H. L. BERMAN.

KEY PLACING AND REMOVING TOOL.

APPLICATION FILED MAY 8, 1920.

1,421,152. Patented June 27, 1922.

Fig. 1.

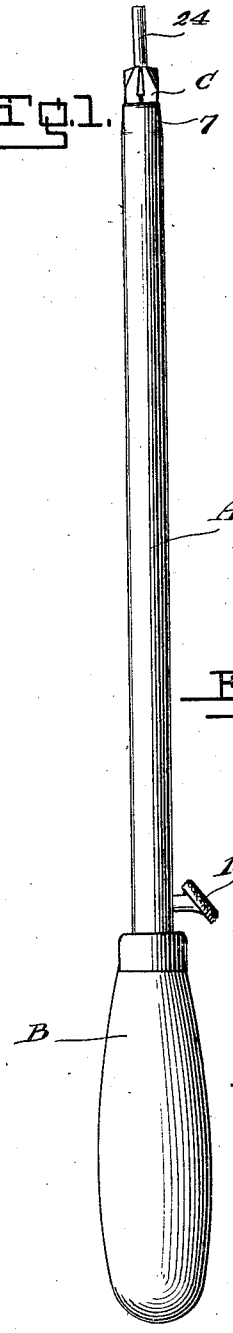


Fig. 3.

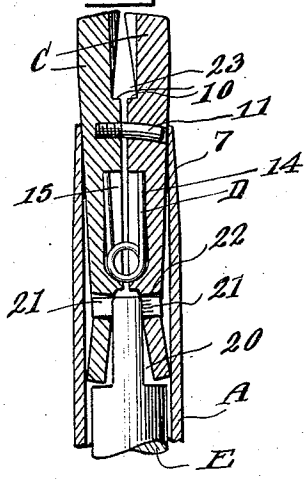


Fig. 4.

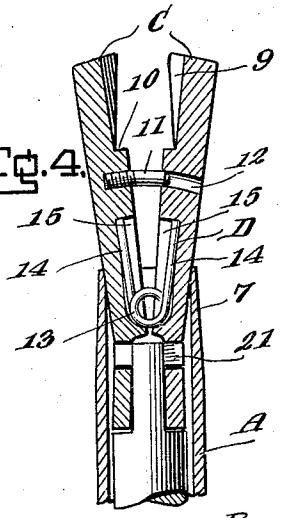


Fig. 5.

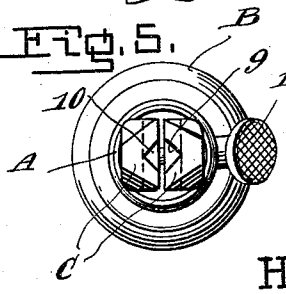


Fig. 2.

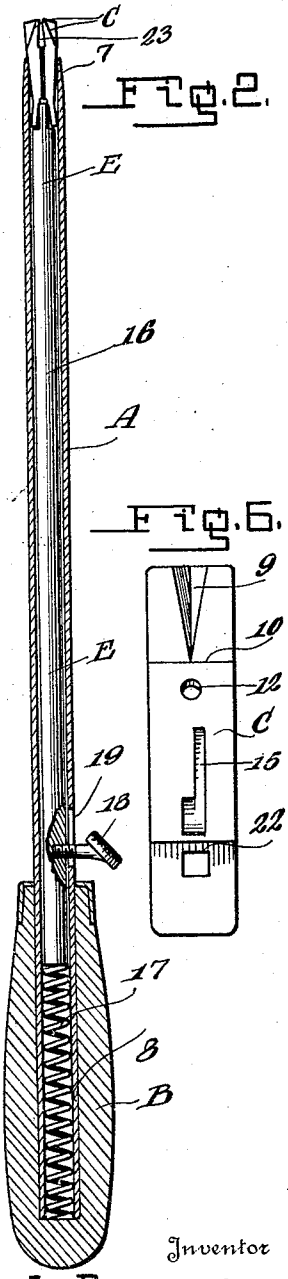


Fig. 6.

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UNITED STATES PATENT OFFICE.

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KEY PLACING AND REMOVING TOOL.

