Oct. 10, 1950 C. P. APPLEGATE 2,524,949

VALVE REMOVING MACHINE

Filed Dec. 23, 1946 3 Sheets-Sheet 1

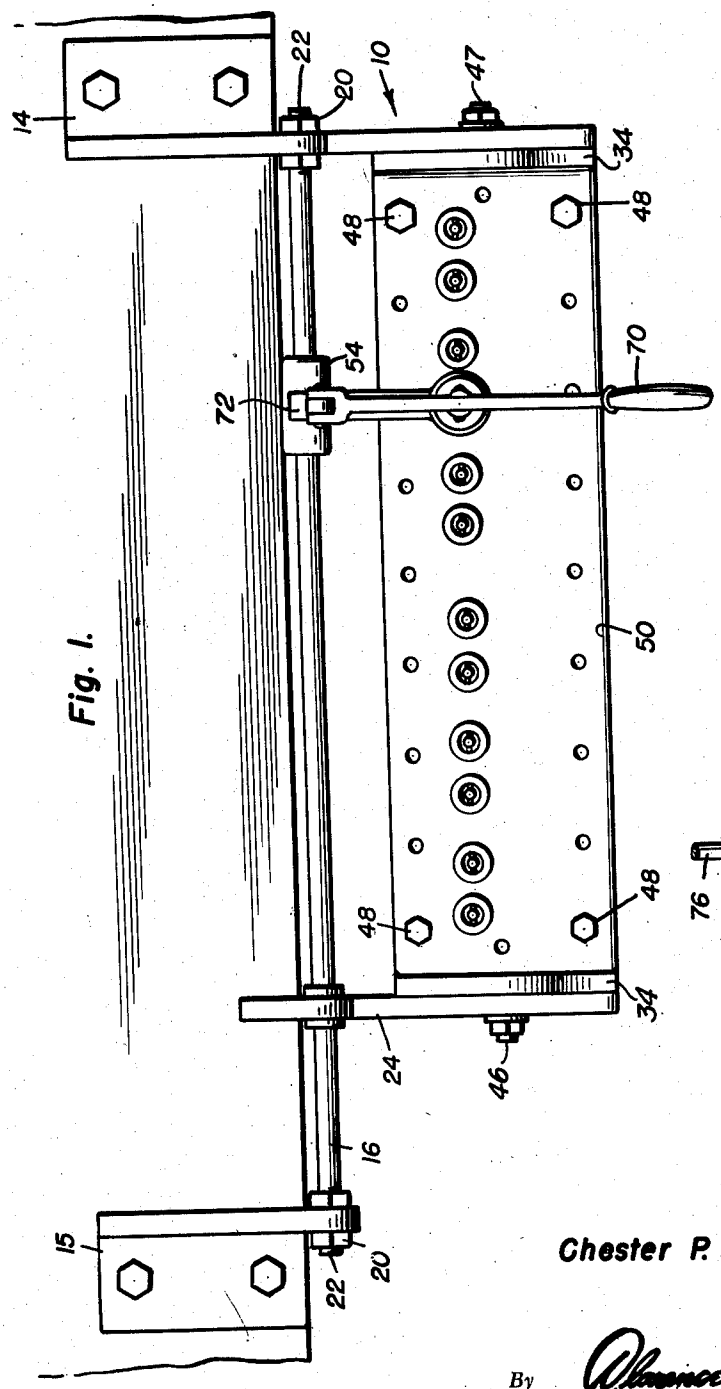


Fig. 1.

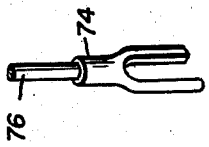


Fig. 7.

