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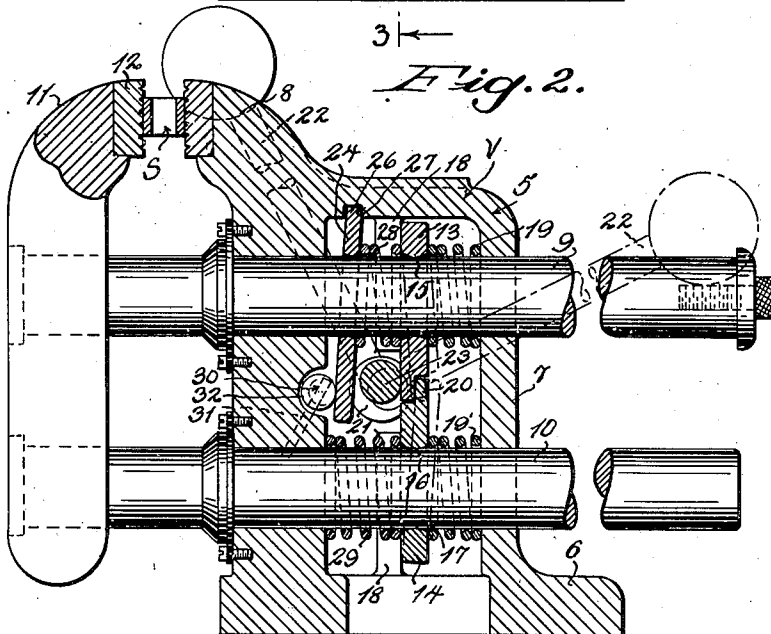
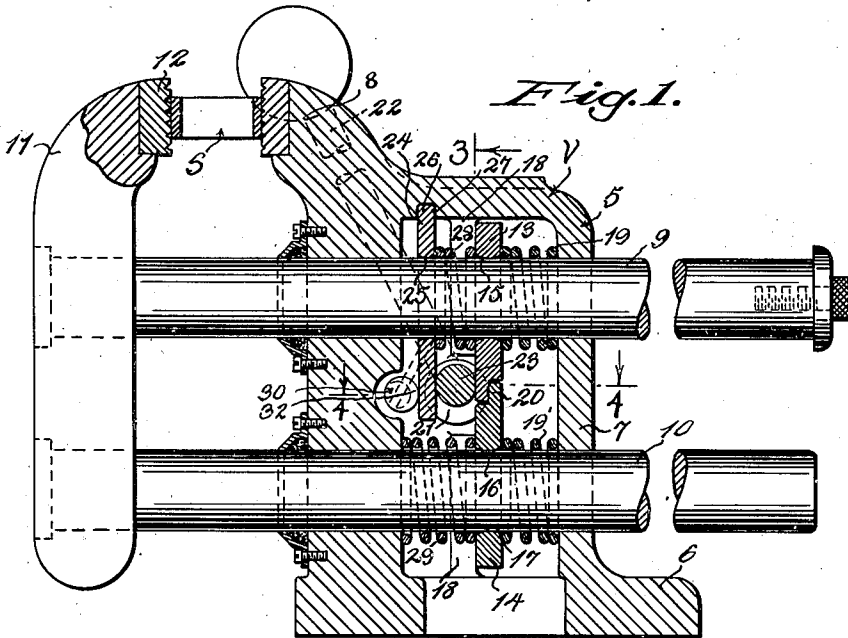
R. O. HEINRICH