1,421,152. Specification of Letters Patent. Patented June 27, 1922.

Application filed May 8, 1920. Serial No. 379,936.

To all whom it may concern:

Be it known that I, HARRY L. BERMAN, a citizen of the United States, residing at Roxbury, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Key Placing and Removing Tools, of which the following is a specification.

The present invention relates to tools and more particularly to such adapted to facilitate the placing and removal of keys or pins used in machinery to limit movement of one element with respect to another or to cause the elements to move in unison.

While the invention is particularly well adapted for use in the placing and removal of keys, or pins, such as are used in connection with the intake and exhaust valves of internal combustion engines, where the valve spring seat is held into operative relation to the valve stem, the tool may be used for other purposes where it is desirable to grasp a relatively small key or pin and guide it into or out of operative relation to an element or elements.

The principal objects of the invention are to provide a tool which may be quickly operated to effectively hold or release the key or pin; a tool well adapted to facilitate the placing and removal of a key or pin, especially where there are other elements in close proximity to that for which the key or pin is adapted, and where it is practically impossible to get at the work by hand or by tools of an ordinary character; and, a tool adapted to hold keys or pins of different shapes, sizes, etc. In this connection, it is pointed out that keys or pins of this character are usually rectangular in cross section, circular in cross section, or are of U-shape, the stems of the U-shaped key being received by slots cut laterally in the valve stem.

Other objects and advantages of the invention are to provide a tool which is simple in construction and assemblage and which will remain in good repair for a considerable length of time, and a tool which may be operated, held in one hand of the user and operated by the thumb or a finger of the holding hand.

Further objects and advantages of the invention will appear in the following detailed description, taken in connection with the accompanying drawings, forming a part of this specification, and in which drawings:

Figure 1 is a plan view of a tool embodying the principle of the invention, showing a key or pin gripped thereby.

Figure 2 is a central longitudinal sectional view through the same.

Figure 3 is a fragmentary enlarged sectional view of the gripping end portion of the tool, showing the jaws in a closed position.

Figure 4 is a similar view showing the jaws in an open position.

Figure 5 is an end view of the tool looking toward the jaw ends.

Figure 6 is an elevation of one of the jaws looking toward that face which in practice confronts a similar face of the other jaw.

In the drawing, where similar characters refer to similar parts throughout the views, A designates a relatively long main body portion, preferably of tubular formation; B a handle at one end portion thereof; C a pair of co-acting jaws; D a device for normally urging said jaws away from one another; and E means for imparting movement to said jaws.

The main body portion A may be conveniently formed from a piece of tubular material and is made relatively long so that it may be readily moved between closely spaced elements, so as to get at "out of the way" places, such as between piping, shafting, pumps, etc., which are so often in close proximity to elements adapted to receive keys or pins. This main body portion is tapered exteriorly at one end, as indicated at 7 so that the line of vision may be directed along the tapered surface of the body and converge at a relatively small acute angle forwardly of and at the axis of the tool, thereby permitting the operator to see the action of the jaw C and their cooperation with an element to be engaged thereby.

The handle B may receive the end portion of body A opposite to its tapered portion, as by being provided with bore 8 in which said end portion of the body A closely fits. This handle is provided so that a person may firmly grasp the tool in one hand and operate elements thereof, as hereinafter described.

The jaws C are adapted to move toward and from one another and with their con-

fronting faces so formed as to provide on each confronting face a substantially V-shaped groove 9 extending longitudinally of the jaw to receive and grip keys of angular or circular cross section longitudinally of the jaws, this groove terminating at an abutment 10. The confronting faces are so formed as to be in diverging relation from the outer ends of the jaws, inwardly, when the jaws are in close relation, as clearly shown in Figure 3 of the drawing, so as to grip the base of U-shaped keys transversely of the jaws. If desired an arcuate guide pin 11 may be carried by one of the jaws extending from its face confronting the other jaw, which latter is provided with an arcuate way 12 into which the pin 11 extends.

In the example shown, the device D may consist of an expansion spring or in other words, a spring having a coil 13 and stems 14 extending tangentially from the coil, these stems and portions of the coil being received in recess 15 formed in the confronting faces of the jaws.

