-cycle internal combustion type, are provided with valves for governing the intake and exhaust of the working agent. The valves often become scratched, clogged or otherwise injured, due to over-heating and the depositions of soot and the like, after they have been in use for a greater or less length of time, making it necessary to remove such valves from their chambers for regrinding the valve or valve seat or for making other repairs. As the valves usually have an exposed stem that carries a spring by means of which the valve is held in a seated or in a predetermined position and as the spring is operatively connected with the stem by engaging a collar or disk on the stem, that is held in place by a key that projects through the stem and against which the disk is held by the spring, the pressure of the spring on the key must be relieved before the key can be conveniently, rapidly and safely removed so that the valve may be withdrawn from its chamber.

My invention therefore has for its object to provide an improved quick and positively acting, convenient and self-sustaining tool for compressing the spring to relieve its force on the valve stem key and also to hold the valve from movement during the time the key is being removed or inserted.

The invention includes those novel details of construction, combination and arrangement of parts, all of which will be first fully described, and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which:

Figure 1, is a side elevation and part section of a part of an internal combustion engine and one of its valves showing the invention in position ready to compress the

valve spring. Fig. 2, is a similar view, the valve spring being compressed to relieve the pressure on the key. Fig. 3, is a view similar to Figs. 1 and 2, showing how the device may be readily placed in position and removed from its operative position by one hand. Fig. 4, is an enlarged detail vertical longitudinal section of the upper part of the device. Fig. 5, is a detail cross section on the line 5-5 of Fig. 4. Fig. 6, is a detail inverted perspective view of the spider that guides and supports the valve head engaging pin. Fig. 7, is a detail perspective view of the centering pin. Fig. 8, is a detail perspective view of the lower end of the clamp member.

Referring now to the accompanying drawings in which like letters and numerals of reference indicate like parts in all of the figures, 1 designates the engine cylinder, 1^a the valve casing walls within which the valve seat 1^b is located, and 1^c designates the hole in the wall 1^a through which the valve 2 may be inserted or withdrawn, it being understood that in the operation of the engine, the hole 1^c is covered by a suitable cap plate, not shown. The valve 2 rests on the seat 1^b and has a stem that projects through the wall 1^a at its bottom and carries a spring 3, one end of which engages the valve casing 1^a and the other end engages a disk or washer 4 on the valve stem 2^a, which washer is held in position by a key 5 that projects through the valve stem 2^a.

6 is the clamp beam which forms a part of my invention, and which is provided at its lower end with a fork 6^a, the upper surface of which is curved as at 6^b, to have a rolling bearing against the disk 4 when the device is in use. The beam 6 at its upper end is provided with a fork 6^c having apertures 6^d through which the pivot pin or bolt 10 passes. The beam 6 at the upper fork 6^c has a flat bearing surface 6^d between the fork arms for a purpose hereinafter to appear.

7 is a bell crank lever which is provided with a forked short arm section 7^a having an aperture 7^b for the pin or bolt 10 and having a second aperture 7^c to receive another pin or bolt 11, through the medium of which the lever section 7^a is joined with the valve head engaging pin 8. The pin 8 consists of a cylindrical body portion whose

lower end is coned as at 8^a and whose upper section is flat, as at 8^b to enter the fork 7^a of the lever 7. The flat part 8^b of the pin 8 has its upper end apertured at 8^c to receive the coupling pin 11 and connect the pin 8 with the lower end of the lever section 7^a. The flat portion 8^b of the pin 8 is notched at 8^d for a purpose hereinafter clearly apparent.

9 is a spider flanged at 9^a to fit into the aperture 1^c of the valve casing, and the spider 9 has a central hole 9^b bored to receive the pin 8. In practice the flat portion 8^b of the pin 8 works in the fork 7^a of the lever 7 while the lever 7 works in the fork 6^c of the beam 6.

When it is desired to use the invention to remove a valve, the cap over the aperture 1^c of the valve casing is removed, the pin 8 is projected through said aperture and the spider 9 is put into position. The lever 7 may then be in the position shown in Figs. 3 or 1 of the drawings. When the lever is in either of these positions, the beam 6 is adapted to have its lower forked end 6^a slipped beneath the disk 4, after which, by moving the lever from the position shown in Fig. 1 to the position shown in Fig. 2, the disk 4 will be lifted off of the key 5, and the spring 3 compressed. At the same time the pin 8 will be held against the valve head 2 to hold it seated while the key 5 is being removed and replaced. It will be noted that when the spring is compressed and the parts are positioned as shown in Fig. 2 of the drawings the lever 7 rests on the bearing surface 6^d of the beam and at this time the pivot pin or bolt 10 will lie in a position to one side of the longitudinal axis of the valve stem and pin 8 so that the force of the spring 3 will automatically serve to hold the lever 7 in the position shown in Fig. 2, and lock the device, as it were, to the engine so that the operator may have both hands free for work. To remove the device it is only necessary to draw the lever 7 from the position shown in Fig. 2 to the position shown in Fig. 1 when the beam 6 may be grasped and pulled off or the operator may move the lever 7 from the position shown in Fig. 2 to the position shown in Fig. 3, which causes the pin 10 to enter the notch 8^d and interlock the parts, as it were. Thus by rocking the lever 7, while in the position shown in Fig. 3 in the direction of the arrows $x-y$, and at the same time lifting the device, the lower end 6^a of the beam 6 may be swung clear of the disk 4 to permit the valve members to assume their operative relation.

