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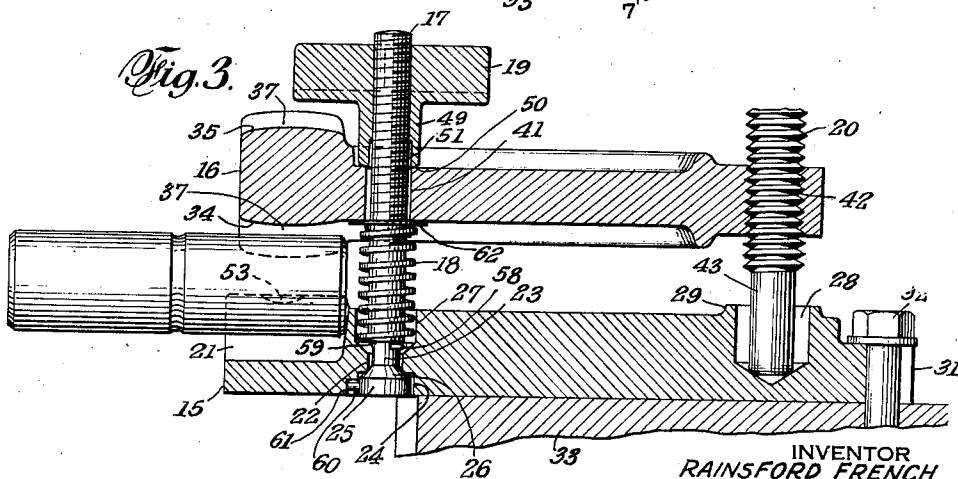
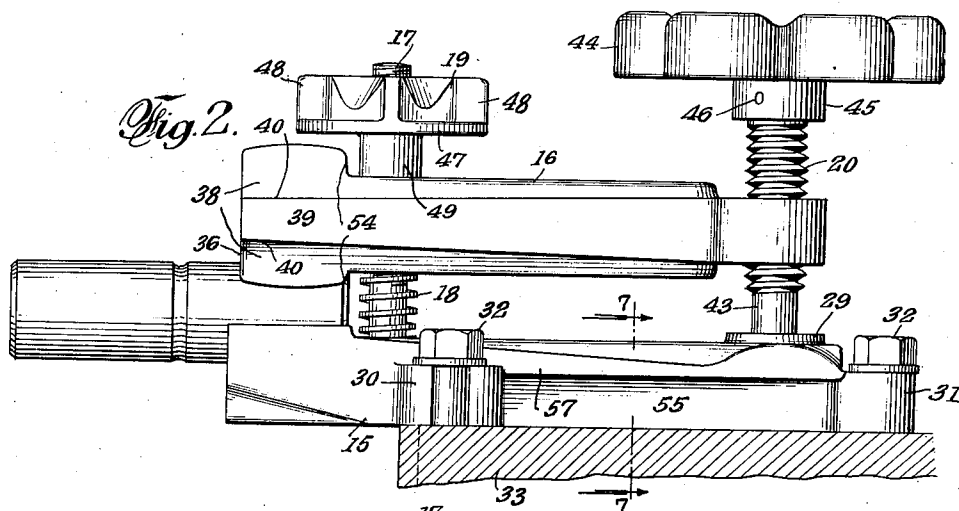
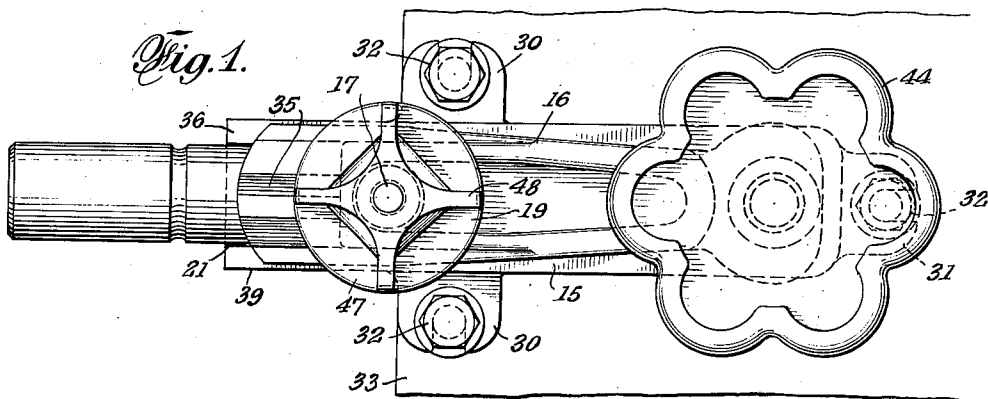
R. FRENCH

2,260,708

PISTON PIN AND KING BOLT VISE

Filed June 15, 1939

3 Sheets-Sheet 1



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Oct. 28, 1941.

