

April 23, 1946.

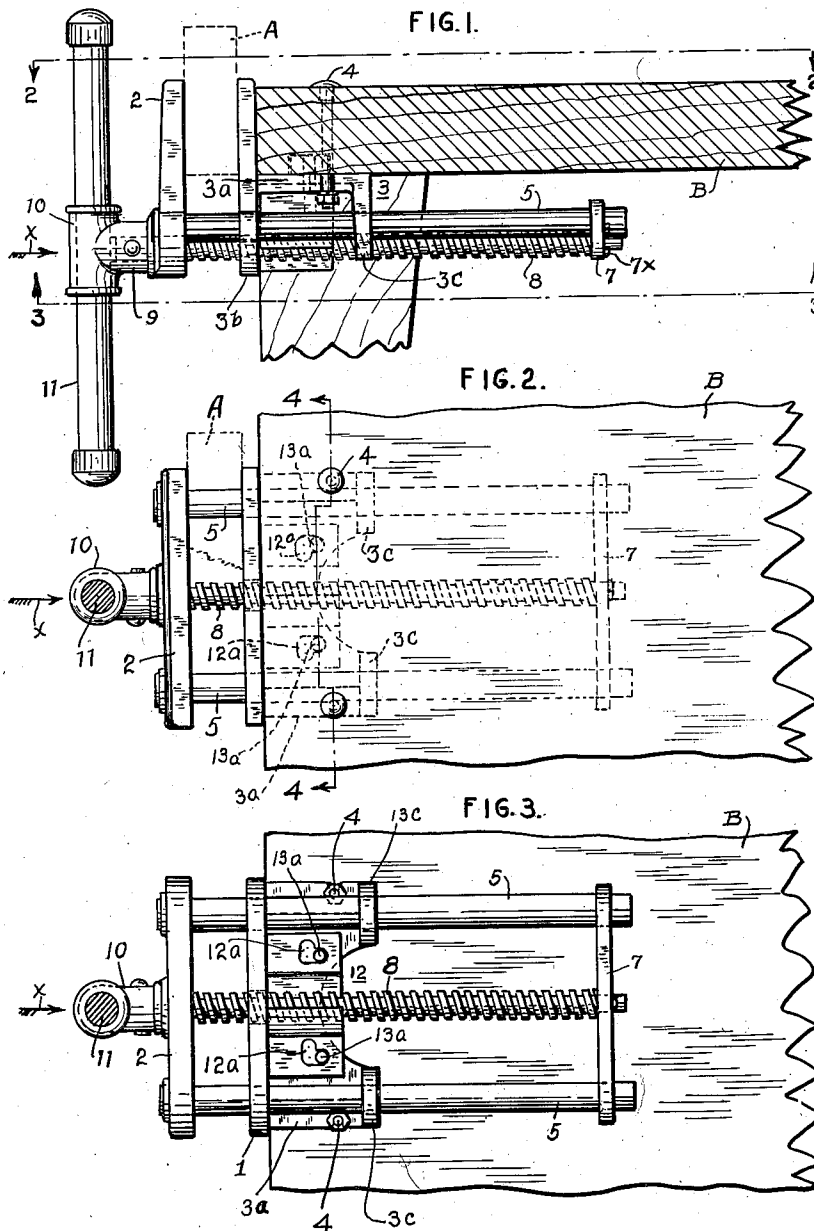
S. W. JORDAN

2,398,941

WISE

Filed March 10, 1944

4 Sheets-Sheet 1



INVENTOR.

SIDNEY W. JORDAN.

BY

Geo. B. Pitts
attorney

April 23, 1946.

S. W. JORDAN

2,398,941

WISE

Filed March 10, 1944

4 Sheets-Sheet 2

FIG. 4.

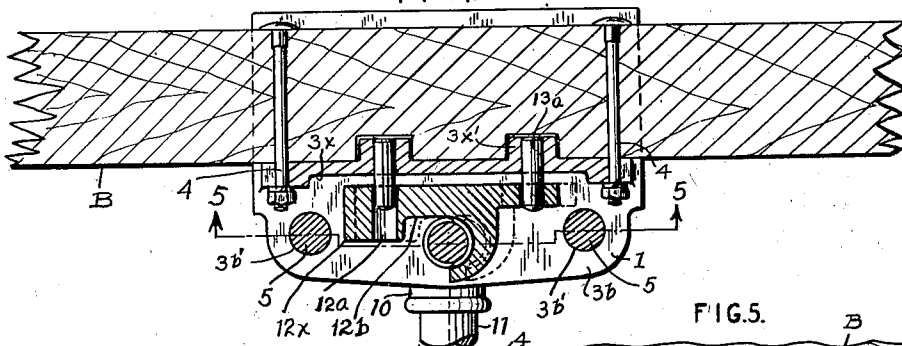


FIG. 5.

