Oct. 7, 1952 R. O. HEINRICH 2,612,805

LOCKING PLATE ADJUSTING MEANS FOR VISE BEAMS

Filed Aug. 10, 1951 2 SHEETS—SHEET 1

Fig. 1.

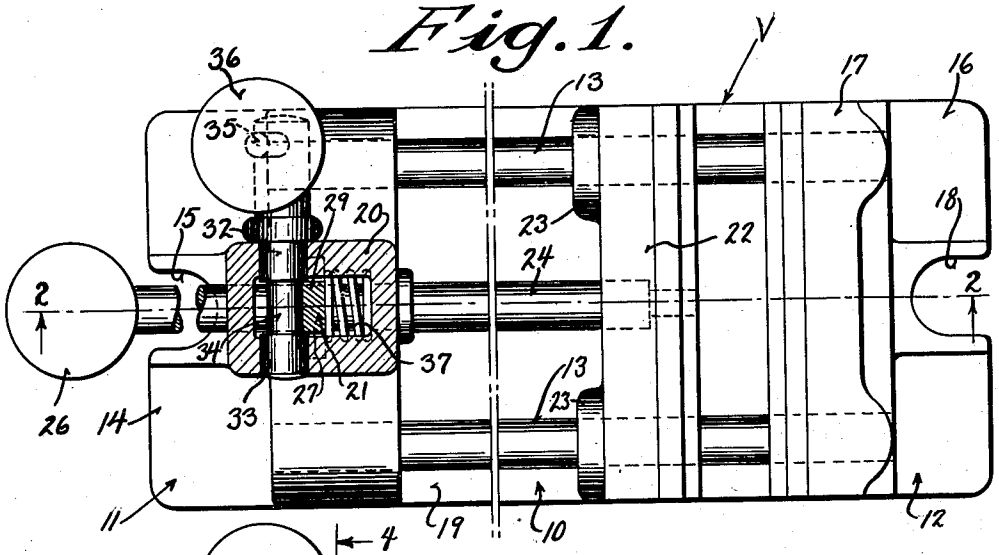
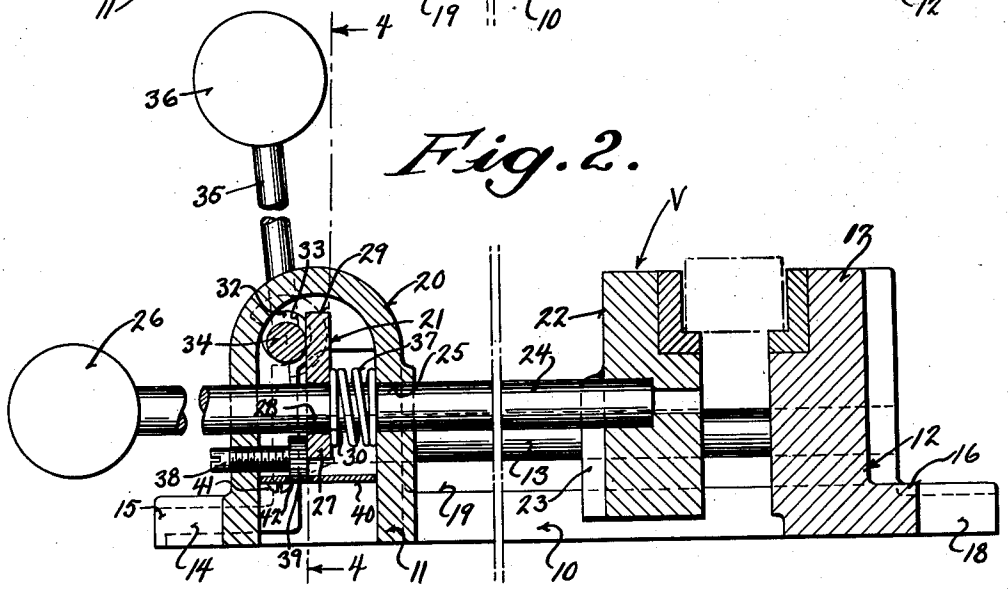


Fig. 2.



INVENTOR
ROBERT O. HEINRICH

BY Young & Wright

ATTORNEYS

Oct. 7, 1952 R. O. HEINRICH 2,612,805

LOCKING PLATE ADJUSTING MEANS FOR VISE BEAMS

Filed Aug. 10, 1951 2 SHEETS—SHEET 2

Fig. 3.