From the foregoing description taken in connection with the accompanying drawings it is thought the complete construction, operation and advantages of my invention will be readily understood by those skilled

in the art to which the invention appertains.

What I claim is:

1. A device of the character stated comprising a clamp beam having a forked lower end to straddle a valve stem and engage the spring abutment disk on said stem, said beam having its upper end forked, a bell crank lever, pivotal connections between said upper forked end and said bell crank lever, a spider insertible in the hole in the valve casing through which the valve is removable, and a valve engaging pin projected through said spider and pivotally connected to said lever.

2. A device of the character stated comprising a clamp beam having a forked lower end to straddle a valve stem and engage the spring abutment disk on said stem, said beam having its upper end forked, a bell crank lever, pivotal connections between said upper forked end and said bell crank lever, a spider insertible in the hole in the valve casing through which the valve is removable, and a valve engaging pin projected through said spider and pivotally connected to said lever, said lever having a forked portion and said pin having a flattened section to enter said forked portion.

3. A device of the character stated comprising a clamp beam having a forked lower end to straddle a valve stem and engage the spring abutment disk on said stem, said beam having its upper end forked, a bell crank lever, pivotal connections between said forked end and said bell crank lever, a spider insertible in the hole in the valve casing through which the valve is removable, a valve engaging pin projected through said spider and pivotally connected to said lever, said lever having a forked portion and said pin having a flattened section to enter said forked portion, and said pin having a notch to receive the pivot pin that connects said lever with said beam when said lever is in a predetermined position.

4. A device of the character described comprising an integrally formed beam having a lateral projection at one end to engage a valve spring, and having its other end curved over in the same general direction as the direction of said lateral projection, a lever actuated member for engaging the valve head and moving said beam to compress said spring, said beam including means cooperative with said lever for holding the valve head engaging member immovable while said spring is compressed.

5. A device of the character stated comprising a beam having a laterally projected fork at one end to engage a valve spring, said beam having its other end curved to project over the top of a valve casing, said other end being forked, a lever pivoted in said last named forked end and having a

short portion, a rod pivoted to said short portion to engage a valve head to hold it immovable during the compression of the spring, and a member insertible into the valve casing to hold said rod in alinement with the valve stem during the operation of compressing the valve spring.

6. A valve spring compressing device comprising a straight beam having an integrally formed laterally projecting fork at one end and having an integrally formed lateral projection at the other end of greater length than the length of said fork, said fork being projectable beneath the valve spring and said projection at the other end of said beam being projectable over the valve casing, a lever pivoted to the end of said second named lateral projection, a valve engaging pin or rod pivoted to said lever to engage the valve head, all being so arranged that when said lever is moved from one position to another said beam will be moved to compress said valve spring, and means for maintaining said rod or pin in alinement with the valve stem.

7. A valve spring compressing device that comprises a beam having provisions for engaging beneath the valve spring and projecting above the valve casing, a member adapted to be fitted over the valve casing and to be projected into the open end of the same, said member having an opening in alinement with the valve stem, a pin adapted to be held in said opening in contact with the valve head, a lever fulcrumed on said beam and pivoted to said pin to cause said

beam to be moved to compress or release said valve spring accordingly, as said lever is in one position or another.

8. A device of the character described comprising a beam having one end provided with a laterally projected valve spring engaging member, and having its other end shaped to project over a valve casing, a lever pivoted to said projecting end, a valve head engaging member pivoted to said lever, a guide for said valve head engaging the member, said lever being movable to bring its pivotal connection with the beam above and to the beam side of the valve head engaging member to compress the valve spring, and means for limiting the movement of said lever to retain the parts in the compressing position and thereby hold the device in place.

9. A device of the character described comprising a beam having a lateral projection at one end to engage a valve spring, and having its other end curved over in the same general direction as the direction of said lateral projection, a lever actuated member for engaging the valve head and moving said beam to compress said spring, said beam including means cooperative with said lever for holding the valve head engaging member immovable while said spring is compressed.

AXEL PETERSEN.

Witnesses:

C. V. RIEDE,
W. S. MILLER.