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VALVE REMOVING MACHINE

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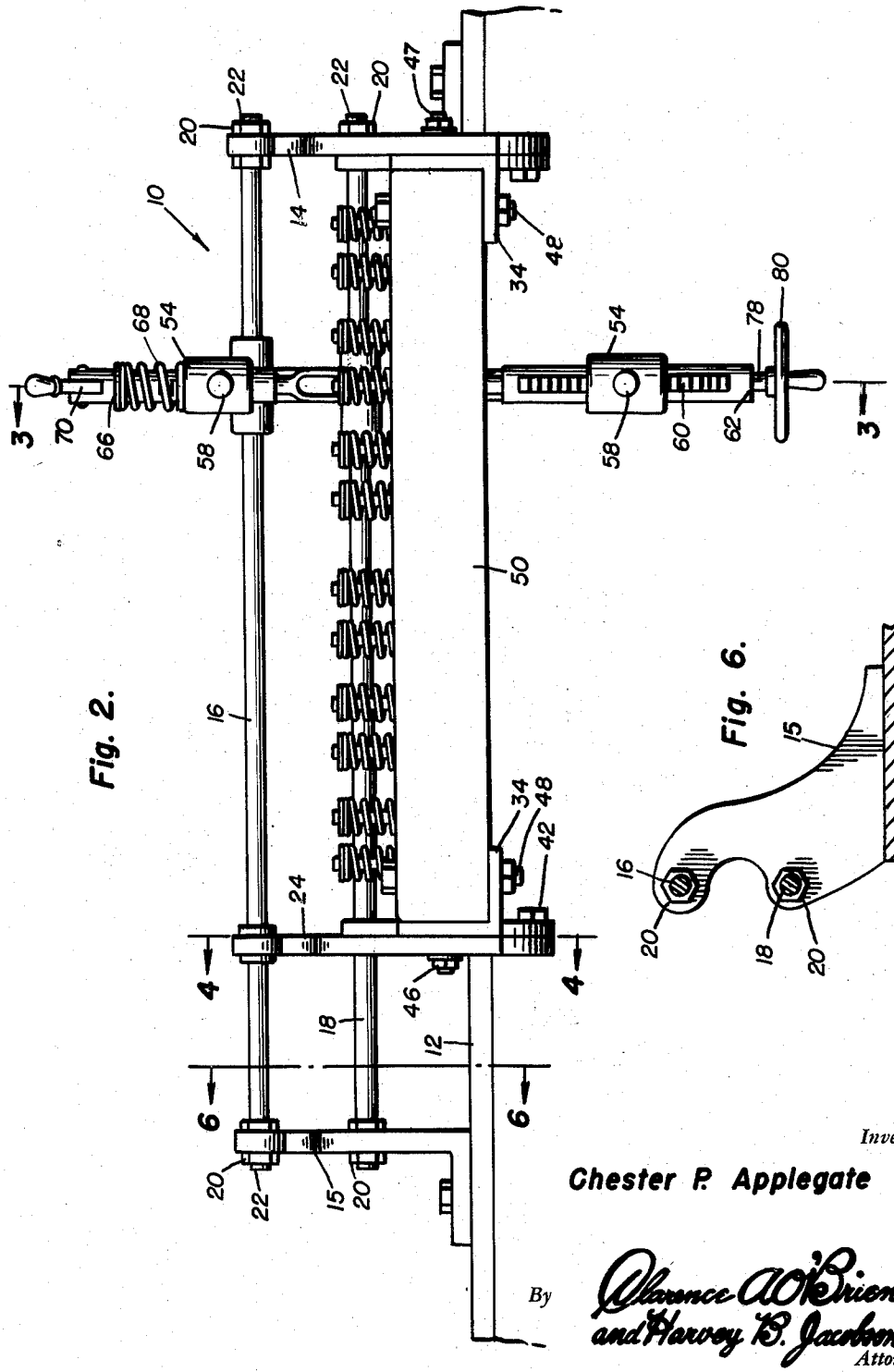


Fig. 2.

Fig. 6.