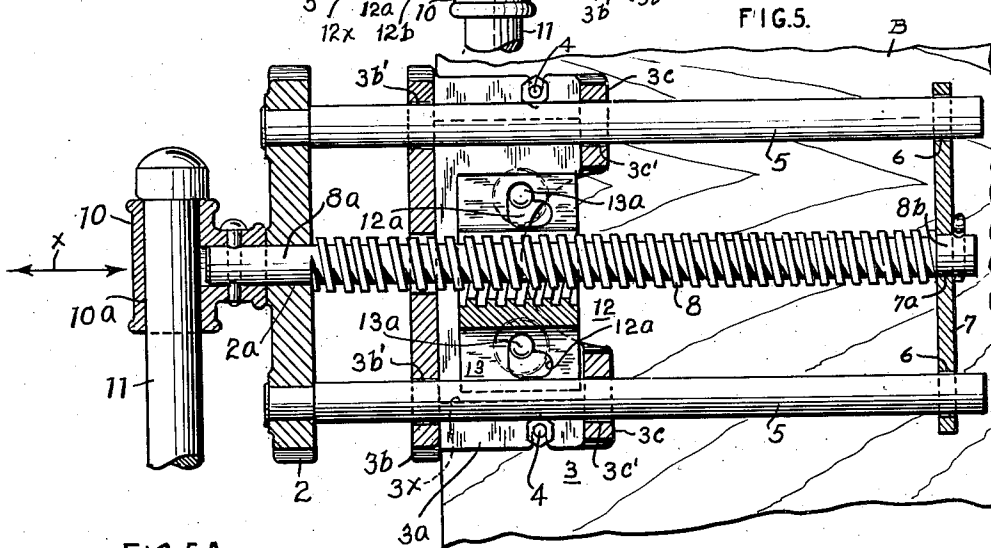


FIG. 5A.

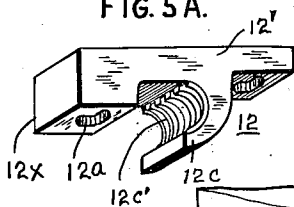


FIG. 6.

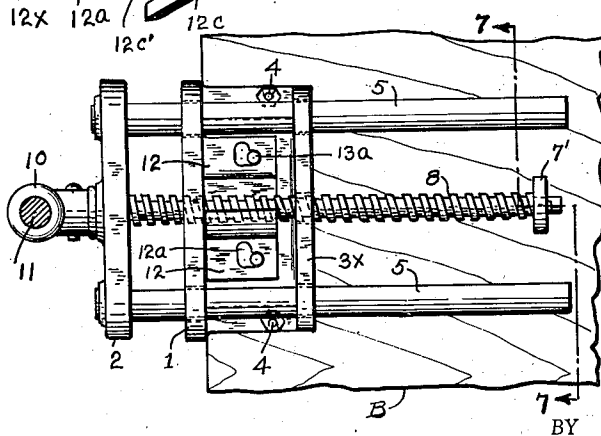
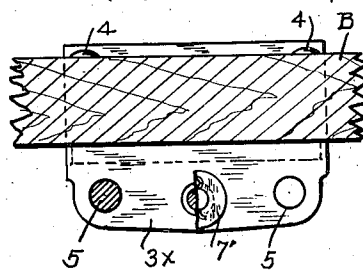


FIG. 7.



INVENTOR.

SIDNEY W. JORDAN.

Geo. B. Riddle
attorney

April 23, 1946.