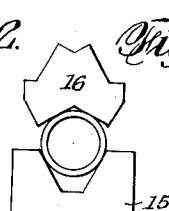
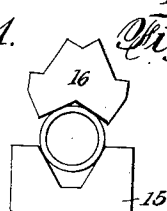
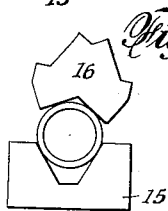
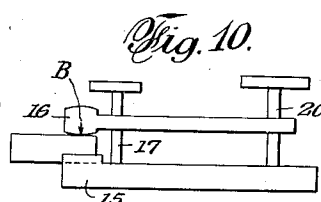
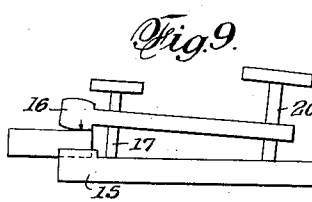
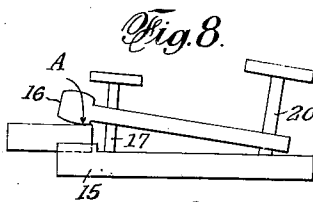
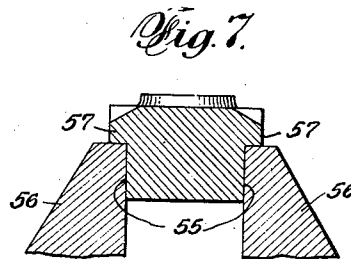
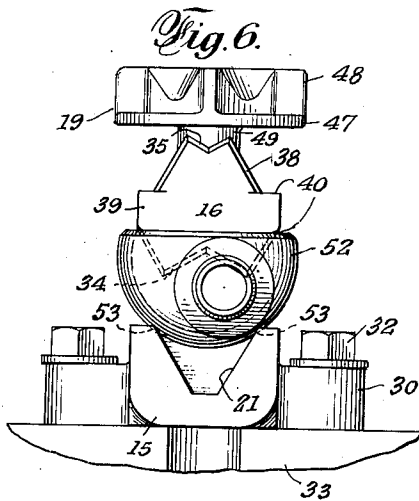
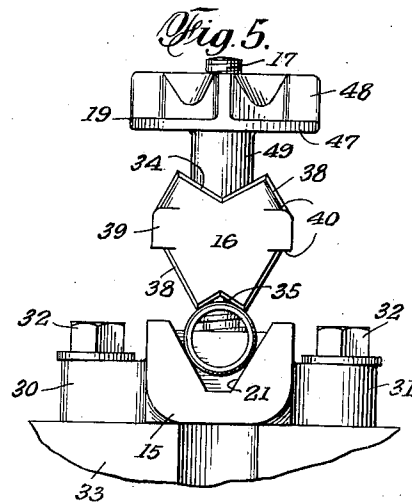
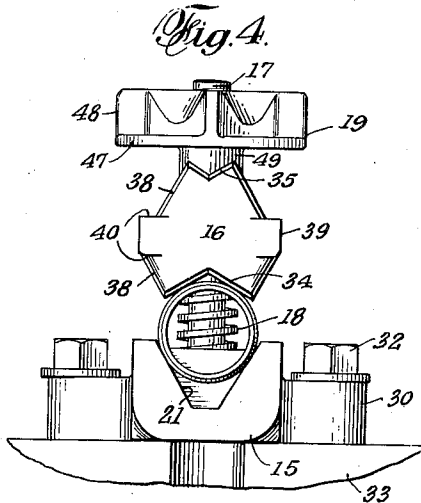
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2,260,708

PISTON PIN AND KING BOLT VISE

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3 Sheets-Sheet 2



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PISTON PIN AND KING BOLT VISE

