This invention appertains to improvements in vises and clamps of the type shown in my pending application, Serial No. 487,099, filed May 18, 1943.

One of the primary objects of my present invention is to provide novel means for arranging the clamping and locking means for the movable jaw, whereby elongated work can be readily held by the jaws without interference from the sliding locking and clamping means.

Another salient object of my invention is the provision of a vise or clamp in which the sliding bars or beams carrying the movable jaw are arranged in a spaced parallel vertical plane instead of a spaced horizontal plane so that relatively wide elongated work can be securely held between the jaws on each side of the sliding bars or beams.

A further important object of my invention is the provision of a single operating means for synchronously actuating the locking or clamping plates for both of the beams or bars, whereby the use of a cam, crank or the like for each set of locking or clamping plates is eliminated.

A still further object of my invention is to provide a simple, but highly efficient means for actuating two sets of clamping or locking plates for the vice bars or beams from a single operating member.

A still further object of my invention is the provision of a set of clamping or locking plates for each bar or beam of the vise with the adjacent ends of the two sets of plates arranged in overlapping relation, whereby a single cam, crank, or other mechanism can be utilized for synchronously actuating both sets of plates from a single central point.

A still further important object of my invention is the provision of means for arranging a locking plate or locking plates, whereby the plate or plates can be efficiently actuated by any desired type of operating means, such as a cam, crank, wedge, screw or the like.

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 side, elevational view, partly in section, showing one preferred form of my improved vise, the sectional part of the figure being taken on the line 1—1 of Figure 3 looking in the direction of the arrows.

Figure 2 is a view similar to Figure 1 but showing the locking or clamping plates in their operating position for holding the movable jaw against the work and against movement.

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 fragmentary, detail, sectional view illustrating a cam lever for moving a locking plate into its locked position.

Figure 5 is a view similar to Figure 4 but showing a set screw for tilting the locking plate.

Figure 6 is a view similar to Figures 4 and 5 but showing a sliding wedge for tilting the locking plate.

Figure 7 is a detail, side, elevational view of a double locking plate for a pair of beams or bars of the vise.

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 10.

This casting or frame 10 embodies a base 11 which can be secured to a work bench, machine or the like and if preferred, the base can be of a swiveled type so that the vise can be swung around in an arc of a circle. The casting 10 also includes a hollow housing 12 which is formed directly on the base and the upper end of the housing has formed thereon the rigid jaw 13.

Slidably mounted through the housing 12 for longitudinal movement is a pair of bars or beams 14 and 15. These bars or beams 14 and 15 are arranged in spaced parallel relation and one above the other in a vertical plane. The forward ends of the bars or beams 14 and 15 have rigidly fastened thereto the movable jaw 16 and hence the movable jaw and the bars or beams 14 and 15 slide back and forth as a unit. A hand grip 17 can be provided for the movable jaw so as to facilitate the sliding of said jaw. The rigid jaw 13 and the movable jaw 16 can be provided with any preferred type of jaw faces 18 and 19 and the jaw faces preferably extend beyond the body of the vise. Hence the jaws extend laterally beyond the bars or beams 14 and 15 and as the bars or beams 14 and 15 are arranged at the center of the vise, work can be readily gripped by the jaws on opposite sides of the bars or beams.

This is of a decided advantage where elongated work is being held in a vertical plane.

Disposed within the hollow housing 12 of the casting or frame 10 of the vise is my improved locking mechanism 20 for the bars or vise beams 14 and 15.
The bars or beams 14 and 15 are locked, advanced or retracted by the mechanism 20 and this mechanism 20 includes a pair of spaced clamping plates 21 and 22 for the bar or beam 14 and a like pair of clamping plates 23 and 24 for the bar or beam 15, and all of these plates are provided with openings 25 through which the bars or beams extend. The openings 25 are of a slightly greater diameter than the diameter of the bars or beams. The front plates 21 and 23 of the clamping mechanism 20 are provided with overlapping interengaging ears 26 and the upper front clamping plate 21 is provided with a reduced finger 27 on its upper end. The lower plate 23 is provided with a similar depending finger 28. These fingers 27 and 28 are engaged by adjustable set screws 29 and 30 respectively.

A spring pressed plunger 31 is carried by the frame or casting and engages the overlapping ears 26 of the plates 21 and 23 and hence this plunger normally tends to cant or tilt the plates 21 and 23 on their bars or beams 14 and 15. The rear clamping plates 22 and 24 have overlapping ears 32 and these ears are similar to the ears 26 on the front plates 21 and 23. Expansion springs 33 are coiled about the beams or bars 14 and 15 and are disposed respectively between the plates 21 and 22 and the plates 23 and 24. Similar relatively heavy expansion springs 34 are also coiled about the beams 14 and 15 and these springs engage the outer faces of the rear plates 22 and 24 and the inner face of the housing 12 of the vise.

Extending transversely through the hollow housing 12 is a rotatable crank shaft 35 and the crank or throw portion 36 of this shaft is arranged between the pairs of plates 21 and 22 and 23 and 24 directly in rear of the spring pressed plunger 31 and at the points of interengagement of the plates by their ears 26 and 32. Suitable bearings can be provided in the frame housing 12 for the shaft 35 and one end of the shaft carries any preferred type of manipulating handle 37. Hence the shaft can be conveniently rocked or turned in the desired direction by the operator.

