Nov. 2, 1943. J. MEYER 2,333,114

VISE

Filed March 22, 1941

Fig. 1.

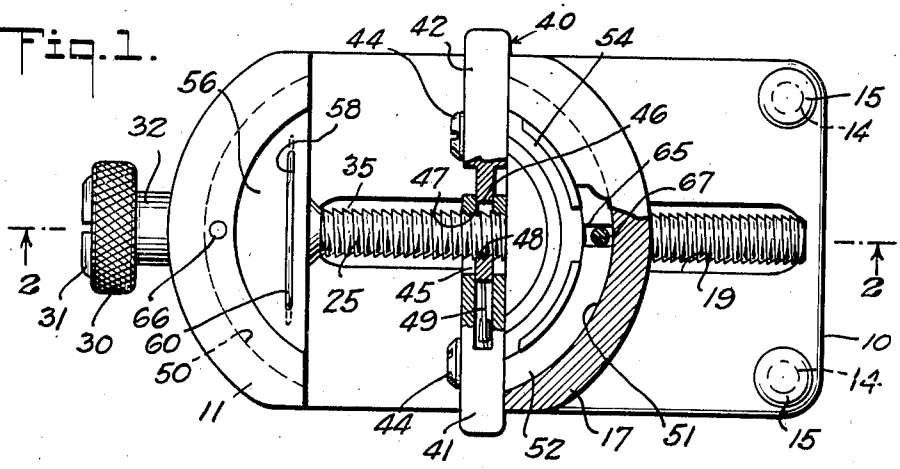


Fig. 2.

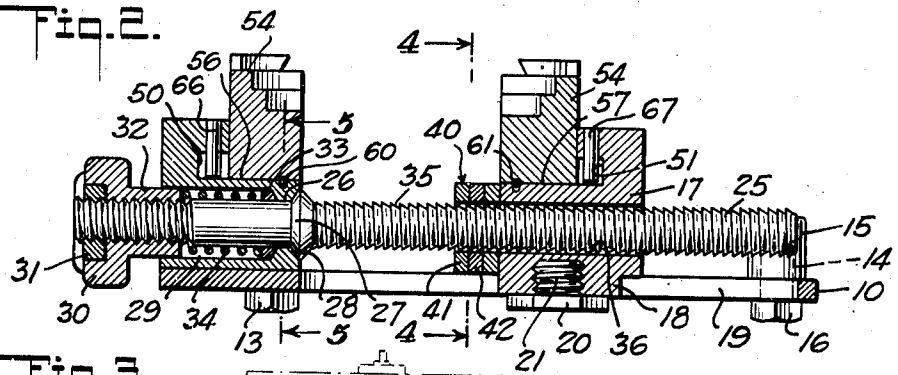


Fig. 3.

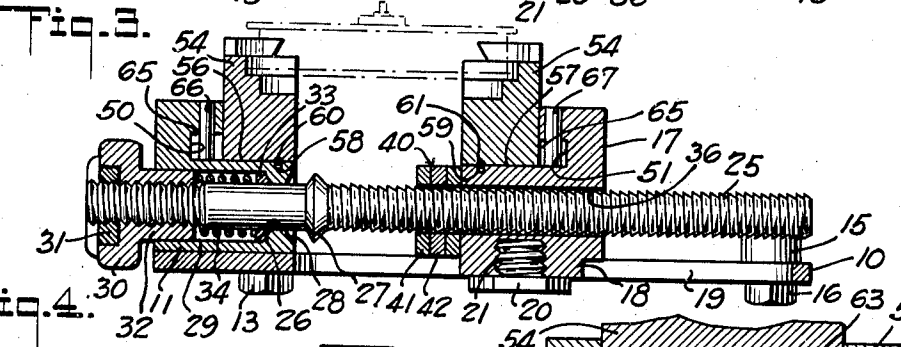


Fig. 4.

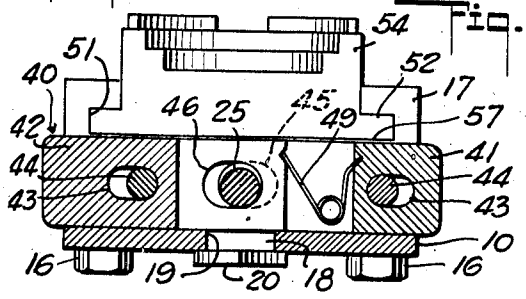
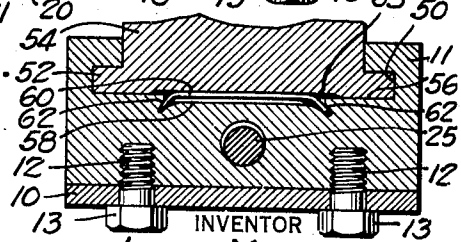


Fig. 5.



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Patented Nov. 2, 1943

2,333,114

UNITED STATES PATENT OFFICE

2,333,114

VISE

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Application March 22, 1941, Serial No. 384,687

4 Claims. (Cl. 81—33)

This invention relates generally to holding tools and appliances and more particularly to vises for holding articles firmly in position while work is being performed thereupon.