Filed June 15, 1939

3 Sheets-Sheet 3

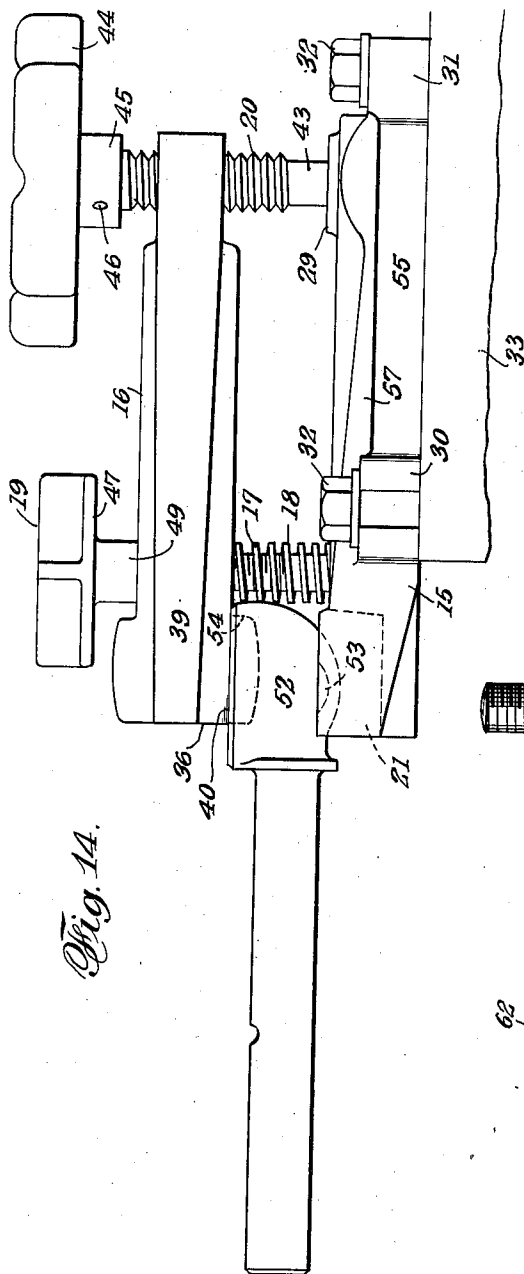


Fig. 14.

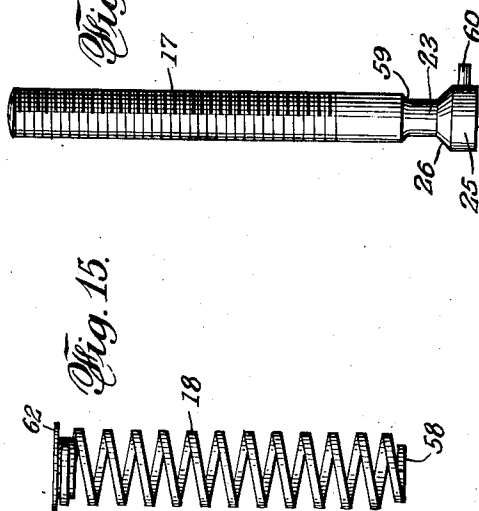


Fig. 15.

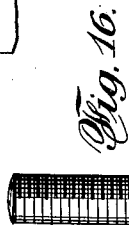


Fig. 16.

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PISTON PIN AND KING BOLT VISE

Rainsford French, Washington, D. C.

Application June 15, 1939, Serial No. 279,372

5 Claims. (Cl. 81—23)

The invention herein disclosed relates to apparatus for holding piston pins, king bolts and the like.

Special objects of the invention are to provide a vise which will securely hold various sizes and shapes of piston pins, king bolts or similar parts, which can be quickly set to accommodate different size parts, which will automatically center and grip the work and hold it securely without bruising, cutting, crushing or otherwise injuring the same, which can be readily mounted on a bench or other support, or if desired, be securely held in a machinist's vise, which will take up but small space on the bench and when required may be easily dismantled to leave only the base structure on the bench; and which with all the foregoing advantages will be of simple inexpensive construction and consist of but few rugged and readily assembled and disassembled parts.

Other desirable objects and the novel features of construction, combinations and relations of parts by which the objects are attained are set forth and will appear in the course of the following specification.

