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SLIDING JAW VISE, INCLUDING A PRESETTABLE, LEVER-ACTUATED, JAW LOCKING MEANS

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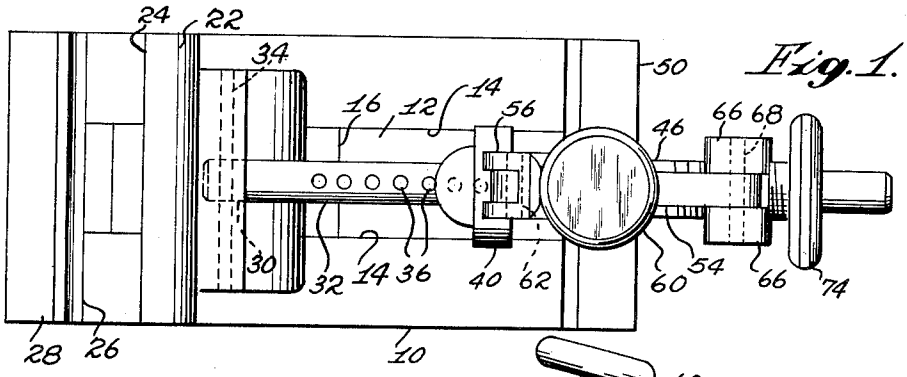


Fig. 1.

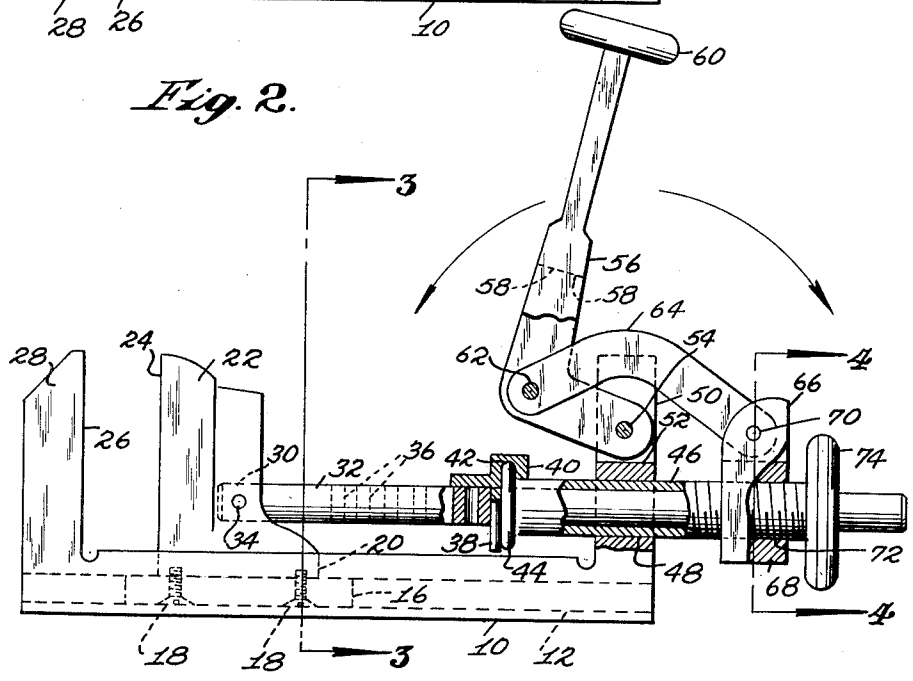


Fig. 2.

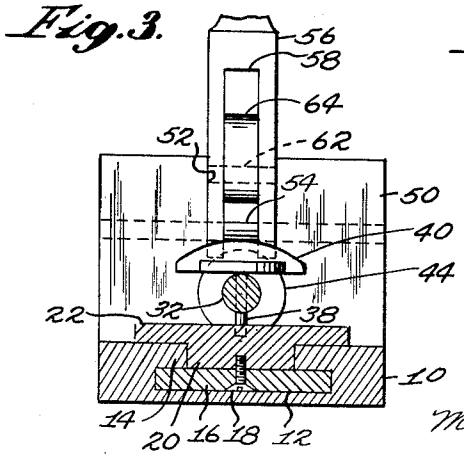


Fig. 3.