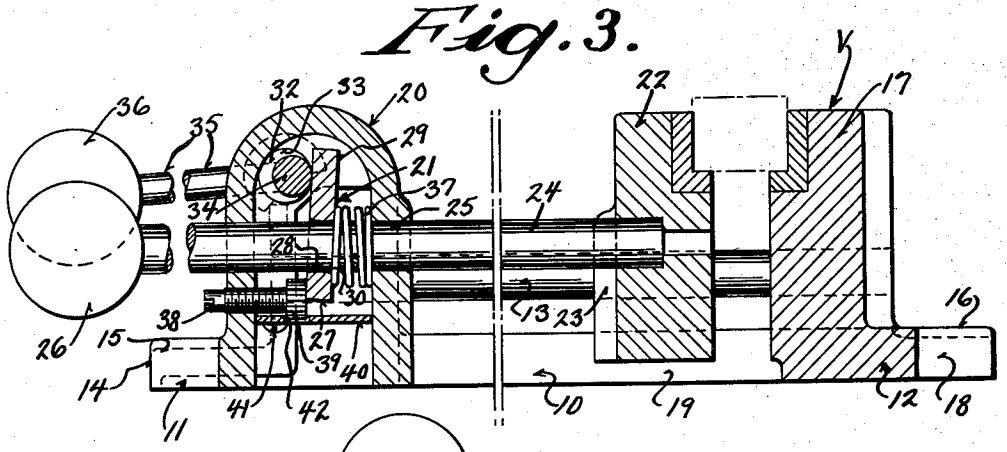


Fig. 4.

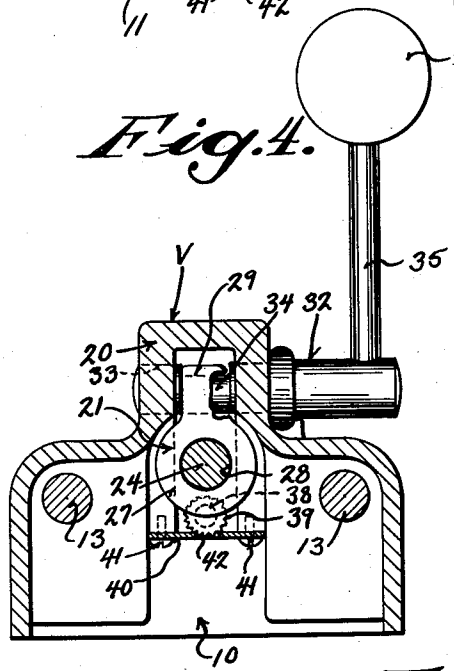


Fig. 5.

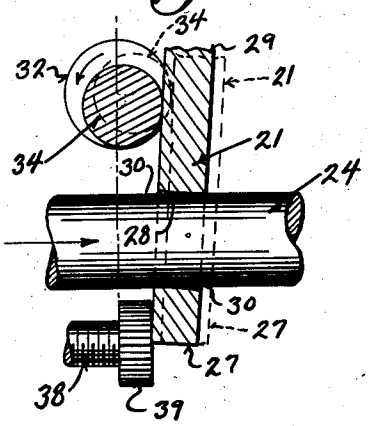


Fig. 6

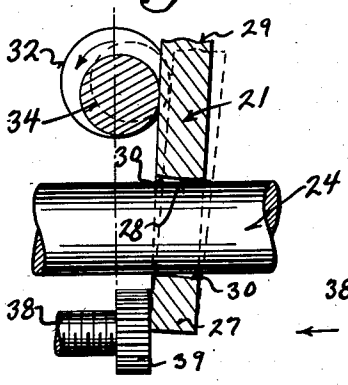
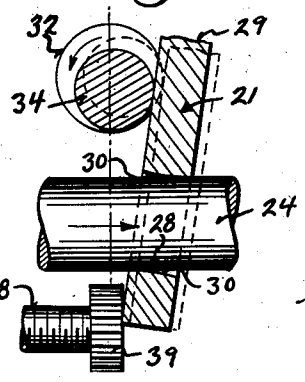


Fig. 7.



INVENTOR
ROBERT O. HEINRICH

BY

Young & Wright

ATTORNEYS

Patented Oct. 7, 1952 2,612,805

UNITED STATES PATENT OFFICE

2,612,805

LOCKING PLATE ADJUSTING MEANS FOR VISE BEAMS

Robert O. Heinrich, Racine, Wis.

Application August 10, 1951, Serial No. 241,313

1 Claim. (Cl. 81—17)

1

This invention appertains to gripping and clamping devices and more particularly to vises of the type shown in my prior patents No. 2,362,067; No. 2,392,820 and No. 2,424,313, issued respectively, on November 7, 1944; January 15, 1946 and July 22, 1947.

One of the primary objects of my present invention is to provide a vise embodying a single plate which effectively advances, locks and retracts the movable jaw of the vise, with means for locating the plate relative to the actuating crank or cam shaft for the plate, so that the plate can be adjusted after wear occurs to still insure the proper engagement of the plate with the center bar or beam of the movable jaw.

