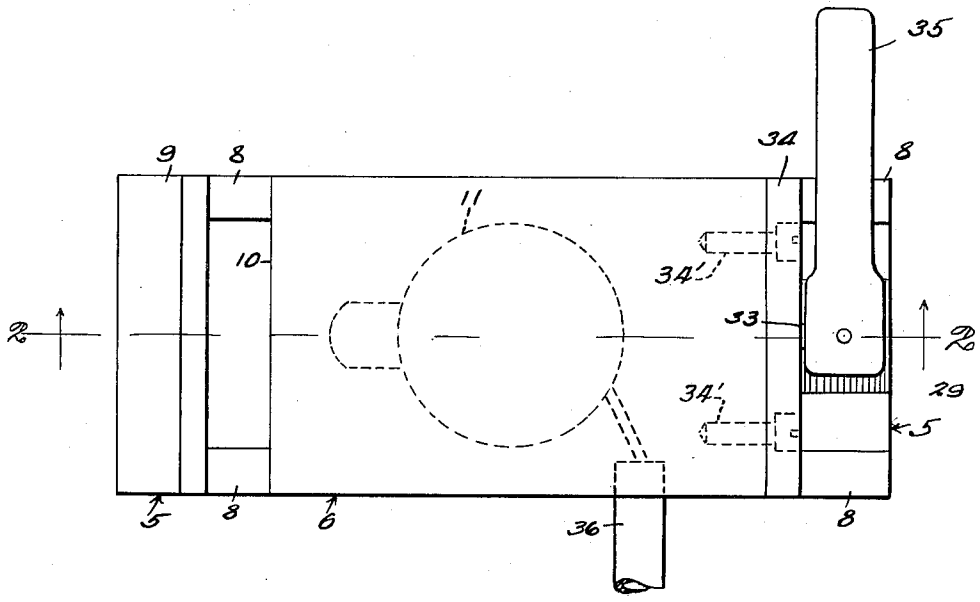
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AIR-OPERATED VISE WITH IMPROVED ACTUATOR AND ADJUSTMENT MEANS

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Fig. 1.



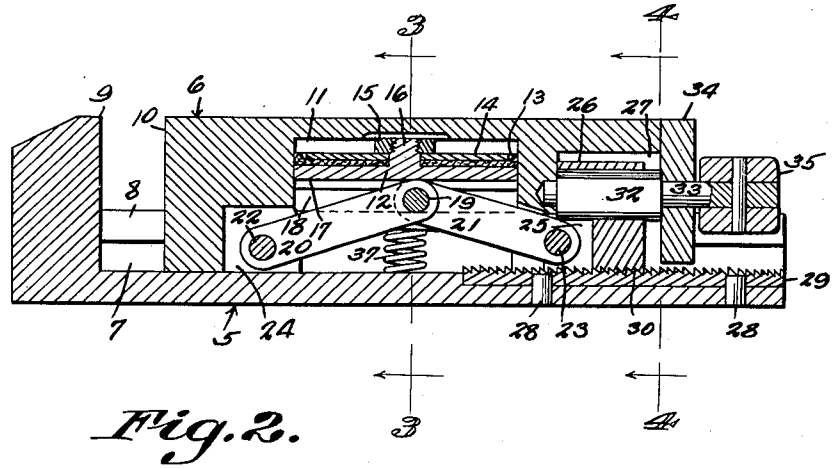


Fig. 2.

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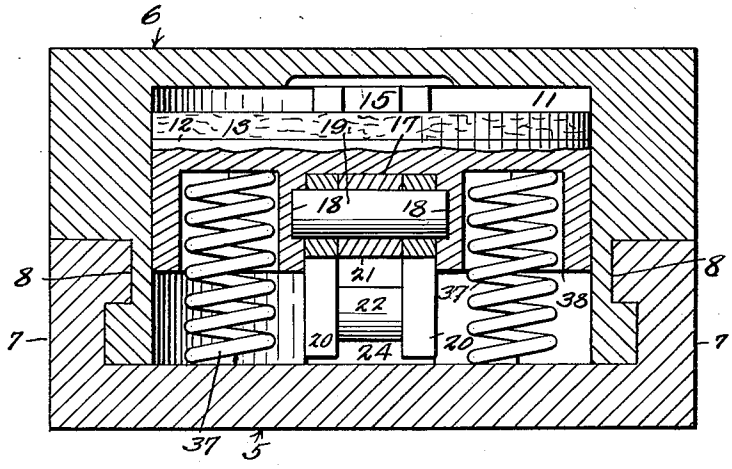
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Fig. 3.