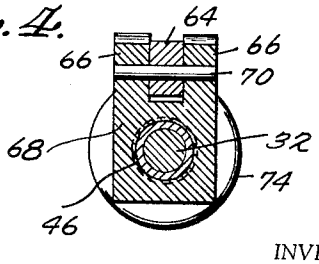


Fig. 4.

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SLIDING JAW VISE, INCLUDING A PRESET-TABLE, LEVER-ACTUATED, JAW LOCKING MEANS

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6 Claims. (Cl. 81—17)

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This invention relates to work holders, and more particularly, has reference to a vise construction having embodied therein an improved jaw locking mechanism.

The present invention has reference to vises of the bench-mounted type. Most vises falling within this category and of which I have knowledge are of the screw type, wherein a movable jaw is shifted into work-gripping position by threaded advancement of a rod carrying said movable jaw, and rotatably and threadedly engaged in the stationary body of the vise.

The operation of shifting the movable jaw into and out of engagement with the work, in a conventional screw type vise, is well appreciated by those regularly using such a vise as being time consuming and accordingly, efforts have heretofore been directed toward the designing of quick-action vises wherein a lever or cam action has been resorted to, for the purpose of bringing the movable jaw into and out of gripping relation with a piece of work.

However, those vises of the cam or lever action type of which I have knowledge have not met with commercial success to any appreciable degree, and I believe that this may perhaps be due to the fact that in cam or lever action vise constructions, swift and accurate preliminary settings of the movable jaw have been difficult to obtain, it being general practice to provide a threadedly advanced rod in obtaining the desired preliminary jaw setting. Here again, the time factor has become of material importance since the threaded advancement of the rod preliminary to locking of the movable jaw against the work by operation of the cam or lever involves an undesirable expenditure of time on the part of the user of the vise.

In carrying out one important object of the present invention, accordingly, it is proposed to provide a vise in which the movable jaw is locked securely against the work by means of a link and lever action, after preliminary adjustment of the movable jaw relative to the work, the preliminary adjustment being effected with maximum speed and facility, through the medium of a construction which in the first instance will allow the movable jaw to be slidably moved against the work without disturbing the position of the link and lever mechanism, and which will in the second instance allow a final adjustment in the position of said mechanism to be carried out in a minimum amount of time.

A second important object of the present invention is to provide a vise as described which will be adjustable within a wide range, for accommodating work pieces varying widely as to size.

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Yet another important object is to provide a bench vise as stated wherein, regardless of the size of the piece of work to be gripped, preliminary adjustment of the fixed and movable jaws relative to the distance therebetween can be carried out speedily, and wherein the locking lever can thereafter be swiftly adjusted to a position almost at a dead center, to permit shifting of said lever thereafter through a very short path of travel, to a position in which it moves beyond dead center and locks the jaws tightly to the work.

Other objects will appear from the following description, the claims appended thereto, and from the annexed drawing, in which like reference characters designate like parts throughout the several views, and wherein:

Figure 1 is a top plan view of a vise formed in accordance with the present invention;

Figure 2 is a view partly in side elevation and partly in longitudinal section;

Figure 3 is a transverse sectional view taken on line 3—3 of Figure 2, a portion of the lever being broken away; and

Figure 4 is a sectional view taken on line 4—4 of Figure 2.

Referring to the drawings in detail, I provide a bed plate 10 which in a preferred embodiment of the invention is of flat, rectangular configuration, and is proportioned to be positioned upon and fixedly secured in any suitable manner to a bench or similar support, not shown.

Formed in the flat upper surface of the bed plate 10 is a longitudinal groove 12, opening at opposite ends of the bed plate, and being formed at opposite sides thereof (see Figure 3) with overhanging longitudinal flanges 14 that are effective to prevent withdrawal in an upward direction of a plate 16 slidable within, and longitudinally of, the groove 12.