When the lever or handle 37 is in its raised position, as shown in Figures 1 and 3, the throw portion 36 of the shaft 35 is in an elevated position so that the springs 33 and 34 function to hold the plates in a substantially vertical position at right-angles to the longitudinal axis of the bars or beams 14 and 15. Hence the movable jaw 16 and the bar 15 can be conveniently slid back and forth.

Considering that work is to be done, the movable jaw 16 can be slid toward the rigid jaw to an initial position for loosely receiving the work, which is indicated by the reference character W. When the movable jaw 16 has been slid to its initial adjusted position and the work W is placed between the rigid and movable jaws, the lever 37 is swung down by the operator. With the initial turning of the shaft 35, the throw portion 36 thereof will be moved away from the ears 26 of the front plates 21 and 23 and the spring pressed plunger 31 will function to push in on the inner ends of the plates 21 and 23 to tilt the same on the beams 14 and 15. As the throw portion 36 moves away from the ears 36 of the front plates 21 and 23, the same is moved into engagement with the ears 32 of the rear plates 22 and 24 and hence these plates will be tilted against the tension of the springs 34. The opposite diagonal corners of the walls of the openings 25 will grip the beams when the plates are tilted and, upon continued downward movement of the handle 37, the throw portion 36 of the shaft 35 will be further moved into engagement with the ears 32 of the plates 22 and 24 and this will move the beams 14 and 15 rearwardly and move the movable jaw 16 into tight gripping contact with the work and the beams will be locked against movement.

When it is desired to release the work, it is merely necessary to swing the handle 37 upwardly and the throw portion 36 of the shaft 35 will be brought away from the plates 22 and 24 and toward the plates 21 and 23 and the plates will return to their initial position. This not only releases the clamping of the beams or bars 14 and 15 by the plates, but the movement of the plates back to their normal position will push forwardly on the beams or bars so as to slightly move the jaw 16 away from the jaw 13.

Great stress is laid on the novel arrangement of the overlapping of the inner ends of the sets of locking plates, whereby only a single throw or operating member is needed to actuate the plates to their locking position.

Obviously, I can employ only one plate for each bar or beam and where only one plate is employed, a bar or beam will still be efficiently locked.

Various types of operating means can be employed for operating the clamping plates and in Figure 4 I have shown a clamping plate 40 and this clamping plate receives the sliding bar or vise beam 41. One end of the plate is provided with a finger 42 and this finger can be engaged by the cam portion 43 of a swinging cam lever 44. The cam lever can be mounted upon a stub shaft or pivot pin 45 carried by the frame or housing of the vise.

In lieu of using a cam lever for engaging the finger 42, I can provide a set screw 46 (see Figure 6) for engaging the finger 42.

In Figure 6 I have shown a sliding wedge bar 47 for engaging the finger 42.

Obviously, other means for actuating the clamping plate 40 will readily suggest themselves to persons skilled in this art.

In Figure 7 I have shown a modified form of clamping plate 50. This clamping plate 50 includes a pair of openings 51 for receiving a pair of vise beams or bars and this clamping plate is provided with laterally extending finger 52 disposed between the openings 51. Any suitable means, such as I have shown in Figures 4, 5, and 6, can be employed for engaging the finger 52 for tilting the clamping plate on the vise bars or beams.

Various 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 pair of freely slideable vise beams engaging the frame, a movable jaw rigidly secured to the beams, a tiltable clamp plate for each beam, the inner ends of the clamp plates being arranged in overlapping relation, spring means engaging the plates on one side for normally urging the plates to a substantially right angular position to the beam, and a manually actuated member engaging the overlapping portions of the plates on the other side for rocking said plates against said spring means in the
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2. A vise or clamp comprising a frame, a rigid jaw on the frame, a pair of beams freely slidable in said frame, a movable jaw rigidly secured to said beams, a pair of clamp plates tiltably mounted on each beam, the inner ends of said pairs of clamp plates being arranged in overlapping relation, an expansion coil spring mounted on each beam between the plates of each pair of plates, an expansion coil spring on each beam disposed between one plate of each pair of plates and an adjacent part of the vise frame, a spring pressed plunger engaging the overlapping portions at the outer faces thereof of the other plates of each set of plates, and an operating member disposed between the overlapping portions of the pairs of plates.

3. A vise or clamp comprising a frame, a rigid jaw on the frame, a pair of beams freely slidable in said frame, a movable jaw rigidly secured to said beams, a pair of clamp plates tiltably mounted on each beam, the inner ends of said pairs of clamp plates being arranged in overlapping relation, an expansion coil spring mounted on each beam between the plates of each pair of plates, an expansion coil spring on each beam disposed between one plate of each pair of plates and an adjacent part of the vise frame, a spring pressed plunger engaging the overlapping portions of the outer faces thereof of the other plates of each set of plates, and an operating member disposed between the overlapping portions of the pairs of plates, said operating member including a rotatable cam shaft and an operating handle.

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