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VALVE REMOVING MACHINE

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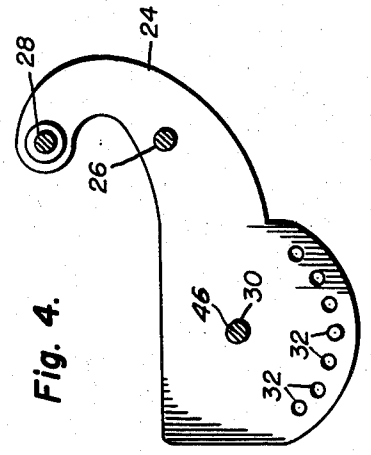


Fig. 4.

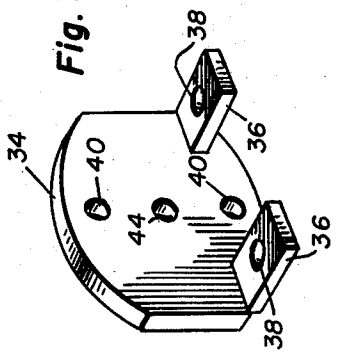


Fig. 5.

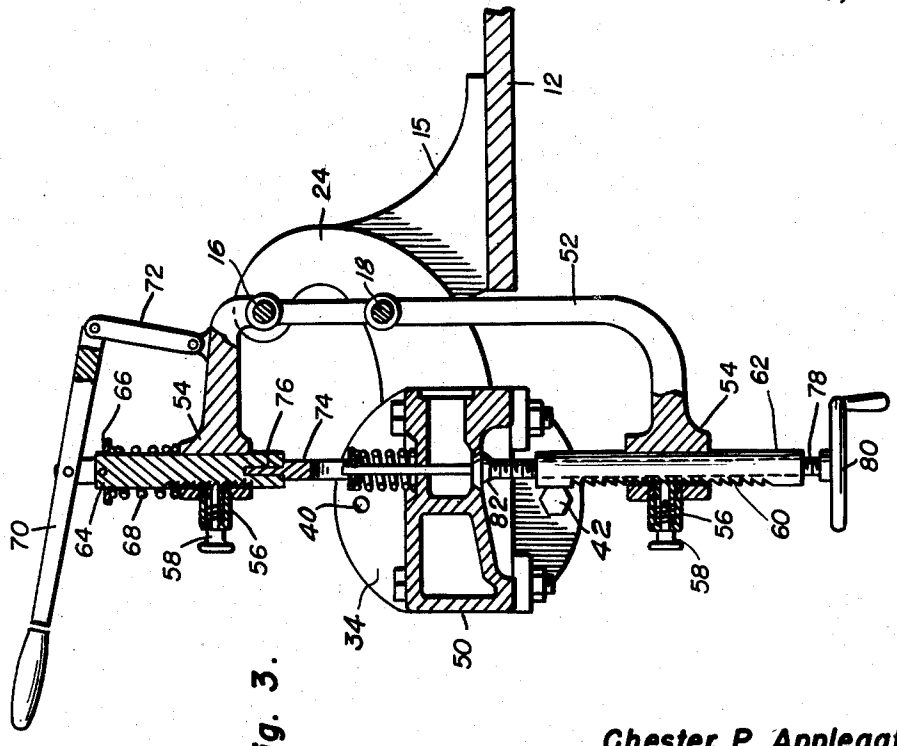


Fig. 3.

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UNITED STATES PATENT OFFICE

2,524,949

VALVE REMOVING MACHINE

Chester P. Applegate, Lakewood, N. J.

Application December 23, 1946, Serial No. 718,062

2 Claims. (Cl. 29—219)

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This invention relates to valve lifting devices and has for its general object to provide means to facilitate the removal of valves from cylinder heads.

Another object of this invention is to provide a bench tool including means for adapting the tool to receive various sizes of cylinder heads.

Another object of this invention is to provide means for tilting the head, thereby making possible the removal of angularly inclined valves.

A still further object of this invention is to provide means for compressing a valve spring and means for holding the valve associated therewith in the compressing operation.

