Aug. 12, 1958 H. B. SPRINK 2,846,907

VISE WITH AN ADJUSTABLE SUPPORT FOR A LOCKING PLATE

Filed July 15, 1957 2 Sheets-Sheet 1

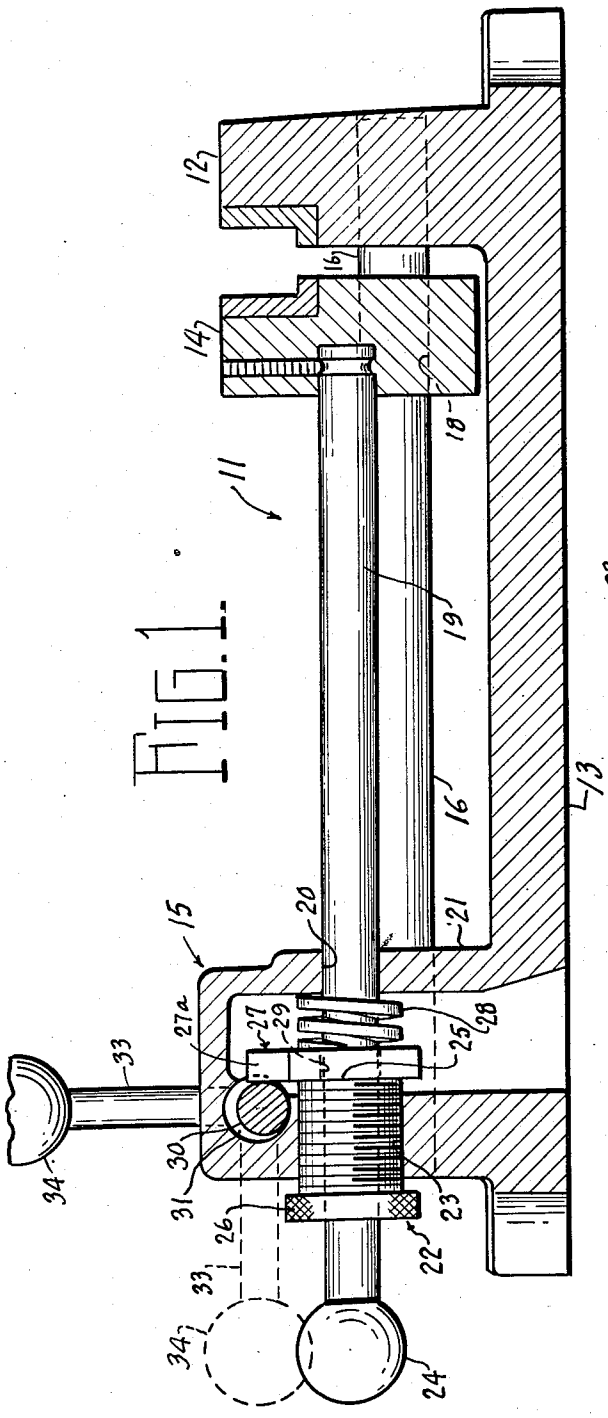


FIG. 1.

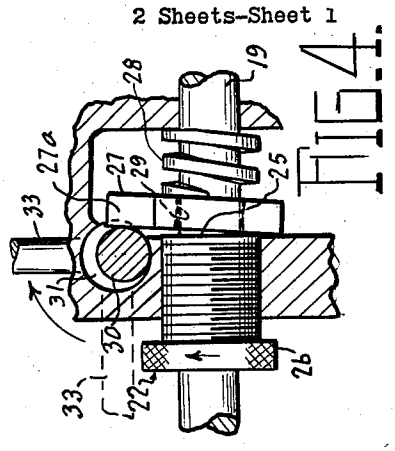


FIG. 4.

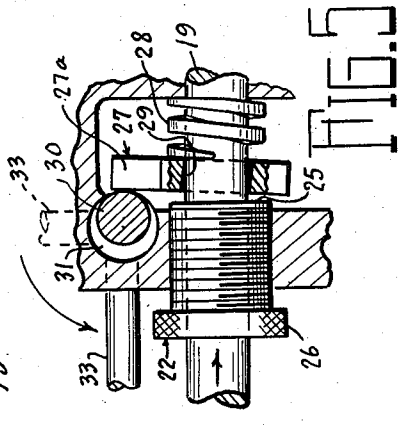


FIG. 5.