The drawings accompanying and forming part of the specification illustrate a present commercial embodiment of the invention. Structure however may be modified and changed, all within the true intent and broad scope of the invention.

Fig. 1 is a plan view of the vise as mounted on a bench top, the latter being indicated partly by broken lines.

Fig. 2 is a side elevation, with the bench structure appearing in section.

Fig. 3 is a broken central longitudinal sectional view of the vise as mounted on a bench.

Fig. 4 is a front end elevation of the vise as mounted on a bench and holding a large size piston pin.

Fig. 5 is a similar view showing the clamp lever reversed and holding a smaller size piston pin.

Fig. 6 is a front view showing the vise as in use for holding a king bolt.

Fig. 7 is a broken detail section as on line 7—7 of Fig. 2, showing the base of the vise as positioned and held in the jaws of a machinist's vise.

Figs. 8, 9 and 10 are diagrammatic side views illustrating the rolling clamping action of the upper jaw member.

Figs. 11, 12, 13 are diagrammatic front views illustrating the self-aligning adjustment of the top jaw.

Fig. 14 is a broken side view of the vise holding

a Ford king bolt and Figs. 15 and 16 are detail views of parts.

As shown particularly in the first three views, the vise consists of but six main parts, a base and lower jaw member 15, a cooperating reversible clamp lever and upper jaw member 16, a front connecting and fulcrum bolt 17, a spring 18 about this bolt for supporting the upper jaw in a "floating" position, a wing nut 19, for forcing the movable upper jaw towards the fixed lower jaw and a leverage screw 20, for rocking the adjustable jaw beneath the wing nut as a fulcrum.

The base is shown as having a wide and deep V channel 21, in the forward end of the same constituting a jaw in which different sizes of piston pins will naturally center and seat.

Back of the jaw, the base has a vertical passage 22, therethrough, loosely receiving the lower reduced cylindrical portion 23 of the forward bolt 17. At the lower end of such vertical passage, there is an enlarged seat 24, loosely receiving the rounded head 25, on the lower end of the bolt. The upper face of this angular head is shown as rounded or conical at 26, to permit this bolt to readily rock in various directions. At the upper end, the vertical passage is enlarged into a countersunk seat 27, for the lower end of the spring and preferably deep enough to accommodate this spring when fully collapsed. The bolt is held against rotation by pin 60, engaging in notch 61, in the base.

At the rear, the base is shown provided with a relatively deep seat 28, large enough in diameter to loosely receive the lower rounded end of the leverage screw 20, and provided with an upstanding annular boss 29, about the rim of the same.

Projecting from the sides of the base, back of the forward jaw section, are mounting lugs 30, 30 and projecting from the rearward end of the base is a similar mounting lug 31, these being usually slotted or perforated to receive suitable holddown bolts 32, for securing the vise on the bench or other support 33. As shown in the illustration, the base is preferably mounted with the jaw part projecting beyond the edge of the bench and sufficiently so for the head 25, to clear the edge of the bench, thus to permit the bolt to be dropped down out of the base.

The upper adjustable jaw member is shown as having relatively large and small V-shaped clamping jaws 34, 35, at opposite sides of the forward or outer end of said member and these

are shown at 36, Fig. 1, as projecting to a somewhat less extent than the lower jaw 21, to facilitate engagement of the work by sliding it down over the end of the top jaw to a seat in the lower jaw. The V seats in the movable jaw member are shown as somewhat more widely angled than the V-groove in the bottom jaw, Figs. 4, 5 and 6 and so as to embrace the work more fully and gain a wider grip over the work.

As shown particularly in Figs. 2 and 3, the jaw elements of the movable upper clamp member are convexly curved longitudinally of such member at 37, so that they may have a rocking or rolling engagement over the work. The sides of the opposite jaw elements 34, 35, are angled inwardly as at 38, from an intermediate body portion 39, constituting the widest part of the member and providing the oppositely facing shoulders 40.

The jaws of the upper member are substantially the depth of the lower jaw, Figs. 2 and 3 and immediately back of such jaws said upper member has an opening 41, therethrough, large enough to loosely receive the forward fulcrum bolt 17, Fig. 3.

