

July 22, 1947.

R. O. HEINRICH
QUICK LOCKING VISE

2,424,313

Filed May 15, 1943

3 Sheets-Sheet 1

Fig. 1.

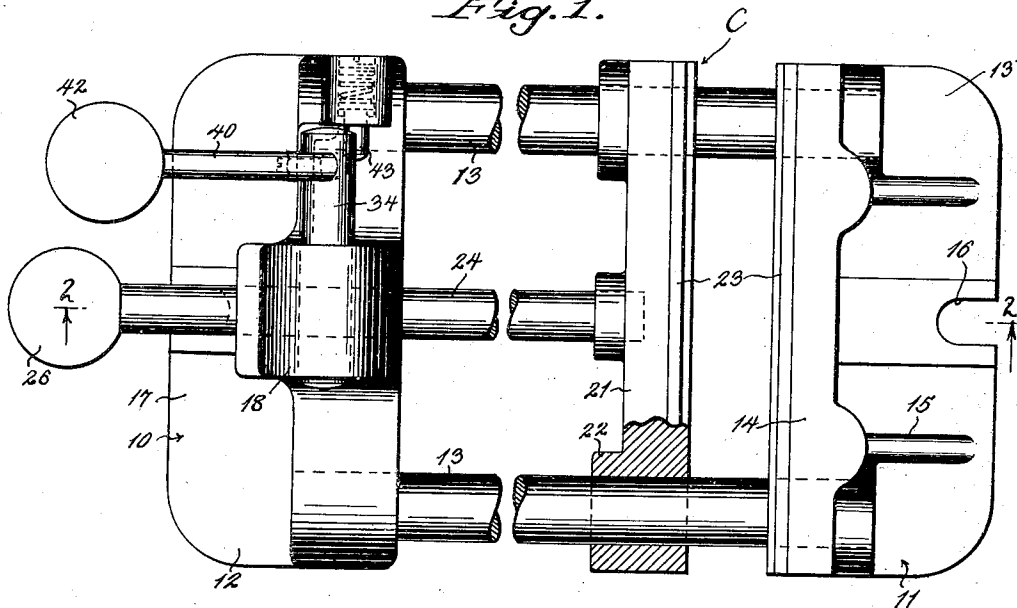
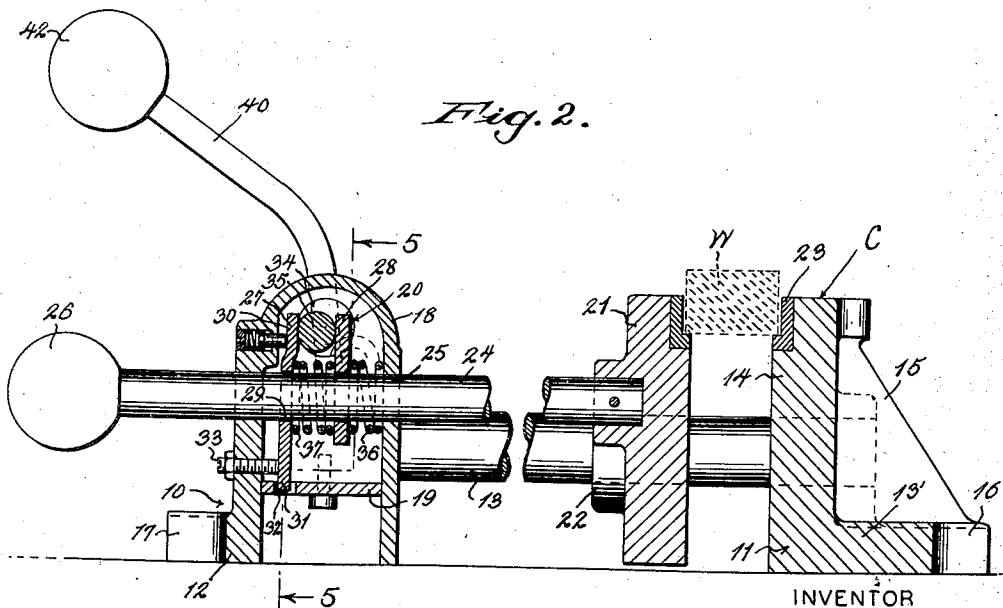


Fig. 2.