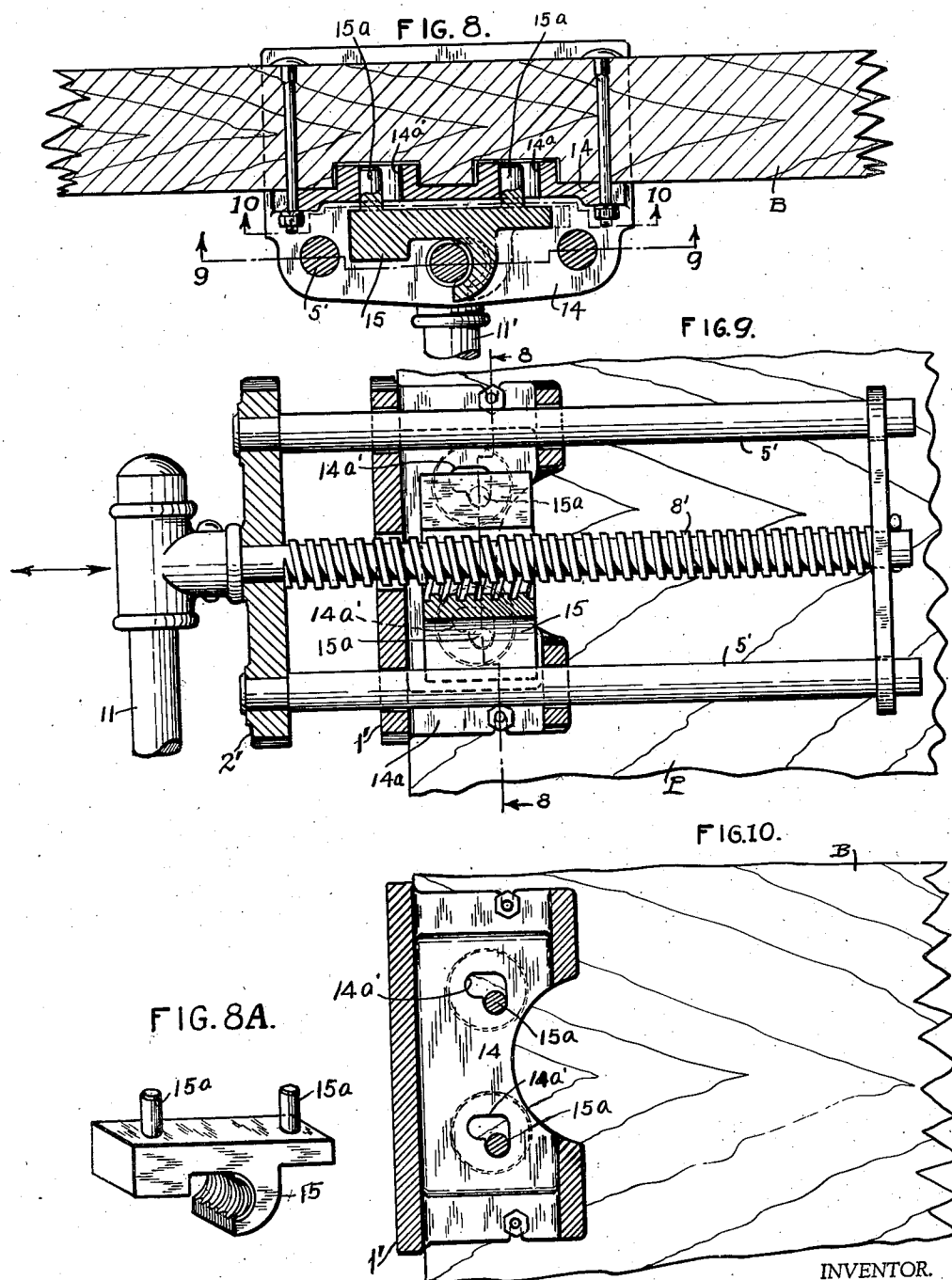
S. W. JORDAN

2,398,941

WISE

Filed March 10, 1944

4 Sheets-Sheet 3



April 23, 1946.

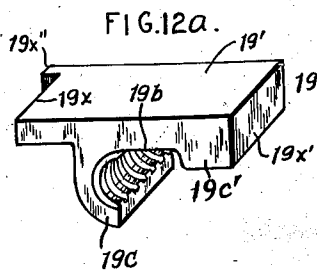
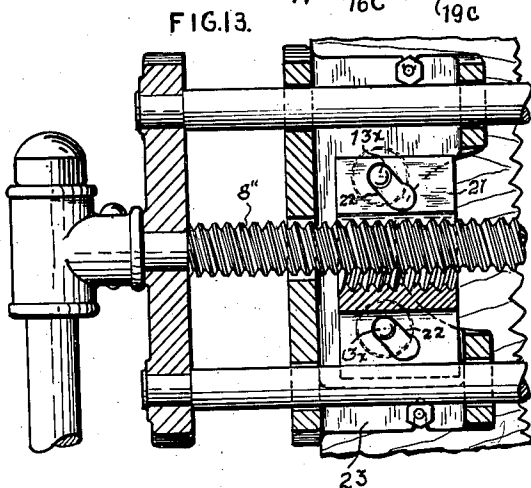
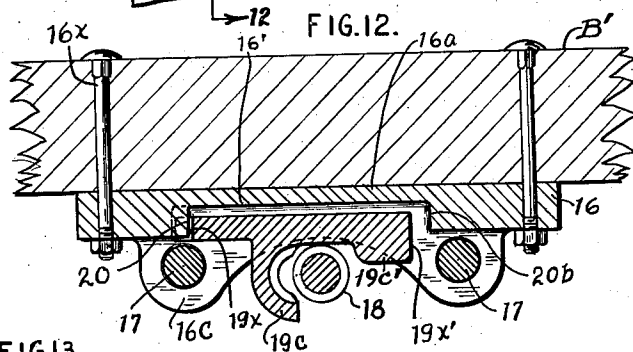
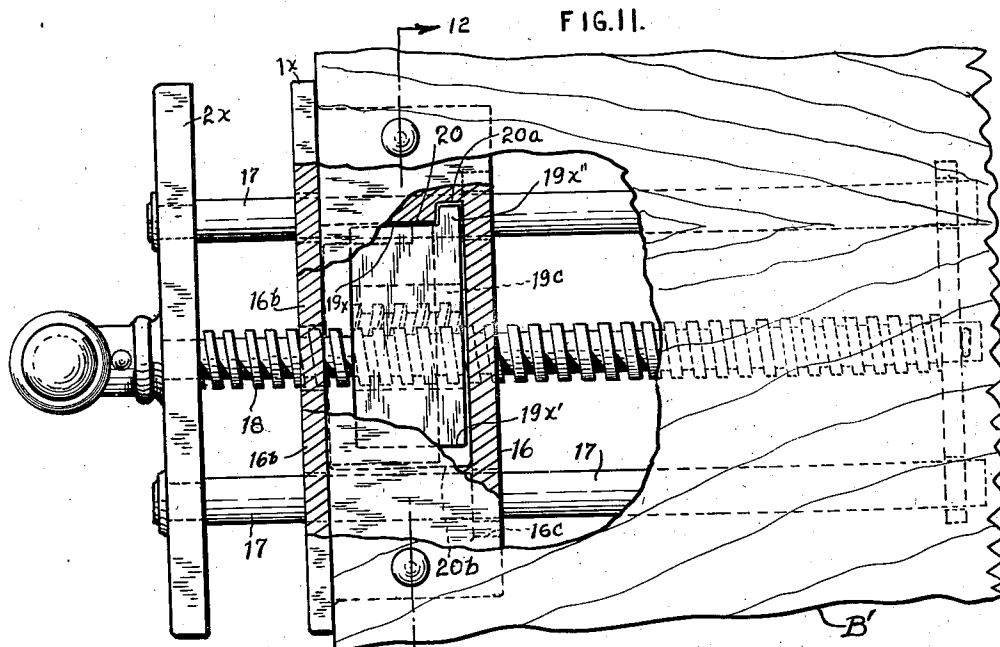
S. W. JORDAN

