Sept. 10, 1946. G. J. MEYER 2,407,341

VISE

Filed June 28, 1943

FIG. 8

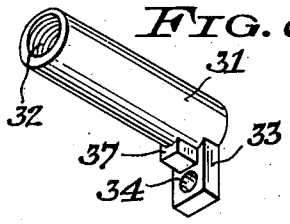


FIG. 1

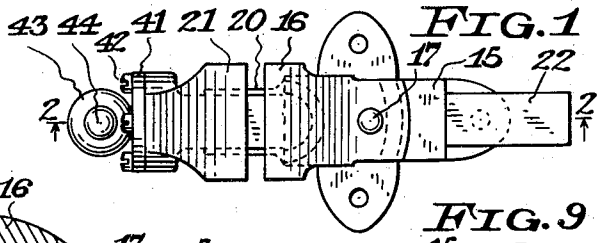


FIG. 9

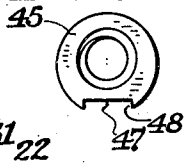


FIG. 2

FIG. 6

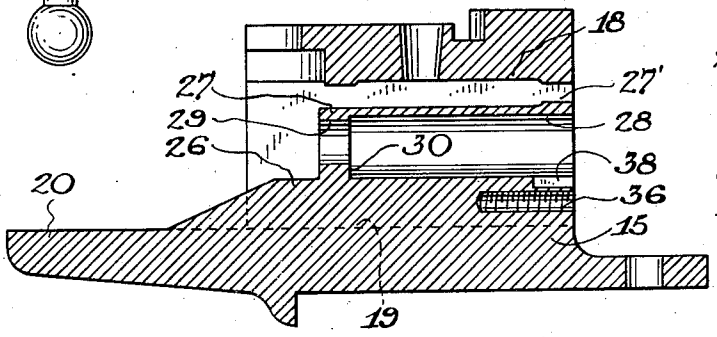


FIG. 7

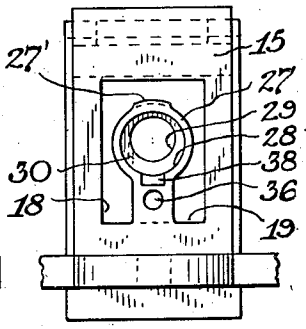


FIG. 3

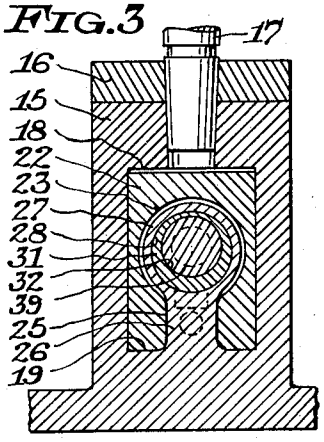


FIG. 4

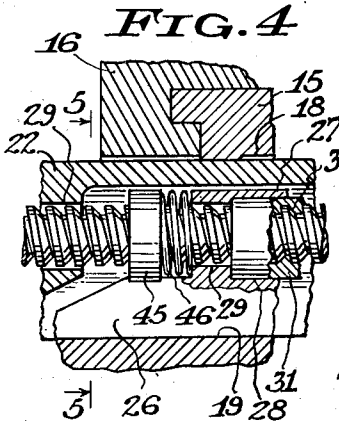
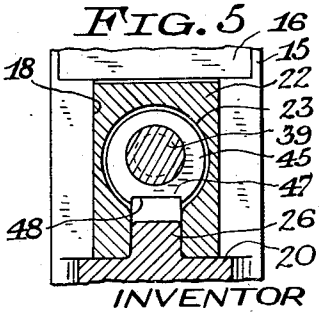


FIG. 5



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VISE

George J. Meyer, Milwaukee, Wis.

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1 Claim. (Cl. 81—33)

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The present invention relates to vises, and has for an object to provide an improved vise of strong, durable and inexpensive construction including jaw actuating means so arranged as to minimize wear and avoid binding and distortion of the parts.

Another object is to provide a vise having jaw actuating means of such character as to minimize lost motion and to insure prompt movement of the movable jaw of the vise when a screw shaft of the actuating means is turned.

A further object is to perfect details of construction generally.

The invention further consists in the several features hereinafter described and claimed.

In the accompanying drawing,

Fig. 1 is a top plan view of a bench vise constructed in accordance with the invention;

Fig. 2 is a longitudinal sectional elevation of the vise, taken on the line 2—2 of Fig. 1;

Fig. 3 is a transverse sectional elevation taken on the line 3—3 of Fig. 2;

Fig. 4 is a detail sectional elevation of a portion of the vise, taken on the same plane as Fig. 2;

Fig. 5 is a transverse sectional elevation taken generally on the line 5—5 of Fig. 4;

Fig. 6 is a detail longitudinal sectional elevation of a vise body;

Fig. 7 is a rear end view of the vise body, parts being broken away;

Fig. 8 is a perspective view of a bushing or nut member for the vise, and

Fig. 9 is a detail view of an auxiliary nut member.

In the drawing, 15 designates a vise body which is flanged at its base for attachment to a bench or other support. If desired, the vise body may have a conventional swivel mounting, not shown. A work-clamping jaw 16 is secured to the vise body and is here shown to have a detachable swivel connection therewith, the jaw being held in normal position by a removable pin 17. In some instances, the jaw may be integral with the vise body. Formed longitudinally through the body 15 is a horizontal passage or guide opening 18 of generally rectangular cross-sectional shape having a flat bottom wall 19. A forwardly projecting ledge 20 is formed on the vise body and has a flat top wall coplanar with the bottom wall of the passage 18.