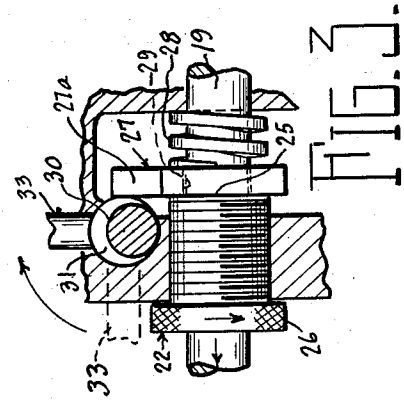


FIG. 7.

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VISE WITH AN ADJUSTABLE SUPPORT FOR A LOCKING PLATE

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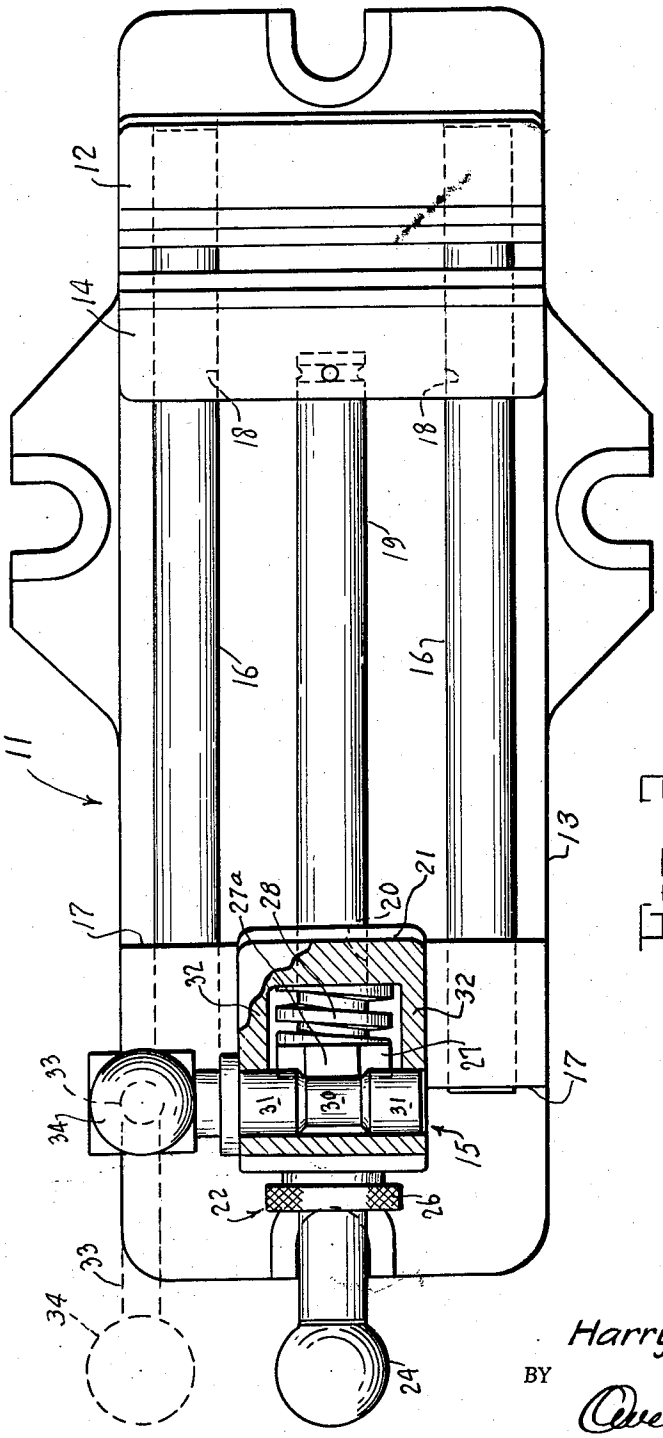


FIG. 1.

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VISE WITH AN ADJUSTABLE SUPPORT FOR A LOCKING PLATE

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4 Claims. (Cl. 81—17)

This invention pertains to a quick-acting vise and more particularly to such a vise with an adjustable support for a locking plate.

Quick-acting vises are well known in the art, including such vises having movable jaws connected to sliding beams held by locking plates in any desired positions. Further, it has been known that the locking plates may be adjustably supported with respect to sliding beams. Previously known adjustable supports, however, have been somewhat difficut to adjust and are limited in the degree of adjustment.

The present invention proposes a quick-acting vise with a locking plate for a beam of a slidable jaw, the plate being supported by an easily adjusted support. The new, adjustable support is capable of holding the locking plate entirely independently of an adjacent cam which tilts the plate. By being independent of the cam, the support can adjust the locking plate through a wider range of positions than heretofore possible, and the support may be manually adjusted without the necessity of employing tools to do so. Further, the new support enables the compressive force exerted by the jaws of the vise on an object held by the jaws to be easily controlled.