Another salient object of my invention, is to provide a tilting lock plate having a novelly formed opening for receiving the center bar or beam of the vise with the actuating crank shaft engaging the upper end of the plate for tilting the same, and an abutment or stop engaging the lower end of the plate, the abutment or stop being adjustable, whereby to correctly position the head of the same relative to the plate and the axis of the crank or cam shaft to insure proper gripping of the walls of the opening in the plate with the center rod or vise beam as wear occurs.

A further important object of my invention is the provision of a removable closure plate for the chamber housing the tilting locking plate, the closure plate forming means for engaging the head of the stop for preventing accidental turning movement thereof after the stop has been adjusted to a desired and selected position.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts, as will be hereinafter more specifically described and claimed, and illustrated in the accompanying drawings, in which drawings,

Figure 1 is a top plan view of my improved vise with parts thereof broken away and in section to illustrate structural detail.

Figure 2 is a central, longitudinal sectional view through the vise taken on the line 2—2 of Figure 1, looking in the direction of the arrows, the view showing the locking plate in its released vertical position.

Figure 3 is a view similar to Figure 2, but showing the plate in its tilted position for bringing the movable jaw into gripping contact with the work.

Figure 4 is a transverse sectional view through

2

the vise taken on the line 4—4 of Figure 2, looking in the direction of the arrows.

Figure 5 is an enlarged fragmentary detail sectional view, showing in full lines the initial tilting of the locking plate for bringing the same into gripping engagement with the center rod or vise beam upon partial movement of the cam or crank shaft, the view also showing in dotted lines, the position of the plate after further turning movement of the cam or crank shaft for advancing the plate and the vise beam, the view further showing the relationship of the parts before wear occurs.

Figure 6 is a view similar to Figure 5, but showing the relationship of the parts after wear occurs, with the resultant non-effective engagement of the plate with the vise beam.

Figure 7 is a view similar to Figures 5 and 6, but showing the adjustment of the abutment or stop after wear has occurred in the plate for permitting the effective engagement of the plate with the vise beam.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter V generally indicates the vise with my improvements incorporated therein. The vise includes a frame 10, embodying a front casting 11 and a rear casting 12. These castings are rigidly connected together by spaced parallel, smooth guide rods 13 which can be formed from polished steel, if so desired.

The front casting 11 includes a base 14, which can be provided with openings or notches 15 for facilitating the bolting thereof to a table or bench.

The rear casting 12, also embodies a base 16 and an upstanding rigid jaw 17. The base 16, can also be provided with suitable openings or notches 18 for facilitating the attachment of the clamp or vise to the desired table or bench.

As illustrated, the castings 11 and 12 can also be united by side rails 19, and hence, if preferred, the front and rear castings 11 and 12, with the rails 19, can be formed as a single unit.

Cast on the base 14, is a centrally disposed upstanding hollow shell 20. Enclosed within the hollow shell 20 is a locking and advancing mechanism 21.

Slidably mounted on the smooth guide rods 13, between the rigid jaw 17 and the upstanding shell 20, is a movable jaw 22. This movable jaw can be reinforced by bosses 23, or the like, at the point where the movable jaw slides on the guide rods 13.

Rigidly attached to the center of the movable jaw 22 is a center bar or beam 24. This beam 24 is preferably of a cylindrical shape and is formed from hardened polished steel and slidably extends through openings 25 formed in the upstanding shell 20. The outer end of the beam 24 is provided with any preferred type of hand grip 26, whereby the beam and the movable jaw 22 can be easily slid back and forth toward and away from the rigid body 15.

The beam 24 is advanced, clamped and retracted by the mechanism 21, which will now be described. This mechanism 21 includes a locking or clamping plate 27 and the same is formed with an opening or bore 28 through which the vise beam 24 extends. The opening or bore 28 is of a slightly greater diameter than the diameter of the beam 24. However, a relatively close fit is had, but one which will still permit the rocking of the clamping plate on the beam.

The plate 27 is of a rugged nature and can be formed from spring steel, so that the same will possess a certain desired resiliency. The upper end of the plate is reduced in width to form a finger 29, which extends above the beam 24.

The opening or bore 28 formed in the clamping plate 27, has the ends of its wall slightly curved outwardly in opposite directions, as at 30. This provides inner annular gripping edges which are of such a character that injury to the surface of the beam 24 is prevented.

Actuation of the clamping plate is had by means of a cam or crank shaft 32, which is rockably mounted in suitable bearing openings 33, formed in the end walls of the shell 20. A throw portion 34 of the shaft is arranged for engagement with a reduced finger 29 of the clamping plate 21. One end of the crank shaft 32 carries a suitable operating handle or lever 35. A hand grip 36 is carried by the lever for facilitating the turning movement thereof. Means can be provided for limiting the throw of the lever in either direction.