The rearward end portion of the upper jaw member has a screw seat 42, for the leverage screw 20, extending entirely therethrough, thus to permit said screw to be entered from either side.

To facilitate quick entry of the leverage screw into either end of the screw seat 42, said screw is shown as having a reduced cylindrical end portion 43, small enough to enter and pass through the screw seat as a guide for the following screw threads.

For quick operation, the leverage screw 20 has a hand wheel 44, shown as secured thereon by hub 45, through which is passed a pin or key 46. This hand wheel is indicated as having a heavy notched rim which may be readily grasped in the fingers and which will rotate with a fly wheel effect.

To retain the forward fulcrum bolt 17, in position when the wing nut 19 is removed, the spring 18 is shown as having a constricted lower coil 58, releasably engaged beneath the shoulder 59 at the upper end of the reduced portion 23 of the bolt. While this construction holds the bolt against dropping down out of the base, the spring can be readily released to permit removal of the bolt.

The wing nut 19 is shown formed with a flat annular disc portion or web 47, between the four radial wings 48, so that the fingers engaging the nut will not slip down into contact with the clamp lever. Also this nut is shown as having an elongated hub 49, extending below the flange 47, and terminating in a rounded bearing end 50, engaging the top of the clamp lever. The lower portion of this bearing hub is shown as enlarged in a plain cylindrical portion 51, to serve as a pilot for directing the nut smoothly down over the upper end of the bolt.

For holding the larger size piston pins, the clamp lever is engaged over the forward bolt 17, with the larger size clamp jaw 34, faced downwardly as in Fig. 4. For smaller size pins the clamp lever is reversed, as in Fig. 5. Reversal of the lever is readily effected by backing the wing nut 19 off the forward bolt, and after removing the lever, unscrewing the leverage bolt 20, from one side and screwing it back into the opposite side of the clamp lever, after which said lever is replaced over bolt 17, in its reversed relation and the wing nut 19 applied.

Figs. 8, 9 and 10 illustrate how after a piston pin is located in the lower jaw seat, the wing nut is turned down, while the hand wheel is backed off so as to engage the work with the lever in a backwardly inclined position, Fig. 8. Then the wing nut may be loosened slightly, while the hand wheel is turned down to bring the clamp lever into a more nearly horizontal position as in Fig. 9, and finally into the full gripping position indicated in Fig. 10. During such adjustments, the clamp lever has rocked forwardly as shown in an exaggerated way in these views with a rolling engagement over the work, shifting the points of contact from A to B. This effects a self-equalizing grip on the work and in the final position, the work is firmly gripped without injury.

In addition to the forwardly rolling self-adjustment last described, the looseness of parts permits the upper jaw to automatically center itself over the work as indicated in the diagrams, Figs. 11, 12 and 13. The first of these views indicates how in the initial position corresponding to Fig. 8, the upper jaw may lay over to one side. Fig. 12 shows how in the intermediate position corresponding to Fig. 9, the upper jaw will begin to center itself over the work and how in the final position, the upper jaw will have straightened up directly over the center, thus assuring equalized pressure, a highly advantageous feature particularly when working on thin walled piston pins.

For holding king bolts of the Ford type and which as shown in Fig. 6 have a substantially hemi-spherical head 52, at one end, the lower jaw is provided with crescent-shaped notches 53, to seat and center the outside of the head and both upper jaws are relatively short and terminate at the back in shoulders 54, adapted to enter the bowl of the head. In such relation, the shoulders 40, at the base of the jaw which is faced downwardly will act as abutments to hold the hollow head of the king bolt firmly seated in the lower jaw. This construction will firmly and positively hold the king bolt in various angular relations without injuring the same.

When the tool is not in use, the upper jaw, the spring and the forward bolt may be removed to leave only the base mounted on the bench. While usually desired to have the base mounted on a bench, there may be times when the vise could better be used if held in a machinist's vise or the like. This is provided for in the present disclosure by constructing the base rearwardly of the side mounting lugs 30, with parallel side portions 55, adapted to be gripped in the jaws 56, of a machinist's vise, Fig. 7, and with shoulders 57 above such parallel side parts adapted to seat on top of such vise jaws. The self-adjusting features enable the vise to firmly grip and hold tapered as well as various cylindrical forms of piston pins.