A movable jaw 21 cooperates with the stationary jaw 16 and is secured to the front end of a shank or slide bar 22 of rectangular cross-section, the jaw 21 preferably being integral with

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the shank. The shank 22 slidably fits in the opening 18 in the vise body and is supported on the ledge 20. Longitudinally formed in the shank 22 is a bore 23 which opens at the rear end of the shank and which communicates at its front end with a smaller longitudinal bore 24 opening at the front end of the shank. A slot 25 formed longitudinally in the bottom of the shank communicates with the bore 23 and constitutes therewith a downwardly opening channel.

Upstanding from the bottom wall 19 of the vise body opening 18 is a central longitudinal rib or flange 26 integral with the vise body and having an enlarged tubular top portion or barrel 27. If desired, the front end of the rib may extend onto the ledge 20 to reinforce the ledge. The tubular portion 27 has a relatively long horizontal bore 28 opening at the rear end thereof and communicating at its front end with a short reduced forwardly opening bore 29, thus forming an annular shoulder 30 at the junction of these bores. The axis of the bore 29 is aligned with the axis of the bore 24 in the slidable shank 22 and is spaced above the axis of the bore 28.

Fitting in the bore 28 is a relatively long, eccentric nut-forming bushing 31 having a screw-threaded opening 32 aligned with the bores 24 and 29. The front end of the bushing abuts against the shoulder 30 and the rear end has a downwardly projecting ear 33 which abuts against the vertical rear face of the rib 26, the ear having an opening 34 to receive a screw 35 which is engaged in a screw-threaded opening 36 formed in the rear end of the rib. The bushing 31 is also shown to have a lug 37 which fits in a groove 38 formed in the rib 26 at the rear end of the bore 28. If desired, the tubular part 27 may have a top pad 27' at its rear end against which the wall of the shank bore 23 is adapted to slidably bear.

A rotable screw-threaded rod or shaft 39 extends through the bore 24 in the movable jaw shank 22 and the bores 28 and 29 in the vise body, and is engaged in the nut-forming bushing 31. The screw shaft is confined against relative axial movement with respect to the movable jaw member in any suitable manner as by a collar 40 on the shaft bearing against the front face of the jaw member and retained in axial position by a forked yoke or clip 41 secured by screws 42 to the jaw member. The screw shaft has the usual transversely apertured head 43 receiving a slidable operating handle 44. The shaft has a buttress or saw-tooth screw-thread the steep side of which faces forwardly so as to resist axial pressure on

the screw when work is clamped in the jaws. This type of screw-thread presents relatively strong, long wearing teeth.

A non-rotatable auxiliary nut **45** is threaded on the screw shaft a short distance in front of the tubular part **27** which houses the nut-forming bushing **31**. The auxiliary nut is urged forwardly by a resilient member such as a short coiled spring **46** surrounding the screw shaft and interposed between the nut and the tubular part, thus tending to open the vise jaws and taking up any play which may exist or later develop in the screw-threaded connection. The auxiliary nut and spring are protectively housed in the hollow shank **22** of the movable jaw, and the nut is held against rotation in any suitable manner as by means of a flat surface **47** thereon abutting against the flat upper edge of the stationary rib or flange **26**. If desired, the nut may have a notch **48** in which the upper edge portion of the rib or web fits. The spring pressure remains approximately constant in all positions of the movable jaw.

The line of action of the spring is substantially coaxial with the screw shaft, thus avoiding any tendency to cause cocking or binding of the auxiliary nut, even though the nut is relatively short in its axial dimension.

In assembling the vise, the screw shaft **39** is first threaded through the auxiliary nut **45** a short distance and is then pushed forwardly to compress the spring **46** to the desired pressure, whereupon the screw shaft is engaged in the main nut or bushing **31**. The spring **46** is under sufficient pressure to move the slidable jaw outwardly when the screw is turned to release clamping pressure on the jaws.

The eccentric screw bushing **31** permits the screw shaft to be brought as high as possible in the jaw shank **22** while still providing ample metal in the bushing. The eccentric mounting of the bushing also tends to resist rotation of the bushing. Rotation of the bushing is further resisted by the screw **35** and the lug **37**. The bushing can readily be replaced if it should become worn after long service.

When the vise is in use, the rotation of the screw shaft **39** in one direction will displace the

movable jaw **21** inwardly for clamping the work against the stationary jaw **16**. The axis of the screw-threaded bushing **31** remains parallel to the slidable jaw shank **22** notwithstanding clamping pressure on the screw shaft, thus avoiding distortion or binding of the screw shaft. The relatively long screw-threaded engagement between the bushing and the screw shaft distributes and minimizes the wear on these parts. The relatively long front ledge **20** supports the slidable jaw shank **22**, thus reducing bending stresses on this shank. When the screw shaft is rotated in a direction releasing the clamping pressure, the spring-pressed nut **45** takes up all play in the screw-threaded connection regardless of the extent of wear, thereby promptly moving the slidable jaw and avoiding lost motion at the handle **44**.

While one specific embodiment of the invention has been shown and described, it will be understood that changes and modifications may be made therein within the spirit of the invention.

What I claim as new and desire to secure by Letters Patent is:

A vise comprising a vise body having a jaw, a shank slidably guided by said vise body and having a jaw cooperating with said first-named jaw, said shank having a longitudinally extending channel therein, a rotatable screw shaft extending longitudinally in said shank and confined against relative axial movement with respect to said shank, said vise body having an integral longitudinal flange extending upwardly into the channel of said shank, a nut carried by the upper portion of said flange, said screw shaft being engaged with said nut for effecting displacement of the movable jaw, a second nut engaged on said shaft in front of said first-named nut and restrained by the forward portion of the flange against rotation, and a spring extending about said shaft and interposed between said nuts for urging said second nut in a forward axial direction tending to open the movable jaw, said second nut and spring being housed in said channeled shank.

GEORGE J. MEYER.