Coiled about the beam 24 is a relatively heavy expansion spring 37. This coil spring 37 is positioned between the plate 21 and one wall of the shell 20, and serves to push back on the plate to hold the finger 29 in contact with the throw portion 34 of the crank shaft 32, and in contact with an adjustable stop 38 which forms the important feature of my present invention.

Particular attention is now called to the adjustable stop 38, and it is to be noted that the same is in the nature of a screw having an enlarged inner stop head 39. The stop head 39 has a smooth, flat front face and the spring 37 normally holds the plate against the stop head. The stop is threaded into the wall of the shell 20 opposite that wall which is engaged by the spring 37. The protruding end of the screw or stop 38 is provided with a slot or equivalent means to permit the turning thereof and consequent adjustment of the head 39 relative to the plate 21 and the axis of the crank shaft 32. The crank shaft engages the plate above the beam 24 and the head of the screw engages the plate below the beam, and, as stated, the plate is urged by the spring 37 into contact with the flat forward face of the adjustable stop or screw 39. The periphery of the head 39 of the stop or screw is grooved or fluted to provide radially projecting teeth, for a purpose which will later appear. Initially, the screw or stop 38 is adjusted so that the rear face of the head 39 lies in a vertical plane perpendicular with the axis of the crank shaft 32, and with the forward face of the head 39 in the same vertical plane with the face of the throw portion 34 of the crank shaft, with the lever 35 in its raised, released position (see Figure 2). In operation of the vise the handle or lever 35 is normally in its raised position, as shown in Figure 2, so that the active face is away from the plate 21. Consequently, the spring 37 functions to hold the plate in a raised position against the shaft and the stop or screw at right angles to the longitudinal axis of the beam 24 so that the central axis of the bore 28 of the plate coincides with the longitudinal axis of the beam 24. The beam can now be freely slid back and forth so as to adjust the jaw 22 relative to the stationary jaw 17 and the work. Upon the swinging of the handle or lever 35 down to the left (referring to Figures 2 and 3) the clamp plate 21 will be tilted, as is clearly shown in Figure 5. Upon the tilting of the plate 21, the diagonal opposite portions of the wall of the bore 30 will first contact and grasp the beam, and upon continued downward movement of the handle or lever 35, the tilting plate 21, beam 24, and movable jaw 22 will be moved as a unit by the throw portion 34, until the movable jaw firmly grips the work. When the lever 35 is again moved to its raised released position, the spring 37 will tend to release the plate from gripping engagement with the beam, but before complete release occurs, the beam, plate and movable jaw are moved as a unit slightly away from the stationary jaw. The spring 37 will hold the clamping plate 21 tight against the smooth forward face of the head 39 of the adjustable stop or screw.

Now by referring to Figure 6, it can be seen that as wear takes place on the wall of the bore 30 of the plate 21, upon initial turning of the throw portion 34 of the crank or cam shaft 32, the clamping plate will not grip the beam. This can be compensated for (see Figure 7) by adjusting the stop or screw 38 away from the plate 21, so that the forward face of the stop head 39 will lie closer to a vertical line bisecting the axis of the crank shaft 32. With the adjustable stop or screw disposed in this position, the clamping plate will normally have a slight tilt, so that upon immediate turning of the crank shaft the throw portion thereof will function to further tilt the clamping plate and bring the wall of the bore thereof into gripping contact with the beam.

A further added feature of the invention is that a removable closure or bottom wall 40 is provided for the shell 20, and the same is held in place by screws 41. The closure plate 40 is provided with an opening 42 and this opening receives a portion of the toothed periphery of the head 39, so that accidental turning movement of the screw or stop will be prevented after adjustment.

Changes in details may be made without departing from the spirit or the scope of this invention, but what I claim as new is:

A quick adjustable vise comprising a frame, a fixed jaw on said frame, a movable jaw, a sliding beam secured to the movable jaw and slidably supported by said frame whereby said movable jaw can be freely slid toward and away from the fixed jaw, a locking plate having an opening therethrough intermediate its ends for receiving the beam, said plate extending above and below the beam, a cam shaft being rockably carried by the frame, and having its throw portion disposed above the beam and engaging the upper end of the plate, means for turning the shaft, an adjustable stop carried by the frame, and disposed below the beam so as to contact the plate below the beam, and spring means normally holding the

plate tight against the throw portion of the shaft and against the stop, the stop being adjustable relative to a vertical line bisecting the axis of the shaft, and said stop having an enlarged head provided with a smooth forward plate-engaging face and a toothed periphery, and means engaging said toothed periphery to prevent accidental movement of the stop.

ROBERT O. HEINRICH.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,424,313	Heinrich	July 22, 1947