2,392,820

VICE LOCK

Filed Nov. 26, 1943

2 Sheets-Sheet 1



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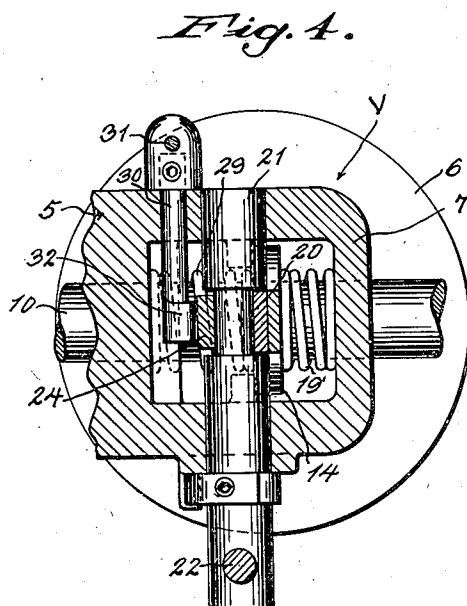
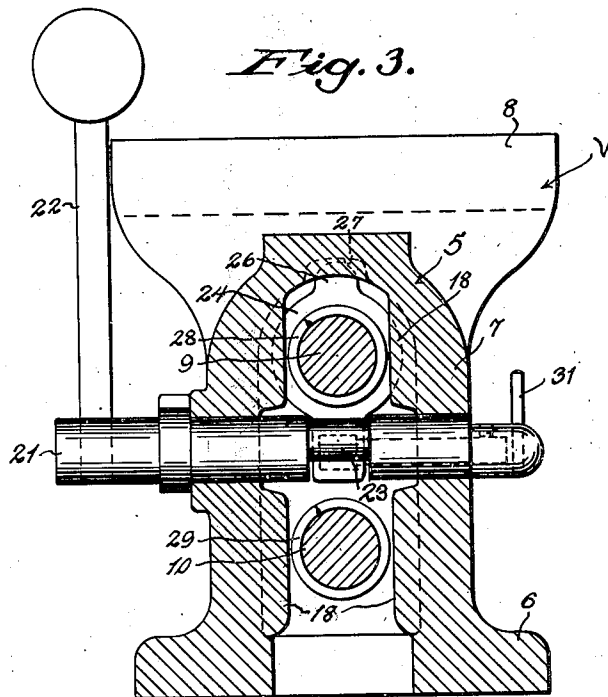
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2,392,820

VICE LOCK

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2 Sheets-Sheet 2



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2,392,820

VISE LOCK

Robert O. Heinrich, Racine, Wis.

Application November 26, 1943, Serial No. 511,779

5 Claims. (Cl. 81-17)

This invention appertains to improvements in vises and clamps of the type shown in my pending applications, Serial No. 487,099, filed May 15, 1943; and Serial No. 493,351, filed July 3, 1943, issued Nov. 7, 1944 as Patent No. 2,362,067.

In my pending applications, I illustrated a novel vise and clamp embodying an operating lever and plates for moving the adjustable vise jaw into and out of locking and gripping position. In these applications, the adjustable jaw, with the lever in one position, could be freely slid by hand into initial engagement with the work and then thereafter forcibly moved into locking and gripping position by the lever.

It is one of the primary objects of my invention to provide means whereby the sliding jaw can be forcibly advanced in a step by step movement toward the stationary jaw for compressing and gripping work as well as operated freely by sliding back and forth by hand.

Another salient object of my present invention is to provide novel means for manually setting certain of the vise beam engaging plates, whereby the sliding jaw can either be advanced forcibly in a step by step movement by the lever or left for free sliding movement by hand and actuated to a locking and gripping position by the lever.

A further important object of my invention is to provide novel means for mounting the plates in the casting or frame of the vise, whereby a simple, compact and durable structure will be had.

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, claimed and illustrated in the accompanying drawings, in which drawings:

Figure 1 is a vertical, sectional view through my novel vise showing the plates in position to permit free sliding movement of the movable jaw and its beams with certain of the plates ready for actuation by the hand lever to move the adjustable jaw to its locking and gripping position.

Figure 2 is a view similar to Figure 1, but showing the manual means moved into a position, whereby the sliding jaw can be forcibly adjusted in a step by step movement toward the stationary jaw.

Figure 3 is a transverse, sectional view through the vise taken on the line 3-3 of Figure 1 looking in the direction of the arrows.

Figure 4 is a detail, horizontal, sectional view

taken on the line 4-4 of Figure 1 looking in the direction of the arrows.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter V generally indicates my improved vise or clamp and the same includes a casting or frame 5.

This casting or frame 5 embodies a base 6, which can be fastened to a work bench or any other preferred place. Likewise, it is to be understood that the base can be of the swiveled type, should such be desired. Formed on the base 6 is a hollow housing 7 and the upper forward end of the housing has formed thereon the rigid jaw 8.

Slidably mounted through the housing 7 for free longitudinal movement is a pair of spaced parallel bars or beams 9 and 10. Rigidly secured to the forward ends of the beams 9 and 10 is the movable jaw 11 and hence the movable jaw and the beams 9 and 10 can be slid back and forth as a unit. The jaws 8 and 11 can be provided with any preferred type of jaw faces 12.