The plate 16 is provided with a plurality of longitudinally spaced, countersunk, smooth walled openings which receive screws 18. These extend upwardly from the plate 12 and are engaged in complementary threaded recesses formed in the underside of a tongue 20, that is an integral part of a movable jaw 22 and depends from said jaw so as to extend into the groove 12.

The movable jaw 22 is provided with a work-

ing face 24 which may be of any desired configuration, a flat working face being shown merely by way of example. The working face 24 is disposed oppositely to the working face 26 of a fixed jaw 28 integrally formed upon the bed plate 10 at one end thereof.

Formed in the back surface of the movable jaw 22 is a socket 30 receiving one end of a solid push rod 32, the rod 32 being secured fixedly within its associated socket through the provision of a pin 34 extending transversely of the jaw 22.

Formed in the rod 32 is a longitudinal series of equidistantly spaced transverse openings 36, any of which is adapted to receive a drop pin 38. The drop pin 38 is integrally formed at one end with a head 40 extending laterally thereof, said head being provided with an arcuate bottom recess 42.

The recess 42 is complementary to, and receives a collar 44 integrally formed upon one end of an elongated carrier sleeve 46, through which the rod 32 extends.

The sleeve 46 extends through a smooth walled opening 48 formed in an upstanding abutment 50, that is integrally formed upon the bed plate 10, at that end thereof remote from the fixed jaw 28. The abutment 50 is provided, above the opening 48, with a vertical slot 52, and extending between the walls of the slot is a pivot pin 54. The pivot pin 54 extends through one end of an angular lever 56 which, as will be seen from Figure 2, is of approximately L-shaped or right angled formation.

The inner end of the lever 56, that is, that end pivotally connected to the abutment 50, is longitudinally slotted as at 58, and the outer end of the lever is provided with a handle or knob 60 for convenience in rocking the lever between the operative and inoperative positions thereof.

Extending between the walls of the slot 58, at the juncture of the angularly related legs of the lever, is a cross pin 62, whereby there is pivotally connected to the lever one end of an angular link 64 the legs of which are related obtusely to one another.

The other end of the link 64 is disposed between the upstanding ears 66 of a follower 68, and is pivotally connected to said follower by a pin 70.

The follower 68 is formed with a threaded opening 72, which is engaged by an externally threaded portion of the sleeve 46. It will thus be seen that upon rotation of the sleeve 46, the follower 68 will be advanced longitudinally of said sleeve in a selected direction.

That end of the sleeve 46 that is contiguous to the follower 68 is provided with a knurled knob 74 for convenience in rotation of the sleeve.

The use of the vise may now be readily noted. A piece of work, not shown, is first positioned against the working face 26 of the fixed jaw 28, the drop pin 38 is removed from the push rod, and the movable jaw 22 is then slidably adjusted against said piece of work. Since the drop pin 38 has been removed, the push rod will slide within the sleeve 46 without changing the position of said sleeve or of the link and lever mechanism.

When the jaw 22 is in engagement with the work, the drop pin 38 is extended through that opening 36 nearest the collar 44 of the sleeve 46. The carrier 46 is now slidably adjusted to the left in Figure 2, if necessary, so as to cause the shoulder or collar 44 to abut against the pin 38, after which the slotted head 40 is lowered into engagement with said shoulder.

Rotation of the adjusting knob 74 will now be effective to swing the link and lever to a position such as that illustrated in Figure 2, wherein the pivot point 62 is disposed slightly above a position in which it would be in line with the pivot points 54 and 70.

Thereafter, to lock the movable jaw 24 against the work, it is necessary merely to shift the lever 56 to the left in Figure 2, so as to move the pivot point 62 through a dead center.

At such time as it is desired to release the work piece, the lever 56 is swung in an opposite direction, which movement will be effective to retract the carrier sleeve 46, and hence the push rod 32 and the movable jaw 22.