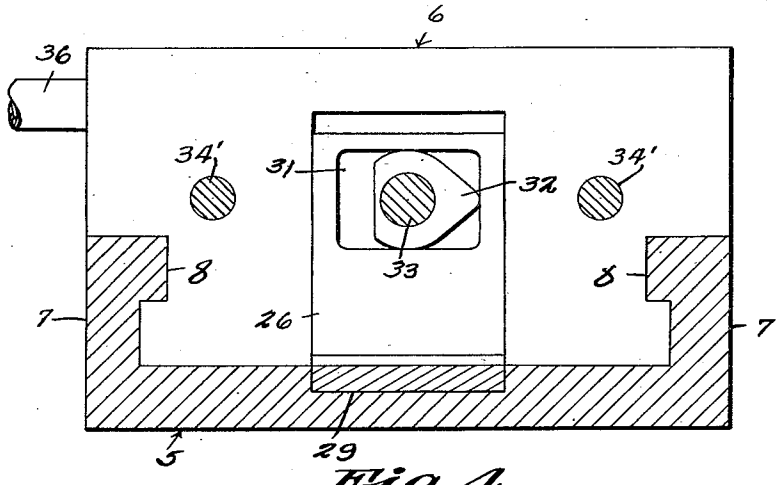


Fig. 4.

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Patented Nov. 14, 1950 2,530,085

UNITED STATES PATENT OFFICE

2,530,085

AIR-OPERATED VISE WITH IMPROVED ACTUATOR AND ADJUSTMENT MEANS

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Application December 20, 1946, Serial No. 717,431

3 Claims. (Cl. 81—17.2)

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This invention relates to vises, and more particularly, to vises which are operable under pressure of compressed air or the like.

It is a general object of the invention to provide an improved vise of the above general character which is of compact rugged construction yet permits of economical manufacture and which not only may be readily adjusted to accommodate various sizes of workpieces but nevertheless is effective to firmly clamp the same.

A more specific object of the present invention is to provide in an air-operated vise which includes fixed and movable jaws an improved actuator and novel locking means for the movable jaw, the latter being readily released and locked so as to permit the position of the movable jaw to be quickly altered with respect to the fixed jaw.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts, hereinafter more fully described and pointed out in the claims, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

Referring to the drawings

Figure 1 is a top plan view of a vise constructed in accordance with the invention, with a lever embodied in the vise being shown in locking position.

Figure 2 is a vertical longitudinal section taken substantially on line 2—2 of Figure 1, and showing a cam actuated lock member in locking engagement with the base portion of the device.

Figure 3 is a view taken substantially on line 3—3 of Figure 2.

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

Referring to the drawings in detail, the reference numerals 5 and 6 indicate generally a stationary base and a movable body portion respectively, which together comprise broadly the entire vise structure.

The movable body portion 6 is mounted for slidable movement on the stationary base 5, the base 5 having parallel longitudinal side walls 7 formed with inwardly extended flanges 8 that provide a seat or groove in which the movable body portion 6 may slide. A jaw 9 on the stationary base 5 and opposed jaw 10 on the movable body portion 6 cooperate to engage material to be held by the vise.

Within the movable body portion 6 there is

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provided a piston chamber 11 in which operates the piston 12. An air-tight fit is provided by the use of a leather cap 13 over which is positioned a clamp plate 14. These are secured to the top of the piston 12 by means of a nut 15 that is threaded onto an upstanding threaded neck 16 formed integral with the piston 12.

In the bottom of the piston 12 is formed a substantially rectangular groove or slot 17 that is centrally and longitudinally disposed and which has oppositely aligned longitudinal slots 18 formed in its side walls. A pin 19 extends transversely of the groove 17 and has its ends positioned in the slots 18 and is freely slidable therein.

To the pin 19 is pivoted the rear ends of a pair of forwardly extended links 20, and between these there is also pivoted to the pin 19 the forward end of a rearwardly extended link 21.

The forward ends of the links 20 are pivoted to a pin 22, and the rear end of the link 21 is pivoted to pin 23. By referring to Figure 2, it is seen that the pin 22 bears in the side walls of a forward extension 24 of the piston chamber 11. The pin 23, however, bears in the side walls formed by an indentation 25 in a lock member 26, that is mounted for up-and-down movement in a rear chamber 27.