Disposed within the hollow housing 7 are a pair of locking and advancing plates 13 and 14. As is clearly shown in Figures 1 and 2, the plates 13 and 14 are provided with, respectively, openings 15 and 16 through which the beams 9 and 10 extend. The walls of the openings 15 and 16 are preferably tapered to provide an annular gripping tooth 17. When the plates 13 and 14 are in a straight vertical plane, the beams 9 and 10 can move freely through the openings 15 and 16. However, when the plates are tilted, the same will grip and hold the beams.

In order to insure the proper holding of the plates 13 and 14 in a vertical position to release the beams 9 and 10 when desired, the inner surface of the hollow housing 7 has formed thereon inwardly extending vertically disposed abutment ribs 18.

The beams 9 and 10 have coiled about the same expansion springs 19 and 19' respectively which normally urge the plates 13 and 14 against the ribs 18 to a released position. To facilitate synchronous movement of the plates 13 and 14, the same are provided with interengaging lips 20 at their inner ends.

Extending transversely through the hollow housing 7 in advance of the tiltable plates 13 and 14 is a rotatable cam shaft 21. Connected to the outer end of the cam shaft is an operating hand lever 22. The throw portion 23 of the shaft is arranged adjacent to the meeting ends of the plates 13 and 14 and consequently when the cam shaft is rocked in a clockwise direction (see Fig-

ures 1 and 2) the plates will be tilted by said shaft. As the plates are tilted, the same will move the beams 9 and 10 to the right and the jaw 11 toward the jaw 8. Upon continued downward movement of the lever 22, the plates will be firmly held in their tilted position against the tension of the springs 19 and 19' and hence the beams 9 and 10 will be locked and work placed between the jaws 8 and 11 will be firmly gripped.

When the hand lever 22 is swung back to its released position to the left, the plates 13 and 14 will be moved back to their straight vertical position by the springs 19 and 19' and the movement of the plates will move the beams 9 and 10 slightly to the left and release the work between the jaws.

In accordance with my present invention, I provide means whereby the beams can be held against backward sliding movement (when so desired) so that upon continued movement of the hand lever 22 back and forth, the movable jaw 11 can be forcibly urged in a step by step movement toward the rigid jaw 8. This feature is of importance in certain types of work, such as compressing coil springs, and other types of work. In Figures 1 and 2 I have shown a leaf spring S between the jaws and being compressed.

This means includes a locking plate 24 and this plate is provided with an opening 25 through which slidably extends the beam 9. The wall of the opening 25 can also be provided with an annular gripping tooth, if so desired. The upper end of the plate 24 has formed thereon a lip 26, which is rockably mounted in a socket 27 formed in the upper wall of the hollow housing 7. The lower end of the plate 24 extends in front of the cam shaft 21, as is clearly shown in Figures 1 and 2 of the drawings. Also mounted upon the beam 9 is an expansion coil spring 28 and this spring is confined between the plates 13 and 24. The spring functions to normally tilt the plate 24 to a gripping position for engaging the beam 9. A compensating coil spring 29 is placed on the beam 10 between one wall of the housing 7 and the plate 14 and this spring merely operates in conjunction with the spring 19' to center the plate 14.

Arranged in front of the lower end of the lock plate 24 is a cam shaft 30. This cam shaft is rotatably carried by the hollow housing and has connected therewith a small hand lever 31, whereby the same can be manually actuated. The throw portion 32 of the shaft 30 is adapted to be moved into and out of engagement with the lower end of the lock plate 24. When the cam shaft 30 is in the position shown in Figure 1, the throw portion 32 thereof moves into engagement with the lower end of the plate and holds the same in a vertical position against the tension of the spring 28 so that the beam 9 can slide freely through the plate 24. However, when the cam portion 32 of the shaft 30 is moved away from the plate 24, see Figure 2, the plate will be tilted by the spring 28 into its locking position.

In use of my vise, when the plate 24 is tilted, as shown in Figure 2, the jaw 11 can be advanced forcibly in a step by step movement toward the jaw 8. This is accomplished by swinging down on the lever 22 for tilting the plates 13 and 14 which will move the jaw 11 toward the jaw 8. As the handle 22 is moved up to its released position, the springs 19 and 19' will move the plates 13 and 14 to their vertical position, but the plate 24 will prevent movement of the beam 9 to the left (see Figure 2). Thus by again moving the

handle 22 down, the jaw 11 will again be forcibly advanced.