2,398,941

VICE

Filed March 10, 1944

4 Sheets-Sheet 4



INVENTOR.
SIDNEY W. JORDAN.

Geo. B. Pitts

ATTORNEY

UNITED STATES PATENT OFFICE

2,398,941

VISE

Sidney W. Jordan, Cleveland, Ohio

Application March 10, 1944, Serial No. 525,833

7 Claims. (Cl. 81—36)

This invention relates to a vise, more particularly to a vise of the quick adjustable type.

One object of the invention is to provide an improved vise of this type employing complementary disengageable screw elements, wherein their operative or inoperative relationship is readily and automatically effected by rotative operation of the feed screw.

Another object of the invention is to provide an improved vise of this type having complementary screw threaded disengageable elements, comprising a minimum number of parts for effecting an operating and non-operating relation therebetween.

Another object of the invention is to construct an improved vise of this type comprising a movable jaw provided with a feed screw and interlocking elements between the stationary jaw of the vise and the feed screw, one of said elements being movable and having a threaded portion adapted to removably engage the feed screw and a portion frictionally engaging therewith, whereby rotation of the screw controls the engagement of the threaded portion of the element with the feed screw and the other element and its disengagement therefrom.

Another object of the invention is to provide an improved vise having between its fixed jaw and the feed screw for its movable jaw a member provided with engaging elements and movable transversely and longitudinally relative to the feed screw, said member being supported on and frictionally engaging the peripheral edges of the screw threads of the feed screw, whereby (a) turning of the screw in one direction moves the member laterally to effect engagement of one element thereof with the screw and permits the screw to move the member in the longitudinal direction to effect engagement of its other element with the fixed jaw and (b) turning of the screw in the opposite direction reverses the movements of the member to effect disengagement of its elements from the screw and fixed jaw.

Another object of the invention is to construct an improved vise of this type having a movable jaw provided with a feed screw and a nut movably mounted between the fixed jaw of the vise and the feed screw and adapted to operatively engage the feed screw and stationary jaw, the nut having a portion frictionally engaging the screw, whereby rotative operation of the latter controls the movement of the nut into engagement with the feed screw and stationary jaw and disengagement therefrom.

Other objects of the invention will be apparent

to those skilled in the art to which my invention relates from the following description taken in connection with the accompanying drawings, wherein

Fig. 1 is a side elevation of a vise embodying my invention mounted on a suitable support;

Fig. 2 is a plan view on the line 2—2 of Fig. 1;

Fig. 3 is a bottom plan view on the line 3—3 of Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 2;

Fig. 5 is a view similar to Fig. 3 (somewhat enlarged), but showing the screw threaded members in non-operating or disengaged relation.

Fig. 5A is a perspective of one of the threaded members;

Fig. 6 is a view similar to Fig. 3, but showing a modification;

Fig. 7 is a section on the line 7—7 of Fig. 6;

Fig. 8 is a section on the line 8—8 of Fig. 9, but showing the threaded elements in operative relation;

Fig. 8A is a perspective view of the movable threaded element;

Figs. 9 and 10 are sections on the line 9—9 and 10—10, respectively, of Fig. 8, but showing the threaded elements in in-operative relation;

Fig. 11 is a plan view of another embodiment of the invention, parts being broken away;

Fig. 12 is a section on the line 12—12 of Fig. 11;

Fig. 12a is a perspective view of the connecting element shown in Figs. 11 and 12;

Fig. 13 is a fragmentary plan view wherein a modified form of screw thread is employed.