An object of the invention is to provide a vise particularly adapted, although not necessarily for use in holding small articles, such as the movements of time pieces and instruments of various kinds, the vise being structurally characterized by means enabling fragile and delicate articles to be yieldingly gripped with any desired pressure from a minimum to a maximum for absolute security in holding the article against displacement without danger of deforming the article, the gripping pressure being conveniently regulatable, and the article being releasable from between the jaws of the vise without changing a preselected relative adjustment of the jaws, whereby to permit the article to be removed and replaced with the utmost ease, and to be gripped with a predetermined pressure in accordance with the jaw adjustment, all to the end of greatly facilitating the handling of small and delicate articles in the performance of work thereon.

Another object of the invention is to provide a vise of the above described character in which its movable jaw can be instantly disconnected from a feed member, for rapid manual shifting away from a relatively fixed jaw, or advanced toward the latter into contact with the article, independently of a relatively slow feeding action of the feed member, whereby to greatly speed up the handling of the work.

A further object of the invention is to provide a vise, the jaws of which are constructed to removably receive work holding adapters whose active faces are formed to accommodate articles of different shapes and proportions so as to enable an article to be securely gripped irrespective of its contour, the jaws and removable adapters thereof having releasable retaining means of simple and positive acting construction to insure that the adapters will not be accidentally displaced, all while enabling the adapters to be easily removed at will.

With these and other objects in view, the invention resides in the combinations, arrangements and functional relationships of elements as set forth in the following specification and particularly pointed out in the appended claims.

In the accompanying drawing,

Figure 1 is a plan view, partly broken away, of one form of vise embodying this invention;

Figure 2 is a longitudinal sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a view similar to Figure 2 and illustrating the positions of the parts in gripping an article with a predetermined yielding pressure;

Figures 4 and 5 are transverse sectional views taken, respectively, on the lines 4—4 and 5—5 of Figure 2.

Referring specifically to the drawing, the invention, in its illustrated embodiment, comprises a base 10 in the form of an elongated flat plate of metal of suitable gauge to insure rigidity, and to one end of which is secured a fixed jaw 11 by screws 12, the heads 13 of which form feet adapted to rest upon a bench or other suitable support. Other screws 14 are secured by nuts 15 at the opposite end of the base 10, for co-action of the heads 16 of the screws with the heads 13 in providing a foot at each corner of the base. The nuts 15 project above the base to a sufficient height for use as finger pieces in a manner to be later described.

Co-acting with the fixed jaw 11 is a movable jaw 17 which is slidably mounted on the base for movement rectilinearly towards and away from the fixed jaw. To this end a guiding projection 18 subtends from the fixed jaw and works in a longitudinal slot 19 in the base, the jaw being secured against displacement from the slot by the relatively large head 20 of a screw 21 threaded into the jaw. It will be noted that the heads 13 and 16 raise the base 10 sufficiently for the head 20 to clear any flat support on which the base is placed.

Co-acting with the jaws 11 and 17 is a feed member 25 in the form of a shaft journaled in a radial bearing 26 in the fixed jaw 11 and provided with an annular beveled thrust collar 27 co-acting with a thrust bearing 28 in the fixed jaw. The outer end of the feed shaft 25 projects freely through a bore 29 in the fixed jaw and is threaded to receive an operating knob 30 which is locked to the shaft by a jam nut 31.

The hub 32 of the knob 30 projects into the bore to act as a journal; and interposed between the hub and a thrust washer 33 on the feed shaft 25 is a coil spring 34 which normally urges the shaft axially in a direction to move the thrust collar 27 into engagement with the bearing 28. In the normal position of these parts shown in Figure 2, the spring 34 is not only fully unloaded but is also inactive because of the fact that the overall length of the spring when unloaded is slightly less than the distance between the hub 32 and the thrust washer 33, so that the thrust collar 27 will not be urged by the spring into contact with the bearing 28 but will be sufficiently free of the

bearing to obviate any frictional resistance to rotation of the feed shaft.

From its collar 27 to its inner end, the shaft 25 is threaded preferably with a screw thread 35 of the buttress type. This portion of the shaft works freely in a smooth bore 36 of the movable jaw 17. The movable jaw is adapted to be operatively connected to the feed shaft 25 for movement towards and away from the fixed jaw in response to rotation of the shaft, by means of a nut 40 composed of two sections 41 and 42 provided with slots 43 receiving screws 44 threaded into the movable jaw to slidably mount the sections thereon. The section 41 is bifurcated to freely receive the section 42, and both sections are provided with other slots 45 and 46 receiving the shaft 25 and provided at diametrically opposed locations with portions of threads 47 and 48 (Figure 1) normally urged into meshing engagement with the buttress thread 35 of the shaft by means of a spring 49 which urges the sections away from each other, all as clearly shown in Figure 4. The outer ends of the nut sections provide finger pieces so as to enable the sections to be pressed towards each other and their thread portions disengaged from the thread 35, whereby to permit the movable jaw to be freely shifted back and forth independently of rotation of the shaft 25. The buttress type thread 35 permits the movable jaw to be independently shifted towards the fixed jaw 11 without the necessity of disengaging the nut sections from the feed shaft, by a ratcheting action of the nut sections on the shaft threads.