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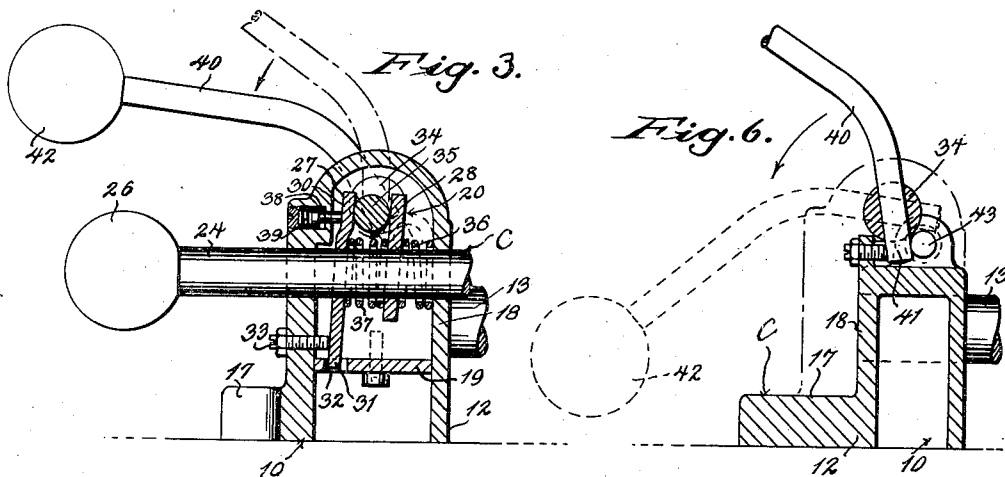
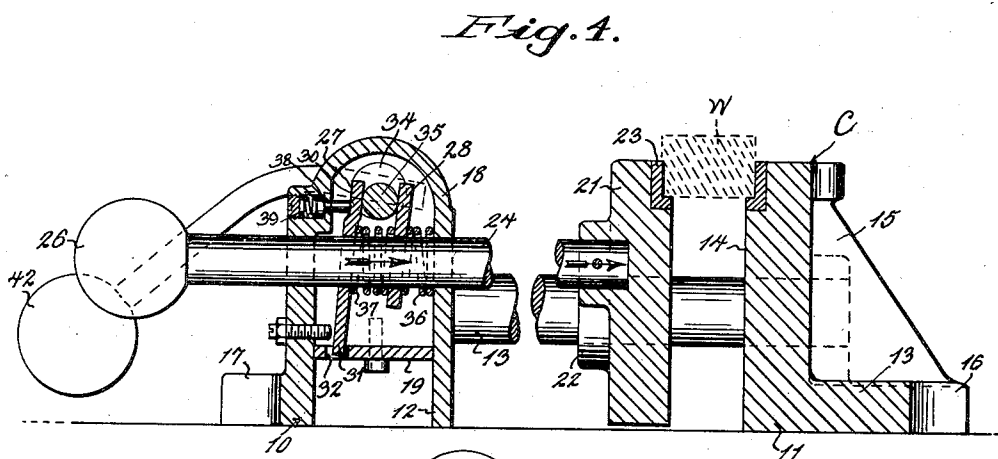
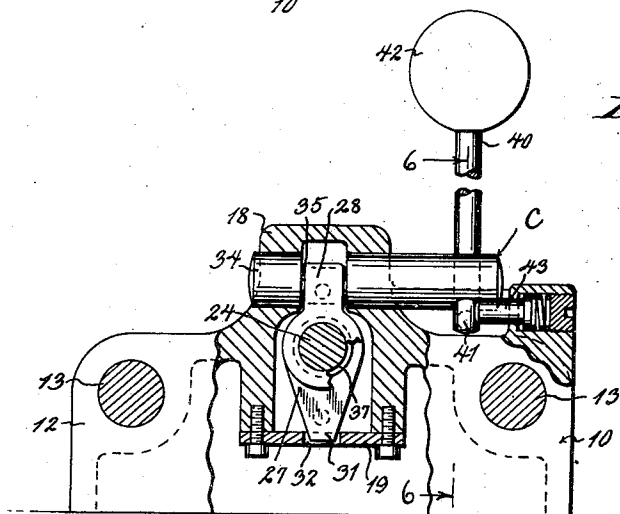
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Fig. 7.