Other objects and features of novelty will be made manifest in the following detailed description, and specifically pointed out in the appended claims, reference being had to the accompanying drawings for a disclosure of the invention, wherein:

Figure 1 is a plan view of a preferred embodiment of the instant invention, showing a conventional cylinder head secured therein;

Figure 2 is an elevational front view of the invention shown in Figure 1;

Figure 3 is a transverse sectional view, partly in elevation, taken substantially on the line 3—3 of Figure 2 and in a direction of the arrows;

Figure 4 is a transverse sectional detail view of a clamp forming part of the instant invention and taken substantially on the line 4—4 of Figure 2 and in the direction of the arrows;

Figure 5 is a perspective view of the angularity varying means used in conjunction with the detail shown in Figure 4;

Figure 6 is a sectional detail showing a clamp forming part of the instant invention and taken substantially on the line 6—6 of Figure 2 and in the direction of the arrows; and

Figure 7 is a perspective view of the valve spring retainer engaging means used in conjunction with the instant invention.

Referring in detail to the accompanying drawings wherein similar reference characters are used to designate similar parts throughout the several views of the invention, the preferred embodiment is generally indicated by the reference character 10. A work bench or table 12 is the recipient of a pair of end plates or members 14 and 15. A pair of rods 16 and 18, respectively, are secured between said brackets, retaining the same in a predetermined fixed relation. Any suitable rod securing means may be used. However, the conventional nuts 20 and end threaded portions 22 are found preferable.

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A bracket 24 having a pair of apertures 26 and 28 therein is slidably received on the said rods 16 and 18. As is seen from an inspection of Figure 4, a third aperture 30 and a plurality of arcuately disposed apertures 32 are also provided in the bracket 24.

A support 34 is provided with a pair of outwardly extending arms 36 having apertures 38 therein. A plurality of apertures 40 are provided in the body of the said support 34. As is apparent from Figures 2 and 4, a pair of the said supports 34 engage the inner faces of the end members 14 and bracket 24. Received in one of the apertures 40 and a selective aperture 32, is a suitable bolt or anchoring means 42. Disposed in the aperture 44 of the said support 34 and through the aperture 30 of bracket 24 is a suitable pivot 46. A bolt 48 is adapted to be received in a stud hole in a conventional cylinder head 50. Obviously, the said bolts 48 are received in the hereinbefore mentioned apertures 38 and thereby rigidly secure the cylinder head to the device. The pivot bolt 47 is disposed in an opening in the end member 14 and in an opening in the other support 34 thereby pivotally mounting this support independently of the support which is pivoted to the bracket 24. It is here noted that by proper selection of apertures 32, the cylinder head may be angularly adjustable, and it is further apparent that by rotation of the said support 34 through an angle of 180°, the bottom portion of the cylinder head is facing upward and readily accessible for repair purposes.

Slidably received on the said rods 16 and 18 and between the said end member 14 and bracket 24 is a jack stand 52 adapted to be selectively positioned between said end member and said bracket. At each end of the jack stand, a bearing 54 is provided with an aperture 56 in the side thereof. A spring loaded ratchet pin 58 is provided in the said aperture for engaging appropriate teeth 60 on shafts 62 and 64. Encircling the said shaft 64 and bearing on a suitable collar 66 is a spring 68 which is received on the said bearing 54, for the purpose of biasing the shaft outwardly. An arm 70, pivotally mounted to the shaft 64, is secured to the said jack stand through the medium of a double pivot link 72.

Referring now to Figure 7, a fork-like member 74 having a reduced shank 76 is adapted to be received in a suitable aperture in the said shaft 64, as seen best in Figure 3.

The function of this portion of the device is quite evident. After a head is secured and set

up in the appropriate brackets and clamps, the lever 70 is pulled downward against the action of the spring 68. The said spring-loaded ratchet pin 58 is secured to said shaft 64 in its depressed position. The fork member 74 engages the conventional valve spring retainer depressing the same and rendering the conventional horseshoe pin accessible. Obviously, upon the release of the said ratchet pin 58, the shaft 64 is moved upward and the spring, desired to be removed, is then ready to be simply picked up.