It is to be noted that during rotatable adjustment of the carrier sleeve 46, the shoulder 44 will rotate relative to the head 40 of the pin 38.

A vise formed in accordance with the present invention is, I believe, particularly well adapted to production work, in which a number of identically sized work pieces are to be successively engaged within the space between the fixed and movable jaws. After the initial adjustment of the parts, one work piece after another can be inserted in and removed from said space, with maximum speed and facility, no further adjustment in the parts being necessary.

Through the medium of the construction wherein the push rod 32 is formed with a longitudinal series of transverse apertures 36, and is slidable within the carrier sleeve 46, work pieces of widely varying thicknesses are capable of being accommodated between the fixed and movable jaws. The adjustment made to effect a preliminary setting of the jaws, in this connection, is in all instances made with ease and with little loss of time.

It is believed clear that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles of operation and the means presently devised to carry out said principles, it being considered that the invention comprehends any minor changes in construction that may be permitted within the scope of the appended claims.

What is claimed is:

1. A vise comprising a bed plate; a fixed jaw thereon; a movable jaw and a carrier sleeve slidable in parallel paths upon the bed plate toward and away from the fixed jaw, said sleeve being rotatable upon the bed plate; a push rod fixedly connected to the movable jaw and connected to the sleeve for adjustment longitudinally thereof and for rotation of the sleeve relative to the push rod in selected positions to which the push rod is adjusted longitudinally of the sleeve; a lever pivoted to the bed plate; and means connecting the lever and sleeve and operative to translate swinging movement of the lever into joint sliding movement of the sleeve, push rod, and movable jaw toward and away from the fixed jaw, said means including a follower threadedly engaged with the sleeve to shift longitudinally thereof responsive to rotation of the sleeve, and a link element connected to the follower and lever respectively and arranged to swingably adjust the lever to selected, pre-set rest positions responsive to shifting of the follower longitudinally of the sleeve.

2. A vise comprising a bed plate; a fixed jaw thereon; a movable jaw and a carrier sleeve slidable in parallel paths upon the bed plate toward and away from the fixed jaw, said sleeve being rotatable upon the bed plate; a push rod fixedly connected to the movable jaw and connected to the sleeve for adjustment longitudinally thereof and for rotation of the sleeve relative to the push rod in selected positions to which the push rod is adjusted longitudinally of the sleeve; a lever pivoted to the bed plate; and a link connected at the opposite ends thereof to the lever and sleeve respectively and operative to translate swinging movement of the lever into joint sliding movement of the sleeve, push rod, and movable jaw toward and away from the fixed jaw, the connection of the link to the sleeve including a follower engaged with the sleeve for movement longitudinally thereof responsive to rotation of the sleeve, said follower being arranged to shift the link and lever to selected, pre-set, rest positions responsive to shifting of the follower longitudinally of the sleeve.

3. A vise comprising a bed plate; a fixed jaw thereon; a movable jaw and a carrier sleeve slidable in parallel paths upon the bed plate toward and away from the fixed jaw, said sleeve being rotatable on the bed plate; a push rod fixedly connected at one end to the movable jaw and connected at its other end to the sleeve for adjustment longitudinally of the sleeve and for rotation of the sleeve relative to the push rod in selected positions to which the push rod is adjusted longitudinally of the sleeve, said connection of the push rod to the sleeve including a drop pin having a head rotatably and separably engaged with the sleeve, the push rod having a longitudinal series of openings in any one of which the drop pin is engageable; a lever having a pivotal connection at one end thereof to the bed plate; and a link pivotally connected at opposite ends thereof to an intermediate portion of the lever and to the sleeve respectively and operative to translate swinging movement of the lever into joint sliding movement of the sleeve, push rod, and movable jaw toward and away from the fixed jaw, the connection of the link to the sleeve including a follower engaged with the sleeve for movement longitudinally thereof responsive to rotation of the sleeve, said follower being arranged to shift the link and lever to selected, pre-set, rest positions responsive to shifting of the follower longitudinally of the sleeve.