In the drawings, 1, 2, indicate the inner and outer jaws of the vise shown clamping a work piece A between them. The jaw 1 is preferably integrally connected to a base, indicated as an entirety at 3. The base 3 preferably consists of a bottom wall 3a having an end wall or flange 3b at its front or outer side and ears 3c on its rearward or inner side adjacent the opposite ends of the wall 3a. The base bottom 3a may be mounted on the upper side of a support B, but in the preferred construction the jaw 1 extends upwardly in the plane of the wall 3b at right angles to the bottom wall 3a. This exemplified arrangement permits the base 3 to be secured to the underside of the support B by bolts 4, such relationship to the support B being advantageous since (a) the jaw 1 may be positioned in face to face engagement with the side wall of the support B whereby the latter resists pressure exerted inwardly on the jaw 1, and (b) the jaws support work pieces in a plane slightly above the surface of the support B, whereby tools on the support employed for work-

ing on the work piece may be readily picked up and replaced thereon.

The jaw 2 is suitably rigidly connected to the outer ends of a pair of spaced parallel guides 5, the inner ends of the guides being supported in openings 6 formed in a cross member 7. Each guide 5 is slidably supported in aligned openings 3b', 3c', formed in the flange 3b and adjacent ear 3c, respectively. From the above description it will be observed that the jaw 2, guides 5 and cross member 7 form the movable members of the vise and are movable relative to the jaw 1 and parts connected thereto in the manner later set forth.

8 indicates a feed screw extending parallel to the guides 5 and preferably disposed midway therebetween. The outer end portion of the screw 8 is reduced, as shown at 8a and rotatively fits and extends through an opening 2a formed in the jaw 2, the projecting end of the reduced portion 8a being rigidly (preferably removably) connected to the hub 9 of a handle carrying member 10. The handle carrying member 10 is formed with a through opening 10a at right angles to the screw 8 to slidably support a handle 11. In the form of construction shown in Figs. 1 to 5, inclusive, the inner end portion of the screw 8 is reduced as shown at 8b and rotatably fits and extends through an opening 7a formed in the cross member 7. The extended end of the reduced portion 8b is preferably formed with a diametrical opening to removably receive a cotter pin 12. In the preferred arrangement, the terminating ends of the screw threads on the screw 8 provide the shoulders for the reduced ends 8a, 8b, and engage the inner sides of the jaw 2 and cross member 7 to fixedly relate the screw 8, jaw 2, guides 5 and cross member 7, so that by grasping the handle 11 or member 10, this assembly which constitutes the movable member of the vise, provided the connecting element (indicated as an entirety at 12) is disengaged from the screw 8, may be freely operated inwardly and outwardly relative to the jaw 2 and base 3, as indicated by the arrows x, whereby the jaw 1 may be translated with a quick movement from one position to another without rotating the screw 8.

13 indicates as an entirety interlocking elements between the base 3 and screw 8, operable to operatively connect the base 3 to the screw 8, whereby the latter may be rotated to clamp the work piece A or release it. In the form of construction shown in Figs. 1 to 5, inclusive, the elements 13 comprise a pair of pins 13a mounted in and depending from the bottom wall 3a of the base 3 at opposite sides of the screw 8 and the connecting element 12 (already referred to), the opposite end portions of which are formed with cam or guide slots 12a into which the pins 13a project. Each slot 12a consists of a portion extending substantially parallel to the screw 8 and a portion extending substantially transversely or laterally and in the same direction as the lateral portion of the other slot 12a. The connecting element 12 consists of a plate 12' of more or less ponderous character disposed between the base bottom 3a and screw 8 and supported on the latter. The plate 12' is provided on its lower side and intermediate its opposite ends with a relatively wide plane surface 12b which frictionally engages with and rests on the peripheral edges of the screw threads of the screw 8, so that (a) when the screw 8 is rotated in either direction the connecting element 12 rolls thereon laterally in one direction and (b) when the movable jaw 1 and screw 8 are being moved rectilinearly from one po-

sition to another position, these edges slide relative to the surface 12b. At one side of the bearing surface 12b, the plate 12' is provided with a lug 12c (preferably formed integrally therewith) depending therefrom at one side of the screw 8, that side of the lug 12c adjacent the screw 8 being preferably of curvilinear shape and concentric to the axis of the screw and provided with screw threads 12c' complementary to the threads of the screw 8 and adapted to engage the latter when the element 12 is moved laterally (from the dotted line position toward the left as viewed in Fig. 4) to the position shown in Figs. 4 and 5.

Figs. 1, 2, 3 and 4 show the jaws 1, 2, clamping a work piece A. In this position the member 12 has been moved laterally and longitudinally to move the end walls of the longitudinal portions of the slots 12a into engagement with the pins 13a. If now the screw 8 is rotated counter-clockwise as viewed in Figs. 1, 2, 3 and 5 (clockwise as viewed in Fig. 4), the co-action between the threads of the screw 8 and threads 12c' will first move the element 12 longitudinally of the screw 8 outwardly to align the transverse portions of the slots 12a with the pins 13a and thereafter the co-action between the peripheries of the threads on the screw 8 and the bearing surface 12b will move the element 12 laterally (toward the right as viewed in Fig. 4) to the position shown in Fig. 5 (see dotted lines in Fig. 4), thereby disengaging the element 12 from the screw 8. With the element 12 in this latter position, the movable jaw 2 is free to move in either direction throughout the length of the screw, without rotating the latter, as limited by the engagement of the cross member 7 with the ears 3c in the outward direction and the engagement of the jaw 2 with the jaw 1 in the inward direction.