The self-equalizing action of the upper clamping jaw enables the vise to be set up tightly without injuring the work. For special work the jaws may be covered with a softer non-scratching metal, such as copper, which can be in the form of sleeves shaped like the jaws and engaged by simply slipping them over the ends of the jaws.

For quick adjustment purposes, the bolt 17 is preferably made with coarse screw threads. To prevent the spring 18 from catching in these screw threads and hindering opening and closing movements of the vise, there is provided, in the illustration, a flanged sleeve 62, Figs. 3 and 15, which

slides easily over the bolt and forms a centering abutment for the upper end of the spring.

What is claimed is:

1. A vise of the character disclosed, comprising a base member and a movable jaw member, said members having companion opposed jaw portions, a forward bolt loosely engaged in the base member, said movable jaw member having a passage therethrough loosely receiving said bolt, said member being reversely engageable over said bolt and having different jaw portions on the opposite sides of the same, a spring interposed between the members for separating the same, a hand nut engaged on the bolt over said movable jaw member for shifting the same toward the base member in opposition to the spring, the rearward portion of said movable jaw member having a screw seat extending entirely therethrough and a leverage bolt reversibly engageable in said screw seat and adapted to be projected therethrough into engagement with the base.

2. A vise of the character disclosed, comprising a base member and a movable jaw member, said members having companion opposed jaw portions, a forward bolt loosely engaged in the base member, said movable jaw member having a passage therethrough loosely receiving said bolt, said member being reversely engageable over said bolt and having different jaw portions on the opposite sides of the same, a spring interposed between the members for separating the same, a hand nut engaged on the bolt over said movable jaw member for shifting the same toward the base member in opposition to the spring, the rearward portion of said movable jaw member having a screw seat extending entirely therethrough, a leverage bolt reversibly engageable in said screw seat and adapted to be projected therethrough into engagement with the base, said hand nut having a rolling engagement over the top of the movable jaw member and said leverage bolt having a rolling engagement with the base permitting longitudinal as well as tilting movements of said movable jaw member over said base.

3. A vise of the character disclosed, comprising a base member and a movable jaw member, said members having companion opposed jaw portions, a forward bolt loosely engaged in the base member, said movable jaw member having a passage therethrough loosely receiving said bolt, said member being reversely engageable over said bolt and having different jaw portions on the opposite sides of the same, a spring interposed between the members for separating the same, a hand nut engaged on the bolt over said movable

jaw member for shifting the same toward the base member in opposition to the spring, the rearward portion of said movable jaw member having a screw seat extending entirely therethrough, a leverage bolt reversibly engageable in said screw seat and adapted to be projected therethrough into engagement with the base, said forward screw having an annular groove above the base member and the spring being of helical form engaged about the bolt and having a constricted lower end yieldingly engaged in said groove to support said screw on the base when the hand nut is removed.

4. A vise of the character disclosed, comprising a base member and a movable jaw member, said members having companion opposed jaw portions, a forward bolt loosely engaged in the base member, said movable jaw member having a passage therethrough loosely receiving said bolt, said member being reversely engageable over said bolt and having different jaw portions on the opposite sides of the same, a spring interposed between the members for separating the same, a hand nut engaged on the bolt over said movable jaw member for shifting the same toward the base member in opposition to the spring, the rearward portion of said movable jaw member having a screw seat extending entirely therethrough, a leverage bolt reversibly engageable in said screw seat and adapted to be projected therethrough into engagement with the base, said base member having an opening therethrough for said forward screw, said opening having an angular countersunk slot at the lower end of the same, the bolt having a head seating non-rotatably in said slot, the upper face of said head being rounded to enable rocking movement of the screw in said passage and the spring being of helical form encircling the screw and constricted at one portion to grip the screw to prevent the same from dropping out of said passage.

5. A quick opening and closing vise, comprising companion jaws, a fulcrum bolt and nut adjustably connecting the jaws near one end, a leverage bolt for spreading the opposite end portions of the jaws, a coil spring about the fulcrum bolt between the jaws, one jaw having a seat for one end of said spring and a flanged sleeve slidably engaged on the bolt and forming a centering abutment for the opposite end of said spring, said fulcrum bolt having a reduced portion below said spring seat and the end of the spring being constricted to engage in said reduced portion of the bolt.

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