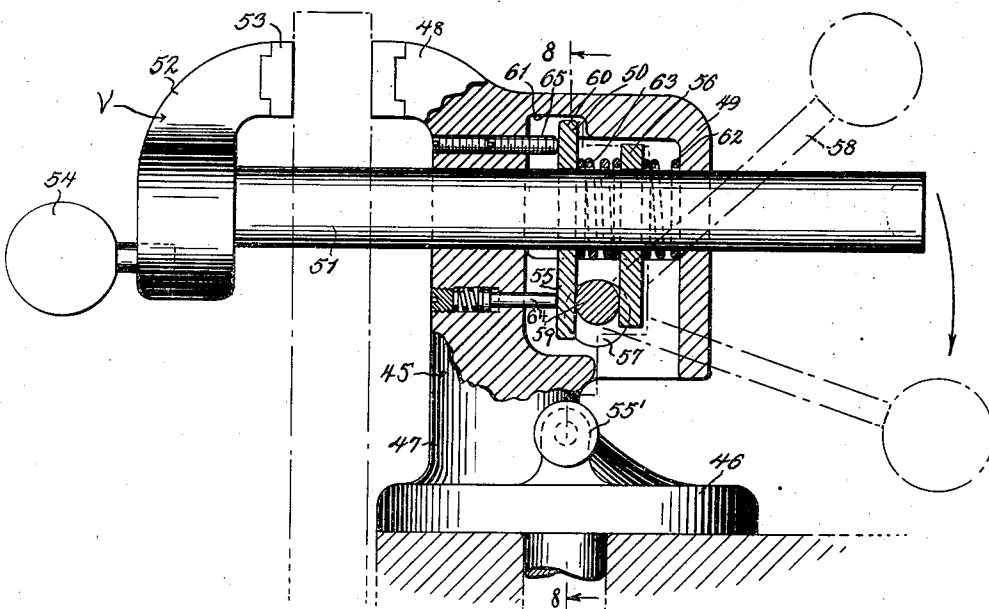
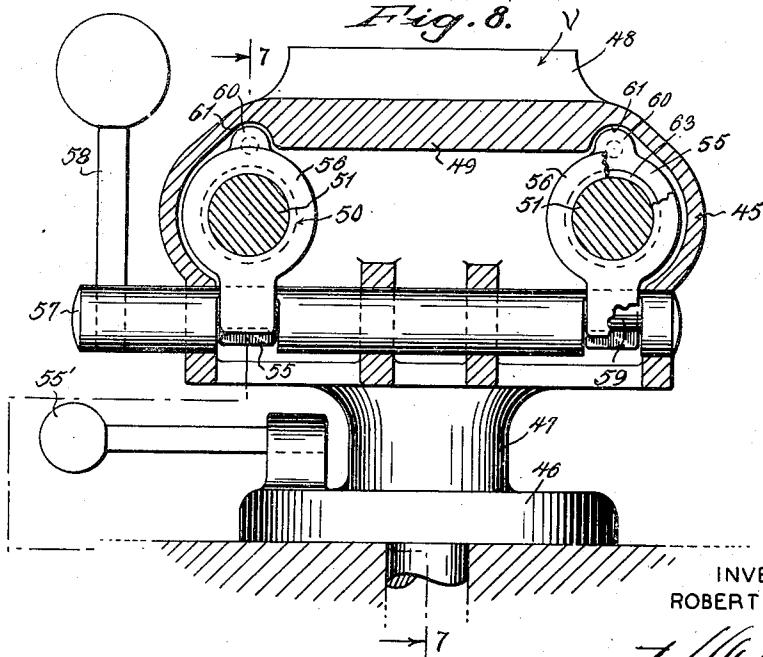


Fig. 8.