During translation of the jaw 2 and screw 8, independently of the connecting element 12, the latter is held stationary in its in-operative position but rests on and has sliding engagement with the threads of the screw, as the screw moves endwise, in position to be rolled laterally for connected relation therewith in the manner above set forth. By turning the screw 8 clockwise as viewed in Figs. 1, 2, 3 and 5 (counter-clockwise as viewed in Fig. 4), the co-action between the bearing surface 12b and peripheries of the screw threads on the screw 8 will first move (that is, roll) the element 12 laterally (toward the left as viewed in Fig. 4) to effect engagement of the threads 12c' with the screw 8 and thereafter the co-action between the threads 12c' and threads of the screw 8 will move the element 12 longitudinally of the screw inwardly to engage the end walls of the longitudinal portions of the slots 12a with the pins 13a or the inner side of the plate 12' with the flange 3b, as shown in Figs. 1, 2, 3 and 4, thereby locking the element 12 to the base 3, so that continued turning of the screw 8 will be effective to clamp the jaws 1, 2, together or with a work piece between them. When the element 12 is locked to the base 3, slight outward pressure is maintained on the screw 8 during turning thereof in the jaw clamping direction until engagement with the work is effected to prevent displacement of the pins 13a with respect to the longitudinal portions of the slots 12a. It will be observed that in operating the screw 8 to effect movement of the element 12 into operative or in-operative relation to the screw 8, the engagement of the pins 13a with the side walls of the slots 12a serves to guide and limit the movement of the element 12. That end of

the plate 12' remote from the lug 12c is thickened, as shown at 12x, to provide a weight to counterbalance the weight of the lug 12c and adjacent end of the plate as well as to insure engagement of the bearing surface 12b with the screw 8 (see Figs. 4 and 5A). In this arrangement the entire weight of the connecting element is supported on the screw 8 since the pins 13a loosely engage the walls of the slots without affecting the frictional relation between the element 12 and screw 8.

When found desirable the bottom wall 3a of the base 3 may be recessed, as shown at 3x (see Fig. 4) to insure clearance for the element 12. In this arrangement the bottom wall 3a may be provided with hollow bosses 3x' to provide adequate seats for the pins 13a.

From the foregoing description it will be noted that I provide between the stationary jaw of the vise and the feed screw for its movable jaw interlocking elements, one of which is movable and is provided with a thread to removably engage the feed screw and controlled by the rotation of the screw to engage and disengage the other element, whereby rotation of the feed screw in the jaw clamping direction serves automatically to effect engagement of these elements and the thread on the movable element with the feed screw or the disengagement of these elements and the movable element from the feed screw.

Where the base 3 is to be supported on the top surface of the support B, the jaws 1, 2, extend in the opposite direction with respect to the base and the connecting element 12 is related to that side of the feed screw remote from the base.

Figs. 6 and 7 illustrate a slight modification of the embodiment to simplify the construction, wherein the cross member 7 shown in Figs. 1 to 5, inclusive, is omitted and a collar 7' is removably mounted on the inner end of the screw 8. In this form of construction the inner side of the base bottom 3a is provided with a flange 3x formed with openings for guiding the guides 5 and an opening for the screw 8, the flange 3x being in the path of movement of the collar 7' and serving as a stop to limit the outward movement of the movable jaw 2 and parts connected thereto.

Figs. 8, 8A, 9 and 10 illustrate another modification of the invention. In these views 1', 2' indicate the jaws of the vise, the stationary jaw 1' being provided on a base, indicated as an entirety at 14, and the jaw 2' being provided with guides 5' slidably mounted in the base 14, in the manner already set forth and 8' indicates a screw operatively connected with a handle 11'. 15 indicates as an entirety a connecting element movably disposed between the bottom wall 14a of the base 14 and the screw 8' and supported on the latter so as to move laterally and longitudinally thereof as already set forth. The construction of the base 14 and element 15 and operation of the latter by the screw 8' are similar to that of the base 3 and element 12, as already set forth, except that the guide pins and guide slots are reversed; that is, the pins, indicated at 15a, are carried by the element 15 (preferably formed integrally therewith) and project upwardly therefrom, whereas the guide slots, indicated at 14a', for the pins are formed in the bottom wall of the base 14 (see particularly Fig. 10). In this arrangement the pins 15a move through the slots 14a' to guide the element 14 when operated in the manner set forth in connection with the embodiment shown in Figs. 1 to 5, inclusive.