It is an object of the invention to provide a vise with an adjustable support for a locking plate which is capable of a wide range of adjustment.

Another object of the invention is to provide a vise with a support for a locking plate which is easily adjusted to control the amount of compressive force exerted by the jaws of the vise on an object held by the jaws.

Other objects of the invention will be apparent from the following detailed description of a preferred embodiment thereof, reference being made to the accompanying drawing, in which—

Fig. 1 is a cross-sectional view taken on line 1—1 of Fig. 2 of a vise embodying the invention.

Fig. 2 is a plan view of the vise of Fig. 1 with parts broken away and shown in section.

Fig. 3 is a detailed view showing portions of the vise of Figs. 1 and 2, including an adjustable support in one position.

Fig. 4 is a detailed view similar to Fig. 3 but showing the adjustable support of Fig. 3 in another position.

Fig. 5 is another view of the same portion of the vise as is shown in Figs. 3 and 4 showing a cam thereof rotated 90°.

Referring to the drawing, and more particularly to Figs. 1 and 2, a vise 11 has a fixed jaw 12 at one end of a frame 13, and a slidable jaw 14. A housing 15 is disposed at the opposite end of the frame 13 and can be integral therewith. Guide posts 16 connect the fixed jaw 12 with heavy side flanges 17 of the housing 15. The slidable jaw 14 is guided on, and supported by, the guide posts 16 through holes 18 in the jaw 14. A beam 19 is suitably attached to the slidable jaw 14 and extends through an opening 20 in a front wall 21 of the housing 15 and through an adjustable bushing support 22 threaded in an opening 23 in the rear wall. A handle 24, attached

to the outer end of the beam 19, is manually grasped to slide the beam and the movable jaw 14 in and out. The support 22 has a smooth, annular end face 25 ground to be as near perpendicular as possible to the axis of the beam 19. A resilient locking plate 27 is disposed within the housing 15 and contains an opening 29 through which the beam 19 extends. The plate 27 bears against the end face 25 of the support 22 by means of a spring 28 which is aligned with the end face 25 and maintains the plate 27 perpendicular to the beam 19 so that the beam can easily slide therethrough without catching on the edges of the opening 29. The opposite end of the support 22 has a knurled ring 26 by means of which the support is easily screwed in and out of the opening 23 and, hence, axially adjusted with respect to the locking plate 27.

An operating cam 30 is provided for the locking plate 27 in the form of a rod eccentrically attached to a shaft 31 which is supported by end walls 32 of the housing 15. The shaft 31 has a crank arm 33 extending at right angles and to which a handle 34 is attached. The crank arm 33 is moved in an arcuate path so as to turn the cam 30 to move it from an unlocked position (Fig. 1) to a locked position (Fig. 5) so that a forward face of the cam (that portion which is nearest to the plate 27) tilts the locking plate 27 by contacting a tab 27*a*. When tilted a sufficient amount, the edges of the opening 29 of the plate 27 bite against the beam 19 to prevent outward movement thereof and, at the same time, move the beam 19 slightly inwardly to enable the slidable jaw 14 to firmly press against an object placed between the jaws 12 and 14.

Fig. 5 shows the crank arm 33 rotated 90° with the locking plate 27 tilted and pushed slightly forwardly. When the arm 33 is rotated about 90°, the force exerted between the forward face of the cam 30 and the tab 27*a* of the locking plate 27 extends approximately through the axis of the shaft 31 and does not exert any substantial torque tending to spring the crank arm 33 back to its original position. For this reason, it is desirable to rotate the arm 33 approximately 90° when forcing the cam 30 against the tab 27*a* of the plate 27. If the arm 33 is rotated less than approximately 90°, the force between the forward face of the cam 30 and the tab 27*a* of the plate 27 will not pass through the axis of the shaft 31 and will thus exert torque on the shaft 31 which, if large enough, will cause the crank arm 33 to spring back and the jaws 12 and 14 to be released.