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QUICK LOCKING VISE

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4 Claims. (Cl. 81—26)

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This invention appertains to vises and clamps and more particularly to a novel means for facilitating the quick adjusting, locking and releasing of the movable jaw of vises, clamps, machine fixtures and like appliances.

One of the primary objects of my invention is to provide a vise or similar device in which the movable jaw can be freely slid to an initial adjusted position toward the work and thereafter forcibly moved into clamping and locking engagement with the work by the mere shifting of a hand lever or the like.

Another salient object of my invention is the provision of a vise, clamp or work fixture in which the sliding jaw and bar or beam is freely slidable, so that the jaw can be rapidly moved toward or away from the work, with means including tiltable clamping plates for engaging the bar or beam for locking said bar or beam and the movable jaw in work engaging position against movement.

A further important object of my invention is the provision of a vise, clamp or work fixture in which the movable jaw can be quickly set to a desired position for receiving the work, with means including lock plates and a lever for moving the jaw into and out of work clamping position by the simple operation of said lever, so that like pieces of work can be quickly held and released without undue manual operation of the vise or clamp, the construction being such that it renders the device particularly susceptible for use on the tables of drill presses and the like.

A still further important object of my invention is the provision of novel means for arranging the lock plates and the operating lever whereby not only will a compact and durable structure be had, but whereby these parts will be out of the way of the operator and the work.

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 top, plan view of my novel vise or clamp, the structure shown being of particular value for use on machine tables, such as drill presses and the like, parts of the view being shown broken away and in section.

Figure 2 is a longitudinal, sectional view through the vise or clamp taken on the line 2—2 of Figure 1 looking in the direction of the arrows, the view showing the novel jaw advanc-

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ing and locking mechanism, the mechanism being in its released or unlocked position.

Figure 3 is a fragmentary, detail, longitudinal, sectional view through the clamping mechanism and showing the first position of the hand lever for moving the locked plates into engagement with the bar or beam of the movable jaw.

Figure 4 is a view similar to Figure 2 but showing the final locked position of the hand lever for moving the lock or clamping plates forwardly so as to advance the movable jaw into clamping engagement with the work.

Figure 5 is a transverse sectional view through the vise or clamp taken on the line 5—5 of Figure 2 looking in the direction of the arrows.

Figure 6 is a fragmentary, detail, longitudinal, sectional view through the clamp taken on the line 6—6 of Figure 5 looking in the direction of the arrows and illustrating the means for holding the operating lever against accidental movement.

Figure 7 is a side, elevational view of a bench vise showing the features of my invention incorporated therewith, parts of the view being shown in section and the section being taken substantially on the line 7—7 of Figure 8.

Figure 8 is a transverse, sectional view through the bench vise taken on the line 8—8 of Figure 7 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 C generally indicates a clamp or vise which can be used to great advantage on work benches, tables of drilling machine and the like and the same includes a frame 10. This frame 10 embodies a front casting 11 and a rear casting 12. These castings are rigidly connected together by spaced parallel guide rods 13. These guide rods can be of polished steel, if so desired. The front casting 11 embodies a base 13' and the upstanding rigid jaw 14 and the jaw and the base can be reinforced by webs 15. The base 13' can be provided with suitable openings or notches 16 for facilitating the attaching of the clamp or vise to the desired table.

The rear casting 12 also includes a base 17 which can be also provided with notches or openings for facilitating the bolting thereof to a table. Formed on the base or frame 17 is the upstanding hollow casing shell 18 which is arranged in spaced parallel relation to the rigid jaw 14. The lower face of the hollow upstanding shell 18 can be closed by a removable plate 19. Enclosed within the hollow shell 18 is the novel

locking and advancing mechanism 20 which will be later more specifically described.

Slidably mounted on the guide rods 13 between the rigid jaw 14 and the upstanding shell 18 is the movable jaw 21. This movable jaw can be reinforced by bosses or the like 22 at the points where the jaw slides on the guide rods. The rigid jaw 14 and the movable jaw 21 can be provided with any preferred character of jaw faces 23.