4. A vise comprising a bed plate; a fixed jaw thereon; a movable jaw sliding upon the bed plate toward and away from the fixed jaw; a sleeve mounted upon the bed plate for rotation and for sliding movement along a path paralleling the path of slidable movement of the movable jaw; a push rod fixedly connected at one end to the movable jaw and extending through the sleeve; means connecting the push rod to the sleeve for adjustment of the push rod longitudinally of the sleeve to effect preliminary movable jaw settings, and for rotation of the sleeve relative to the push rod; an operating lever having a pivotal connection at one end thereof to the bed plate; a follower threadedly engaged with said sleeve for adjustment longitudinally of the sleeve responsive to rotation of the sleeve; and a link pivotally connected at opposite ends thereof to an intermediate portion of the lever and to the follower respectively and swingable through a dead center responsive to pivotal movement of the lever, to translate swinging movement of the lever into joint sliding movement of the sleeve and movable jaw toward and away from the fixed jaw and to lock the movable jaw in positions to which it is slidably moved, said follower adjustment constituting a lever and link pre-setting means in compensation for adjustment of the sleeve and push rod to selected positions longitudinally of one another.

5. A vise comprising a bed plate; a fixed jaw thereon; a movable jaw sliding upon the bed plate toward and away from the fixed jaw; a sleeve mounted upon the bed plate for rotation and for sliding movement along a path paralleling the path of slidable movement of the movable jaw; a push rod having a longitudinal series of openings fixedly connected at one end to the movable jaw and extending through the sleeve; means connecting the push rod to the sleeve for adjustment of the push rod longitudinally of the sleeve to effect preliminary movable jaw settings and for rotation of the sleeve relative to the push rod, said means comprising a collar on one end of the sleeve and a drop pin insertable in any of said push rod openings and including a head slotted for rotatable engagement of the collar therein; an operating lever having a pivotal connection at one end thereof to the bed plate; a follower threadedly engaged with said sleeve for adjustment longitudinally of the sleeve responsive to rotation of the sleeve; and a link pivotally connected at opposite ends thereof to an intermediate portion of the lever and to the follower respectively and swingable through a dead center responsive to pivotal movement of the lever, to translate swinging movement of the lever into joint sliding movement of the sleeve and movable jaw toward and away from the fixed jaw and to lock the movable jaw in positions to which it is slidably moved, said follower adjustment constituting a lever and link pre-setting means in compensation for adjustment of the sleeve and push rod to selected positions longitudinally of one another.

6. A vise comprising a bed plate; a fixed jaw rigid with and extending upwardly from one end thereof; a movable jaw sliding upon the bed plate intermediate the ends of the bed plate, toward and away from the fixed jaw; a sleeve mounted upon the other end of the bed plate for rotation and for sliding movement along a path paralleling the path of slidable movement of the movable jaw; a push rod fixedly connected at one end to the movable jaw and extending through the sleeve, said push rod having a longitudinally series of openings and being arranged longitudinally of the bed plate; means connecting the push rod to the sleeve for adjustment of the push rod longitudinally of the sleeve to effect preliminary movable jaw settings and for rotation of the sleeve relative to the push rod, said means comprising a collar on one end of the sleeve, and a drop pin insertable in any of said push rod openings and including a head slotted for rotatable engagement of the collar therein; an operating lever having angularly related, rigidly connected legs, said lever being connected pivotally, at one end of one of the legs thereof, to said other end of the bed plate; a follower threadedly engaged with said sleeve for adjustment longitudinally thereof responsive to rotation of the sleeve; and an angular link pivotally connected at one end to the lever at the juncture of the legs of the lever and at its other end to the follower and arranged

to swing through a dead center responsive to pivotal movement of the lever, to translate swinging movement of the lever into joint sliding movement of the sleeve and movable jaw toward and away from the fixed jaw, and to lock the movable jaw in positions to which it is slidably moved, said follower adjustment constituting a lever and link pre-setting means in compensation for adjustment of the sleeve and push rod to selected positions longitudinally of one another.

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