The means E is provided for imparting movement to the jaws so as to effectively grip or release the key or pin and in the example shown comprises a rod 16 reciprocable in the bore of the main body A; and expansion spring 17 at the handle end portion of the tool; and a finger piece 18 carried by the rod 16 and extending exteriorly of the body A, as through slot 19 into close proximity to the handle B. The coil spring 17 may abut against the end portion of rod 16 and the end of the bore 8 of handle B, thus urging the rod 16 toward end portion of body A, but limited in its movement by finger piece 18 engaging the end of slot 19 as is obvious from an inspection of the drawings. In order to operatively connect the rod 16 with the jaws C, the end portion of the rod opposite to the handle is reduced laterally, as indicated at 20, wherein the inner end portions of the jaws C may rock, oppositely disposed, laterally extending lugs 21 being provided at the reduced end portion of the rod and received in ways 22, formed in the jaws C. These lugs 21 act as a pivot for the jaws.

The spring D urges the jaws into frictional engagement with the bore of body A so that when they are retracted from the position shown in Figure 4 they move toward one another so as to effectively grip a key or pin, no matter whether the same is rectangular in cross section, circular in cross section or of U-shape, as hereinbefore described. If the pin extends longitudinally of the jaws as shown in Figure 1 its end portion engages abutment 10 thus aiding in forcing the pin into place. If a U-shaped pin or key is used the base of the pin or key may be received in the space indicated at 23 engaging the abutment 10 when being forced into place and readily pulled out, when removal is desired, by the formation of the confronting faces diverging, as hereinbefore described.

Changes in details may be made without departing from the spirit or scope of my invention; but,

I claim:

1. A tool for placing and removing keys comprising in combination, a main body portion having a bore, a pair of cooperating jaws extending into the bore of said main body portion longitudinally of the axis thereof, said jaws having their confronting faces each provided with a substantially V shaped groove extending longitudinally of the jaw to receive and grip keys of angular or circular cross section, longitudinally of the jaws, said confronting faces being in diverging relation from the exposed end portions of the jaws, inwardly, when the jaws are in close relation to grip the base of U-shaped keys transversely of the jaws, and means for operating said jaws.

2. In a tool for placing and removing keys, the combination of a pair of cooperating jaws movable toward and from each other, said jaws having their confronting faces each provided with a substantially V-shaped groove extending longitudinally of the jaw to receive and grip keys of angular or circular cross section longitudinally of the jaws, said confronting faces being formed so as to be in diverging relation from the end portion of the jaws inwardly, when the jaws are in close relation, to receive and grip the base of U-shaped keys transversely of the jaws, and means for moving said jaws toward and from each other.

3. In a tool for placing and removing keys, the combination of a pair of cooperating jaws movable toward and from each other, said jaws having their confronting faces each provided with a substantially V-shaped groove extending longitudinally of the jaw from the end inwardly and terminating at an abutment, to receive and grip keys of angular or circular cross section longitudinally of the jaws, said confronting faces being arranged in diverging relation from the end portion of the jaws inwardly, when the jaws are in close relation and terminating at said abutment, to receive and grip the base of U-shaped keys transversely of the jaws and means for moving said jaws toward and from each other.

4. A tool of the class, described, comprising a tubular body portion, a rod reciprocably mounted in the bore of said tubular body, a pair of jaws pivotally mounted on an end of said rod to extend from said tubular body, spring means normally urging said rod and jaws outwardly of said tubular body, and means to force said rod into said body for closing said jaws.

5. A tool of the class described, comprising a tubular supporting body, a handle mounted over one end of said tubular supporting body, a rod snugly and slidably mounted within said tubular body, a pair of jaws pivotally mounted upon an end of said rod to extend adjacent the open end of said tubular body, means normally forcing said jaws apart, an arcuate guide pin mounted in one of said jaws for sliding within a socket in the other of said jaws, a spring disposed in said tubular body adapted for normally forcing said rod and jaws outwardly of said tubular body, and a finger engaging member carried by said rod and extending through a slot disposed longitudinally in the tubular body whereby the rod and jaws may be drawn inwardly of the tubular body for proximate movement of the jaws to grip an article.

HARRY L. BERMAN.