Rigidly attached to the center of the movable jaw 21 is the bar or beam 24. This bar or beam is preferably of a cylindrical shape and can be formed from hardened polished steel and this bar or beam slidably extends through openings 25 formed in the upstanding shell 18. The outer end of the bar or beam 24 can be provided with any preferred type of hand grip 26 whereby the bar and the movable jaw 21 can be easily slid back and forth toward and away from the rigid jaw 14.

The bar or beam is clamped, advanced or retracted by the mechanism 20, which will now be described. This mechanism 20 includes a pair of spaced clamping plates 27 and 28 and the plates are provided with openings 29 through which the bar or beam 24 extends. The openings 29 are of a slightly greater diameter than the diameter of the bar or beam 24. The plate 27 has its upper end slightly off-set, as at 30, and the lower end of the plate extends below the plate 28 and terminates in a finger 31 which is loosely received in an opening 32 formed in the closure plate 19. An adjustable set screw 33 is carried by the shell 18 for limiting the backward swinging movement of the lower end of the clamping plate 27.

Rockably mounted in suitable bearing openings formed in the ends of the shell is a cam or crank shaft 34 and the throw portion 35 of said shaft is disposed between the upper ends of the clamping plates 27 and 28. An expansion spring 36 is coiled about the bar or beam 24 for normally urging the clamping plate 28 into engagement with the throw portion 35 of the cam or crank shaft 34. A similar expansion spring 37 is coiled about the bar or beam 24 and is confined between the plates 27 and 28 for normally holding the lower ends of the plates away from one another. A suitable spring device is provided for engaging the upper end of the plate 27 so as to normally hold this plate into engagement with the throw portion of the cam or crank shaft 34. This spring device can include a plunger 38 which is normally urged toward the plate 27 by a coil spring 39.

One end of the rock cam or crank shaft 34 is extended beyond the shell 18 and a suitable handle or lever 40 is connected to said shaft to facilitate the turning or rocking thereof. In the present showing, a lever is used and the lever extends entirely through the shaft 34 so as to provide a short extension 41, the purpose of which will be set forth. The outer end of the long arm of the lever 40 can be provided with any preferred type of hand grip 42.

In operation of the clamp or vise, the lever is moved to a raised position for releasing the clamping plates and to a lowered position for locking and advancing the bar or beam 24 and a spring pressed detent 43 is carried by the casting 12 at one side of the shell 18 for engaging the extension 41 of the lever, when the lever is in either its locking or unlocking position, see Figures 5 and 6. The spring pressed detent engages either one side or the other of the lever extension 41, as can be readily understood.

In use of my clamp or vise, the lever is swung

to a raised position, as is clearly shown in Figure 2 and the hand grip 26 is grasped by the operator and the movable jaw 21 can now be moved toward or away from the rigid jaw 14. Considering that work is to be done, the movable jaw can be slid toward the rigid jaw to an initial position for loosely receiving the work indicated by the reference character W in Figures 2 and 4. The movement of the bar or beam 24 and the jaw 21 is permitted due to the fact that the clamping plates 27 and 28 will be in a substantial vertical position with the openings 29 thereof in diametrical alignment with the longitudinal axis of the bar or beam 24.

When the movable jaw 21 has been slide to its initial adjusted position and the work W is placed between the jaw faces and the hand grip 42 of the lever is grasped by the operator and the lever 40 is swung down, with the initial turning of the shaft 34, the throw portion 35 thereof will be moved away from the clamping plate 27 and into engagement with the clamping plate 28 and consequently the plate 28 will be tilted and the spring 36 will be put under tension. The spring 37 will follow the plate 28. The spring pressed plunger 38 will now also tilt the clamping plate 27. Consequently the opposite diagonal edges of the walls of the openings 29 in the plates will grip the bar or beam 24, see Figure 3. Upon continued downward movement of the lever, the throw portion 35 of the shaft will be further moved forwardly and further tilt the plate and the clamping plate 27 follows the movement of the plate 28, see Figure 4. This will shove the beam 24 and the sliding jaw 21 toward the rigid jaw 14 and consequently the work will be firmly gripped and the bar or beam will be clamped against accidental movement.