Figs. 11, 12 and 13 illustrate a different embodiment of the invention wherein the walls of the base and connecting element are co-operatively related to guide the latter when operated by the feed screw. In these views, 1x, 2x, indicate the inner and outer jaws, respectively, the inner jaw 1x being mounted on a base indicated as an entirety at 16 which is secured to the support B' by bolts 16x. The base 16 comprises a bottom wall 16a, a front depending wall 16b, to which the inner jaw 1x is connected, and a rear depending wall 16c, the walls 16b and 16c being formed with aligned openings in which guides 17 are slidably supported. The outer ends of the guides 17 are suitably secured to the outer jaw 2x. 18 indicates a feed screw rotatably connected to the jaw 2x similarly to the screw 8, as already set forth. The parts above described are substantially similar to like parts shown in Figs. 1 to 10, inclusive, except that the base 16 is formed on its lower side with a recess 16' the side walls of which are related to the side walls of a connecting element 19 to guide the latter laterally of the feed screw and longitudinally thereof when operated by the screw 18. By preference the opposed faces of the walls 16b, 16c, form the front and rear walls of the recess 16'. The element 19 consists of a plate 19' provided on its lower side or face with (a) a relatively wide plane surface 19b which frictionally engages with and is slidably supported on the peripheries of the threads of the screw 18 and rolls thereon when the screw is turned, as already set forth, and (b) a lug 19c at one side of the bearing surface 19b, the lug 19c being provided with screw threads complementary to the threads of the screw 18 and that end of the plate 19' remote from the lug 19c being thickened, as shown at 19c' to counterbalance the weight of the lug. As shown in Fig. 12, the screw 18 and base 16 are so related that the element 19 is movably supported within the recess 16' for guidance by the walls thereof in co-operation with the rotative movement of the screw 18. Due to the employment of right hand threads on the screw 18, the left side wall of the recess 16' (as viewed in Fig. 12) is shaped to form a guide portion 20, which is parallel to the axis of the screw 18, and an off-set 20a preferably adjacent the rear wall 16c, whereas the right side wall 20b of the recess 16' between the walls 16b, 16c, is parallel to the axis of the screw 18. As shown in Fig. 11, the connecting element has a shape corresponding to that of the recess 16' except that (a) the width thereof between its end walls 19x, 19x', is less than that between the walls 20 and 20b, to permit lateral movement of the element 19 and (b) the length of the element is less than that of the recess between the walls 16b, 16c, to permit longitudinal movement of the element 19. Figs. 11 and 12 show the element in its in-operative position, its inner side wall abutting the wall 16c, and its off-set 19x'' within the off-set 20a and its left side wall 19x abutting the wall 20. If now the screw 18 is turned clockwise (as viewed in Fig. 12) the element 19 will be rolled laterally toward the right during the initial movement of the screw, such movement serving to engage the threads on the lug 19c with the adjacent threads of the screw, further rotation of the screw 18 serving first to move the element 19 longitudinally outwardly into engagement with the wall 16b, as shown in dotted lines in Fig. 11, and thereafter the adjustment of the outer jaw inwardly. Operation of the screw 18 counter-clockwise serves to move the element 19 longitudinally inwardly into engage-

ment with the wall 16c and then laterally to the position shown in Fig. 11, the effect of which is to disconnect the element 19 from the screw 18, whereby the outer jaw 2x may be freely translated to and from different positions without turning the screw. As will be observed, the inner side wall of the element 19 has sliding engagement with the wall 16c during lateral movement thereof, whereas during its longitudinal movement the off-set 19x' and wall 19x' have sliding engagement with the walls 20, 20b, respectively.

Fig. 13 shows a form of construction similar to that shown in Figs. 1 to 4, inclusive, except that the screw threads on the feed screw 8'' and connecting element 21 having tapered sides terminating in flat peripheries on which the element 21 is slidably supported and rolls. In this form of threaded elements the guide slots 22 for the pins 13x, which depend from the base 23, are disposed in parallel relation but inclined to the axis of the feed screw (parallel to the outer sides of the threads of the screw), so that when the latter is rotated in either direction to roll the element 21 laterally, it moves in a direction which is substantially the composite of the components (the transverse and longitudinal portions) of the slots 12a (Fig. 5), and accordingly the screw threaded lug on the element 21 is engaged with or disengaged from the screw according to the direction of rotation of the latter.

From the foregoing description it will be observed that the movable jaw may be quickly moved from any extended position into engagement with a work piece and that by turning the feed screw in work clamping direction the connecting element is moved into engagement with the feed screw whereupon the work piece may be clamped and that by turning the screw in the opposite direction the connecting element is disengaged from the screw, the work piece is released and the movable jaw is free to be moved away from the fixed jaw any desired distance.

To those skilled in the art to which my invention relates many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope of the invention. My disclosures and the description are purely illustrative and are not intended to be in any sense limiting.

What I claim is:

1. A vise comprising inner and outer jaws, a base member for supporting said inner jaw and for slidably supporting said outer jaw and releasable connections between said base member and said outer jaw, said connections consisting of a feed screw rotatably carried by said outer jaw, a movable member straddling said feed screw and slidably supported intermediate its ends on the peripheries of the threads on said screw, the rotation of said screw in either direction serving to bodily roll said movable member laterally, one end portion of said movable member being provided with a depending wall having screw threads arranged to operatively engage the threads on said screw when said movable member is rolled in one direction and to disengage the threads on said screw when said movable member is rolled in the opposite direction, and means for guiding and limiting the movement of said movable member in each direction, said guide means consisting of slots formed in one of said members each having a portion extending substantially parallel to said screw and a portion extending at right angles thereto

in the same direction as the corresponding portion of the other slot and the other of said members being provided with pins projecting into said slots, respectively for translation there-through.