The jaws 11 and 17 are provided on their confronting faces with arcuate shaped recesses 50 and 51, respectively, receiving complementarily shaped flanges 52 on work holding adapters 54 which have work engaging surfaces of various contours and dimensions to most effectively coact with a particular work piece to be gripped.

The flat bottom faces 56 and 57 of the recesses 50 and 51 are provided with transverse grooves 58 and 59, receiving retainer springs 60 and 61, the ends of which are laterally bent in diverging relationship as shown in Figure 5, and seat in sockets 62 in the respective jaws so as to prevent displacement of the springs.

The springs 60 and 61 are normally urged to a position wherein they project above the plane of the bottom faces 54 and 55 so as to snap into grooves 63 (Figure 5) in the respective adapters 54, whereby to releasably retain the adapters against displacement from the jaws. The flanges 52 of the adapters are provided with peripheral notches 65 into which project pins 66 and 67 carried by the jaws so as to effectively prevent any rotational movement of the adapters relative to the jaws in the operation of the vise which is as follows:

With a work piece such as the movement of a watch or other instrument placed between the adapters 54 selected from a supply of different forms thereof, rotation of the shaft 25 by the knob 30 in a direction to advance the jaw 17 towards the jaw 11 is effected to cause the adapters to engage the work piece. Continued rotation of the shaft 25 will load the spring 34 so that the work piece will be yieldingly gripped with such maximum pressure as will hold the work piece securely yet not deform or otherwise damage the work piece.

The work piece can be instantly released from the jaws without changing the adjustment of the latter, by simply applying axial pressure with the thumb against the outer face of the knob 30 as a finger is engaged with one of the nuts 15.

It will be clear that the jaw 17 can be manually advanced rapidly towards the jaw 11 by shifting the jaw 17 on the feed shaft 25 as the threads 35 and the spring retained nut sections 41 and 42 will co-act in the manner of a ratchet. To manually move the jaw 17 away from the jaw 11, it is only necessary that the nut sections be squeezed to release their thread portions 47 and 48 from the feed shaft and then shift the jaw 17 while holding the nut sections in released position.

From the foregoing description it will be manifest that fragile or delicate work pieces of different sizes and shapes can be handled with ease and dispatch so as to greatly facilitate the performance of operations thereon.

What is claimed is:

1. In a vise, a base; a fixed jaw secured to the base and having a bore, a portion of which defines a radial bearing; a movable jaw mounted on the base for movement towards and away from the fixed jaw; a feed shaft journaled in said bearing and having an operating knob; means operatively connecting the movable jaw to the feed shaft for actuation in response to rotation of the shaft; a thrust collar on the feed shaft adapted to bear against the fixed jaw; and a coil spring surrounding the feed shaft in said bore and co-acting with the fixed jaw and feed shaft to yieldingly urge the latter axially in a direction which will advance the movable jaw towards the fixed jaw.

2. In a vise, a base; a fixed jaw secured to the base and having a bore, a portion of which defines a radial bearing; a movable jaw mounted on the base for movement towards and away from the fixed jaw; a feed shaft journaled in said bearing; means operatively connecting the movable jaw to the feed shaft; an operating knob fixed to the feed shaft and having a hub projecting into said bore; a thrust collar on the feed shaft adapted to bear against the fixed jaw; a thrust ring surrounding the feed shaft in said bore; and a coil spring surrounding said shaft and engaging the thrust ring and the hub of said knob to urge the feed shaft axially in a direction to advance the movable jaw towards the fixed jaw.

3. In a vise, a base; a fixed jaw secured to the base and having a bore, a portion of which defines a radial bearing; a movable jaw mounted on the base for movement towards and away from the fixed jaw; a feed shaft journaled in said bearing and having an operating knob; means operatively connecting the movable jaw to the feed shaft for actuation in response to rotation of the shaft; a thrust collar on the feed shaft adapted to bear against the fixed jaw; and a coil spring surrounding the feed shaft in said bore and co-acting with the fixed jaw and feed shaft to yieldingly urge the latter axially in a direction which will advance the movable jaw towards the fixed jaw; the length of said spring when unloaded being less than that required for the spring to maintain the thrust collar in engagement with the fixed jaw, so that said collar and jaw will not set up any frictional resistance to rotation of the feed shaft.

4. In a vise, a base having a fixed jaw; a movable jaw mounted on the base for movement towards and away from the fixed jaw; a feed member rotatably mounted in a bearing in the fixed jaw; a thrust collar on the member; means opera-

tively connecting the movable jaw to the feed member for actuation thereby; a spring co-acting with the feed member and fixed jaw for urging the collar into contact with the bearing; said spring being operable when loaded, to cause a work piece to be yieldingly gripped by the jaws; and means responsive to sufficient rotational movement of the feed member in a direction to increasingly load the spring when a work piece is being gripped by the jaws, to cause all of the spring coils to contact together and form a rigid connection between the jaws, of which the spring in its fully loaded condition, forms a part, whereby to enable the work piece to be rigidly gripped by the jaws.

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