The desired operation can now be done on the work and when the same is completed, it is merely necessary to swing the lever upwardly and the throw portion of the shaft will move away from the plate 28 and the spring 36 will move the clamp plates 27 and 28 back to their initial position. The releasing of the plate from the bar 24 and the moving back of the plates will move the bar and the sliding jaw back a slight distance so as to permit the release of the work.

Obviously like work can be quickly associated with the clamp or vise and efficiently clamped without any further initial adjustment of the sliding jaw.

My invention entirely eliminates the use of the slow process of turning a screw shaft for advancing and retracting an adjustable jaw and stress is laid on the double adjusting feature, namely, the initial free adjusting of the movable jaw and second, the advancing of the adjusting jaw to gripping contact with the work and the locking thereof.

In Figures 7 and 8 I have shown my invention incorporated with a bench vise V and this vise can include a casting or frame 45. This casting or frame 45 can include a base 46 which can be, if so desired, swivally mounted upon the bench or other table. Arising from the base 46 is a standard or column 47 and formed on the standard or column 47 is the rigid jaw 48 and a housing or shell 49 for the locking and advancing mechanism 50. The column and shell are provided with pairs of spaced openings for slidably receiving the pair of spaced parallel bars or beams 51 which carry the movable jaw 52. The movable jaw 52 and the rigid jaw 48 can be provided with any preferred type of jaw faces

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53. A hand grip 54 can be provided for the movable jaw so that the movable jaw and its bar or beam can be easily slid back and forth. Likewise, the base 46 can be provided with a handle 55' for facilitating the turning of the base.

As stated, the advancing and locking mechanism 50 is housed within the shell or housing 49 and the same includes a pair of clamping plates 55 and 56 for each bar or beam 51. The plates 55 and 56 are of the same character as the plates 27 and 28, with the exception that the position thereof is inverted, that is, the crank or cam shaft 57 for the plates is disposed between the lower ends of the plates instead of the upper ends of the plates. The main reason for lowering the position of the crank or cam shaft is to have this shaft and its operating lever 58 out of the way of the operator of the vise. The shaft 57 is rockably mounted in suitable bearing openings in the housing or shell 49 and the shaft is provided with a pair of throws 59 and a throw is disposed between each pair of plates 55 and 56.

The plates 55 are each provided with an upstanding finger 60 and these fingers are loosely received in recesses 61 formed in the inner surface of the housing 49. Coil springs 62 are placed around the bars or beams 51 and engage the plate 56 and the housing for normally urging the plates 56 toward the plates 55 and the crank or cam shaft. Springs 63 are also placed about the bars or beams 51 between the plates 55 and 56 of each bar. A spring pressed plunger 64 is also provided for each plate 55 and these plungers engage the lower ends of the plates 55 so as to normally urge these plates toward the plates 56 and against the springs 63. Engaging the finger 60 of each plate 55 is an adjustable set screw 65 and these set screws limit the movement of the fingers in their recesses.

The vise shown in Figures 7 and 8 operates similar to the vise shown in Figures 1 to 6 inclusive and consequently when the lever 58 is in a raised position, the plates 55 and 56 are in their normal substantially vertical position so that the movable jaw 52 and its bars or beams 51 can be freely slid back and forth. When the lever 59 is swung down, the throws of the crank shaft tilt the clamp plates 55 and 56 and advance the bars or beams and move the jaw 52 into gripping contact with the work and the plates lock the bars or beams 51 against movement.

If desired, a detent can also be provided for the lever 58 to prevent accidental swinging movement thereof.

Particular attention is called to the fact that the active surfaces of the jaw faces 53 extend beyond the base 46 of the vise and consequently elongated work (see dotted lines in Figure 7) can be conveniently held by said jaws.

From the foregoing description it can be seen that I have provided an exceptionally simple and compact arrangement for vises and clamps whereby a movable jaw can be quickly slid to an initial adjusted position and thereafter moved to a clamping and locking position by the mere operation of a lever.