By rotating the crank shaft 30 in a clockwise direction (see Figure 2) the cam portion 32 thereof will be brought into engagement with the locking plate 24 and move and hold this plate in a vertical position, see Figure 1. With the handle 22 in its elevated position, the jaw 11 can be freely slid back and forth. The vise can now be operated in the same manner as my vises shown in my mentioned pending applications and hence the jaw 11 can be slid to an initial desired position in close engagement with the work and upon swinging down the handle 22, the plates 13 and 14 will be tilted for moving the jaw 11 into tight gripping contact with the work and the tilted plates will hold the beams 9 and 10 against movement. When the handle 22 is swung up, the plates 13 and 14 will be returned to their vertical position by their springs 19 and 19' and this return movement will move the jaw 11 to release the work.

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

1. A vise or clamp comprising a frame, a fixed jaw on the frame, a movable jaw, a smooth vise beam rigidly connected to the movable jaw and slidably associated with the frame for free movement, means for advancing and retracting the movable jaw to and from a work clamping position including a tiltable clamp plate for engaging the beam, manual means for tilting the plate, spring means for returning the plate to a substantially right angular position relative to the longitudinal axis of the beam, and means for preventing the releasing of the beam and movement of the movable jaw away from the work including a tiltable lock plate, spring means for tilting the lock plate to a clamping position and manual means for returning the lock plate to a released substantially right angular position relative to the beam.

2. A vise or clamp comprising a frame, a fixed jaw on the frame, a movable jaw, a smooth vise beam rigidly connected to the movable jaw and slidably associated with the frame for free movement, means for advancing and retracting the movable jaw to and from a work clamping position including a tiltable clamp plate for engaging the beam, manual means for tilting the plate, spring means for returning the plate to a substantially right angular position relative to the longitudinal axis of the beam, and means for preventing the releasing of the beam and movement of the movable jaw away from the work including a tiltable lock plate, spring means for tilting the lock plate to a clamping position, and manual means for returning the lock plate to a released substantially right angular position relative to the beam, said last named means including a cam shaft having a throw portion for engaging the locking plate and a handle for turning said shaft.

3. In a vise or clamp, a frame, a fixed jaw on the frame, a movable jaw, a smooth vise beam fixed to the movable jaw and slidably associated with the frame, means for advancing and retracting the movable jaw to and from a work clamping position including a tiltable plate carried by the frame having an opening through the beam, manual means for tilting the plate to advance and lock the beam, spring means engaging the plate for normally holding the plate at right-angles to the beam whereby the beam

can slide freely through the opening, a lock plate rockably mounted in the frame having an opening through which the beam normally slides, a spring means engaging the lock plate for tilting said plate to a locking position and independent manual means for moving said lock plate against said spring means to a substantially right angular position relative to the longitudinal axis of the beam and to released position.

4. A vise or clamp comprising a frame having a fixed jaw thereon, a movable jaw, a pair of vise beams rigidly secured to the movable jaw for supporting the same and slidably mounted for free movement on the frame, whereby the movable jaw can be freely slid toward and away from the fixed jaw, said beams being arranged in spaced parallel relation, a tiltable clamp plate for each beam, the inner ends of the clamp plates being arranged in overlapping relation, spring means engaging the plates for normally holding the plates in a released position at right-angles to the beams, manually actuated means engaging the overlapping portions of the plates to tilt said plates, a tiltable clamp plate for one of the

beams, spring means normally urging the lock plate to a tilted locked position and manual means for holding the clamp plate in a released position at substantially right angles to the longitudinal axis of the beam against the tension of said last named spring means.

5. In a vise or clamp, a frame, a fixed jaw on the frame, a movable jaw, a smooth beam secured to the movable jaw and slidably mounted in said frame, elongated rigid stop means on the frame on each side of the beam having plane stop faces at direct right-angles to the beam, means for advancing and retracting the movable jaw to and from a work clamping position including a tiltable clamp plate having an opening through which the beam extends, spring means engaging the plate for normally holding the plate against said plane stop faces of the elongated rigid stop means, whereby the beam can freely slide through the opening, and manual means for tilting the plate against said spring means at an angle to said rigid stop means and the beam.

ROBERT O. HEINRICH.