Diametrically opposite the said shaft 64 is a hollow shaft 62. A similar ratchet pin 58 is received in the said bearing 54 for retaining the said hollow shaft 62 in its desired position. The bore of the said shaft 62 is threaded and a suitable screw 78 is provided therein and is adapted to engage the head of a poppet valve. A wheel 80 is rigidly secured to the other end of the said shaft 78 for driving and securing the said screw against a valve in the said head 50.

It is believed that the operation of the instant invention is now fully set forth. A cylinder head 50 is bolted in the said supports 34. If the valves therein are angularly disposed with respect to each other, the supports 34 may be adjusted as hereinbefore described to properly align the valves with the device. The said jack stand 52 is then slid over the valve which is to be removed, and the lever 70 depressed until the said member 74 lightly contacts the valve spring retainer. This is done in order to be certain that the jack stand 52 is in proper alignment with the valve to be removed. The wheel 80 is then grasped and simply pushed upwardly, thereby carrying the said hollow shaft 62 therewith and locking the same by means of the ratchet pin 58. The said wheel 80 is then turned until the valve head contacting member 82 at the end thereof contacts the head of the valve. The lever 70 is then depressed, the horseshoe pin removed from the valve stem and then the ratchet pin 58 is released, permitting the valve spring to be simply picked off the cylinder head.

While there has been described but a single embodiment of the inventive concept, it is understood that various changes including omissions and additions may be made without departing from the spirit of the invention. Accordingly, limitation is desired only in accordance with the scope of the following claims.

Having thus described the instant invention, what is claimed as novel and improved is as follows:

1. A valve lifter comprising a frame which includes a pair of end members, each having a pair of apertures therein, a pair of parallel rods fixed at their ends to said end members and disposed in said apertures, a bracket slidably disposed on said rods and having a series of apertures therein, supports, means mounting said supports for rotation on said bracket and one of said end members, means disposed in said series of apertures retaining one of said supports in adjusted positions, means fixed to said supports for mounting an engine head, a substantially U-shaped stand slidably disposed on said rods, means for compressing a valve spring disposed at one end of said U-shaped stand including a shaft, a valve spring retainer engaging element disposed at one end of said shaft, a link pivoted to said stand, a lever pivoted to said link and the other end of said shaft, a spring reacting on said stand opposing the operation of said shaft, teeth in said shaft and a keeper carried by said stand disposed between adjacent teeth, and compound adjustable means disposed at the opposite end of said stand for retaining a valve in a substantially stationary position while said shaft is being operated.

2. A valve lifter comprising a frame which includes a pair of end members, each having a pair of apertures therein, a pair of parallel rods fixed at their ends to said end members and disposed in said apertures, a bracket slidably disposed on said rods and having a series of apertures therein, supports, means mounting said supports for rotation on said bracket and one of said end members, means disposed in said series of apertures retaining one of said supports in adjusted positions, means fixed to said supports for mounting an engine head, a substantially U-shaped stand slidably disposed on said rods, means for compressing a valve spring disposed at one end of said U-shaped stand including a shaft, a valve spring retainer engaging element disposed at one end of said shaft, a link pivoted to said stand, a lever pivoted to said link and the other end of said shaft, a spring reacting on said stand opposing the operation of said shaft, teeth in said shaft and a keeper carried by said stand disposed between adjacent teeth, and compound adjustable means disposed at the opposite end of said stand for retaining a valve in a substantially stationary position while said shaft is being operated including an internally threaded sleeve having teeth on the outer surface thereof, a keeper carried by said stand operatively engaged between the teeth on said sleeve, and a threaded shaft adjustably disposed in said sleeve and having a valve head contacting member carried thereby.

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