When the locking plate 27 is new, very little tilting is required to cause the edges of the opening 29 to bear against the beam 19. Little movement of the crank arm 33 is therefore necessary. However, since it is desirable to turn the cam 30 approximately 90° to render the cam self-locking, the bushing support 22 is screwed inwardly to displace the plate 27 and the tab 27*a* from the cam 30 when in the unlocked position (see Fig. 3). The displacement is sufficient to cause the cam 30 to contact the tab 27*a* of the plate 27 only during the last portion of the rotation of the crank arm 33 toward its horizontal position so as to tilt the plate 27 just sufficiently to bite against the beam 19 and to move it slightly forwardly. As the plate 27 wears, the support 22 is screwed out until the tab 27*a* of the plate 27 contacts the forward face of the cam 30 when the plate is in its normal vertical position and the cam is in the unlocked position (see Fig. 1). The support 22 may be still further moved so that the plate is initially tilted before the arm 33 is moved at all (see Fig. 4).

The bushing support 22 also enables the degree of compression exerted by the jaws 12 and 14 to be easily regulated. Thus, if a fragile object is placed between the jaws, the support 22 can be easily screwed farther in-

wardly so that the cam **30** will be in contact with the tab **27***a* of the plate **27** during a smaller portion of the rotation of the arm **33**. The plate **27** will then be tilted less and will move the beam **19** forwardly to a lesser extent and thus produce less compressive force on the jaws. Similarly, if greater compression is desired, the support **22** may be quickly moved outwardly so that the cam **30** will cause the plate **27** to move the beam **19** forwardly to a greater extent and produce larger compressive forces on the object. The amount of force can be controlled to some extent by the amount the crank arm **33** is rotated, but, as stated before, if the crank arm is not turned far enough, the cam **30** will not be self-locking and the jaws **12** and **14** will not hold the object.

The above description and drawing have been intended to serve in an illustrative and not a limiting sense, the scope of the invention being determined only by the claims appended hereto.

What I claim is:

1. A quick-acting vise comprising a frame, a fixed jaw on said frame, a slidable jaw, a beam secured to said slidable jaw and slidably supported by said frame whereby said slidable jaw can be moved toward and away from said fixed jaw, a locking plate having an opening through which said beam extends, a cam rotatably carried by said frame, means for turning said cam from an unlocked to a locked position for causing said cam to contact and tilt said plate to cause edges of the opening in said plate to bite against said beam, a support carried by said frame and surrounding a portion of said beam, said support having an end face which is perpendicular to said beam and adjustable between positions behind and in front of a forward face of said cam when in the unlocked position and capable of supporting said plate independently of said cam, and a spring normally holding said plate against said end face of said support.

2. A quick-acting vise comprising a frame, a fixed jaw on said frame, a slidable jaw, a beam secured to said slidable jaw and slidably supported by said frame whereby said slidable jaw can be moved toward and away from said fixed jaw, a locking plate having an opening through which said beam extends, a cam rotatably carried by said frame, means for turning said cam from an unlocked to a locked position for causing said cam to contact and tilt said plate to cause edges of the opening in said plate to bite against said beam, a support carried by said frame and surrounding portion of said beam, said support having an end face which is perpendicular to said beam and adjustable between positions behind and in front of a forward face of said cam when in the unlocked position, and a spring normally holding said plate against said end face of said support, said spring being aligned with said end face.

3. A quick-acting vise comprising a frame, a fixed jaw on said frame, a slidable jaw, a beam secured to said slidable jaw and slidably supported by said frame whereby said slidable jaw can be moved toward and away from said fixed jaw, a locking plate having an opening through which said beam extends, a cam rotatably carried by said frame, means for turning said cam from an unlocked to a locked position for causing said cam to contact and tilt said plate to cause edges of the opening in said plate to bite against said beam, a bushing threaded in an opening in said frame and surrounding a portion of said beam, said bushing having an annular end face perpendicular to said beam and capable of being screwed into and out of said frame to be moved between positions behind and in front of a forward face of said cam when in the unlocked position, the area of said end face being sufficiently large to support said plate independently of said cam, and a spring normally holding said plate against said end face of said support.

4. A quick-acting vise comprising a frame, a fixed jaw on said frame, a slidable jaw, a beam secured to said slidable jaw and slidably supported by said frame whereby said slidable jaw can be moved toward and away from said fixed jaw, a locking plate having an opening through which said beam extends, a cam rotatably carried by said frame, means for turning said cam from an unlocked to a locked position for causing said cam to contact and tilt said plate to cause edges of the opening in said plate to bite against said beam, a bushing threaded in an opening in said frame and surrounding a portion of said beam, said bushing having an annular end face perpendicular to said beam and capable of being screwed into and out of said frame to be moved between positions behind and in front of a forward face of said cam when in the unlocked position, and a coil spring normally holding said plate against said end face of said support, said spring being axially aligned with said end face of said support.

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