2. A vise comprising inner and outer jaws, a base member for supporting said inner jaw and for supporting said outer jaw for free sliding movement toward and from said inner jaw, a feed screw rotatably carried by said outer jaw, and means for releasably connecting said base member to said feed screw, controlled by the rotation of the latter in the work clamping direction, said means consisting of a movable member straddling said feed screw and bodily supported intermediate its ends on and having rolling and sliding engagement with the peripheries of the threads on said screw, one of said members being formed with slots each having a portion extending substantially parallel to said screw and a portion extending at right angles thereto in the same direction as the corresponding portion of the other slot and the other of said members being provided with pins projecting into said slots, respectively for translation therethrough, the rotation of said screw in either direction serving to bodily roll said movable member laterally, one end portion of said movable member being provided with a depending wall having screw threads arranged, when said screw is rotated in the work clamping direction to roll said movable member laterally, to operatively engage the threads on said screw, and when said screw is rotated in the work unclamping direction, to roll said movable member laterally, to disengage the threads on said screw.

3. A vise as claimed in claim 2 wherein the other end portion of said movable member is provided with a weight to counter-balance the said depending wall.

4. A vise comprising inner and outer jaws, a base member for supporting said inner jaw and slidably supporting said outer jaw, a feed screw rotatably carried by said outer jaw, a handle for turning said screw, a movable member having sliding and rolling engagement with and supported on said feed screw and arranged to be moved thereby laterally and substantially parallel to the axis of said screw relative to said base member, said movable member being provided with a screw threaded wall depending from said movable member at one side of said screw, and co-acting guide elements between said members, the guide elements on one of said members having walls extending parallel to said screw and walls extending laterally relative to said screw, the turning of the screw in one direction serving to first roll said movable member in a direction to engage said depending wall with said feed screw and then longitudinally thereof and turning of said screw in the opposite direction serving to first move said movable member longitudinally of the screw and then roll it in the opposite direction to disengage said depending wall from said feed screw.

5. A vise comprising inner and outer jaws, a base member for supporting said inner jaw and for slidably supporting said outer jaw, a feed screw rotatably carried by said outer jaw, a handle for turning said screw, and a movable member having sliding and rolling engagement with and supported on said feed screw and provided with a screw threaded wall depending from said movable member at one side of said screw, the turning of said screw in the work clamping direc-

tion serving to move said movable member first laterally to engage said wall with said screw and then longitudinally, relative to the axis of said screw, and turning of said screw in the work unclamping direction serving to move said movable member first longitudinally and then laterally, relative to the axis of said screw, to disengage said wall from said screw, and means for guiding said movable member laterally and longitudinally of said screw and limiting the movement thereof when moved by said screw.

6. A vise comprising inner and outer jaws, a base member for supporting said inner jaw and for slidably supporting said outer jaw, the lower side of said base member being formed with a recess one side wall of which is provided with a lateral off-set, a feed screw rotatably carried by said outer jaw, a handle for rotating said screw, and a movable member having sliding and rolling engagement with and supported on said feed screw and provided with a threaded wall depending from said movable member at one side of said screw, the upper portion of said movable member being disposed within said recess and provided at one end with a laterally extending off-set removably fitting into the first mentioned off-set, the rotation of said screw in work clamping direction serving to move said movable member first laterally to engage said wall with said screw and then longitudinally, relative to the axis of said screw, and rotation of said screw in the work unclamping direction serving to move said movable member first longitudinally and then laterally, relative to the axis of said screw, to disengage said wall from said screw, the inner

side wall of said recess being arranged to limit the inward longitudinal movement of said movable member and guide it laterally in either direction, the side walls of the recess being arranged to guide the movable member longitudinally in either direction and the outer side wall of said recess being arranged to limit the outward longitudinal movement of said movable member.

7. A vise comprising inner and outer jaws, a base member for supporting said inner jaw and for slidably supporting said outer jaw, a feed screw, the threads of which have tapered sides, rotatably carried by said outer jaw, a handle for rotating said screw, and a movable member having sliding and rolling engagement with and supported on said feed screw and provided with a wall depending from said movable member at one side of said screw and provided with threads complementary to the threads of said screw, and co-acting guide elements between said base member and said movable member consisting of slots formed in one of said members and pins carried by the other member and projecting into said slots, said slots having portions parallelly related and extending in a direction inclined to the axis of said screw and contiguous portions disposed parallel to the axis of said screw, the rotation of said screw in working clamping direction serving to move said movable member to effect engagement of said wall with said screw and rotation of said screw in the work unclamping direction serving to move said movable member to disengage said wall from said screw.

SIDNEY W. JORDAN.