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 fixed jaw, a movable jaw, a freely slidable bar connected to the movable jaw for moving said movable jaw to

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an initial adjusted position, a pair of spaced clamp plates having openings through which the bar extends, a rock crank shaft having its throw portion disposed between the clamp plates for tilting said plates, and spring means normally urging the plates to a substantially right angular position relative to the bar, with the openings therein in longitudinal alignment with the bar and against said throw portion.

2. A vise or clamp comprising a fixed jaw, a movable jaw, a freely slidable bar connected to the movable jaw for moving said movable jaw to an initial adjusted position, a pair of spaced clamp plates having openings through which the bar extends, a rock crank shaft having its throw portion disposed between the clamp plates for tilting said plates, spring means normally urging the plates to a substantially right angular position relative to the bar, with the openings therein in longitudinal alignment with the bar and the plates against said throw portion, a handle for rocking the shaft, and means for holding the handle against accidental movement.

3. A vise or clamp comprising a frame including front and rear members, guide rods rigidly connecting said members together, a rigid jaw formed on the front member, a housing formed on the rear member, a movable jaw freely slidable on the guide rods, a bar fixed to the movable jaw and slidably extending through said housing, a hand grip on the bar for moving the movable jaw to an initial adjusted position, means for advancing and retracting the movable jaw to and from work clamping position including a pair of spaced clamping plates tiltably mounted within the housing, said plates being provided with openings for receiving the bar, the openings being in longitudinal alignment with the longitudinal axis of the bar when in one position to permit free sliding of said bar, a rock shaft carried by the housing having a throw portion disposed between the clamping plates, a coil spring between said plates, a second coil spring engaging one of said plates and the housing for normally holding the last mentioned plate against the throw portion of the rock shaft, the other of said plates being provided with a finger, means on the housing for loosely receiving said finger, and a spring pressed plunger engaging the last named plate for moving said last named plate in the direction of the throw portion of the shaft.

4. A vise or clamp comprising a frame including front and rear members, guide rods rigidly connecting said members together, a rigid jaw formed on the front member, a housing formed on the rear member, a movable jaw freely slidable on the guide rods, a bar fixed to the movable jaw and slidably extending through said housing, a hand grip on the bar for moving the movable jaw to an initial adjusted position, means for advancing and retracting the movable jaw to and from work clamping position including a pair of spaced clamping plates tiltably mounted within the housing, said plates being provided with openings for receiving the bar, the openings being in longitudinal alignment with the longitudinal axis of the bar when in one position to permit free sliding of said bar, a rock shaft carried by the housing having a throw portion disposed between the clamping plates, a coil spring between said plates, a second coil spring engaging one of said plates and the housing for normally holding the last mentioned plate against the throw portion of the rock shaft, the other of said plates being provided with a finger, means on the housing for loosely

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receiving said finger, and a spring pressed plunger engaging the last named plate for moving said last named plate in the direction of the throw portion of the shaft, means for adjusting the position of the finger in said means, and a handle for operating said shaft.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date	
1,027,941	Viezzi	May 28, 1912	15
1,854,891	Dwofsky	Apr. 19, 1932	
1,439,822	Johnson	Dec. 26, 1922	
1,283,192	Hughes	Oct. 29, 1918	

8

Number	Name	Date
1,450,940	Cobb	Apr. 10, 1923
1,349,225	Rosenblum	Aug. 10, 1920
Re. 12,864	Mills	Oct. 13, 1908
5 1,020,129	Grandal	Mar. 12, 1912
1,783,713	Holman	Dec. 2, 1930
2,061,217	Watcher	Nov. 17, 1936
348,818	Baker	Sept. 7, 1886
2,262,196	Olsen	Nov. 11, 1941
10 766,145	Greer	July 26, 1904
934,929	Morrison	Sept. 21, 1909
1,065,209	Brittsan et al.	June 17, 1913
1,120,751	Smiley	Dec. 15, 1914

FOREIGN PATENTS

Number	Country	Date
24,854	Great Britain	Dec. 27, 1893