Secured to the stationary base 5 by pins 28 is a toothed plate or rack 29, the bottom of the lock member 26 being provided with corresponding teeth 30. Normally the teeth 30 are out of engagement with the toothed plate 29. However, the lock member 26 is provided with a rectangular bore 31 through which is positioned a cam 32 fixedly mounted on a shaft 33 that is rotatable in an opening in the end plate 34 of the body portion 6. Bolts or the like 34' secure the end plate 34 to the body portion 6. By referring to Figure 4, wherein the lock member 26 has been lowered into engagement with the toothed plate 29, it is seen that the cam 32 is proportioned to lower the lock member 26 by clockwise rotation of the shaft 33, and to raise it by rotation of the shaft in an opposite direction.

Fixedly secured to the rearwardly projecting end of the shaft 33 is a lever 35, whereby the shaft may be rotated. Normally, during disengagement of the lock member 26 from the toothed plate 29, the lever 35 is vertical. When the lever 35 is dropped, however, the cam 32 turning in the rectangular bore 31 causes the lock member to be lowered into its position of engagement.

Leading into the upper end of the piston chamber 11 is a connection 36 which is adapted for

connection with any suitable compressed air supply. Also, for yieldably holding the piston 12 in normally elevated position, springs 37 are provided, the upper ends of which are positioned in sockets 38 formed in the bottom of the piston 12, on either side of the longitudinal groove 17.

To operate my vise, the work to be engaged is positioned between the stationary jaw 9 and jaw 10 of the movable body portion 6. The body portion 6 is then manually moved forwardly until the work is engaged, somewhat loosely, by the jaws 9 and 10. It is understood that this will be done with the lever 35 elevated so that the lock member 26 will be out of engagement with the toothed plate 29, so as to permit sliding of the body portion 6 on the stationary base 5.

The lever 35 is then dropped, lowering the lock member 26 by cam action into engagement with the toothed plate 29. Air is then supplied to the piston chamber 11, forcing the piston 12 downwardly, and spreading the toggle comprising links 20 and 21. It is here pointed out that the cam 32 is free to slide longitudinally within the rectangular bore 31 of the lock member 26, and that while the cam 32 fills the space between the front and rear walls of the rear chamber 27, the lock member does not. Thus, with the lock member being held stationary by its engagement with the toothed plate 29, and with the rear end of the link 21 being connected to the lock member 26, the spreading of the links will force the body portion 6 forwardly, and the engaged material will be securely locked between the jaws 9 and 10.

When the air pressure is relieved, the springs 37 act automatically to move the piston 12 to its normally elevated position, and the links are raised by the pin 19 carried in slots 18, thus releasing the engaged material.

What is claimed is:

1. A vise comprising, in combination, a base having a work-engaging jaw rigid therewith, a body portion supported on and movable longitudinally of the base and carrying a work-engaging jaw in opposed relation to the one on the base, a cam rotatable about an axis fixed with respect to the body portion, a lock member carried by the body portion but longitudinally movable relative thereto, said member being operatively associated with said cam for movement into and out of locking engagement with said base, a toggle linkage interposed between said body portion and said lock member, and actuator means carried by said body portion and connected to said linkage for extending the same to move the body portion with respect to the lock member and the base and thereby to move said jaws toward each other.

2. An air vise, embodying a stationary base and a movable body portion slidable thereon, opposed jaws rigid with the base and body portion, a vertically movable piston in the body portion operable under pressure of air, a lock member mounted in the body portion for sliding relative thereto in the plane of body portion movement, said lock member being also mounted in the body portion for up-and-down movement in a plane perpendicular to said plane for engagement with the base, said lock member being held stationary by engagement with the base, a cam mounted in the body portion in engagement with the lock member, and proportioned to raise and lower the lock member into and out of engagement with the base, said body portion, lock member, and piston being operatively joined, whereby downward movement of the piston will move the jaw on the body portion toward the jaw on the base, and spring means for yieldably holding the piston in normally elevated position.

3. A vise including a base, a body portion freely slidable thereon in the direction of its length, said body portion having a piston chamber and a lock member chamber, work-engaging jaws rigid with the body portion and base respectively, a rack rigid with the base, a lever-operable cam rotatably mounted in the second-named chamber and extended longitudinally of the body portion, a lock member slidable on and longitudinally of the cam, sliding movement of the lock member in either direction being limited by end walls of the second-named chamber, the cam being rotatable in the lock member and adapted when rotated to move the lock member in a plane perpendicular to the plane of sliding movement of the lock member, teeth on the lock member engageable with the rack when the lock member is moved responsive to cam rotation, to hold the lock member and base against relative movement, a toggle in the first-named chamber connected at its ends to the body portion and lock member respectively, and a fluid-pressure-responsive piston in said first-named chamber for actuating the toggle.

ERNEST H. SHAFF.

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