

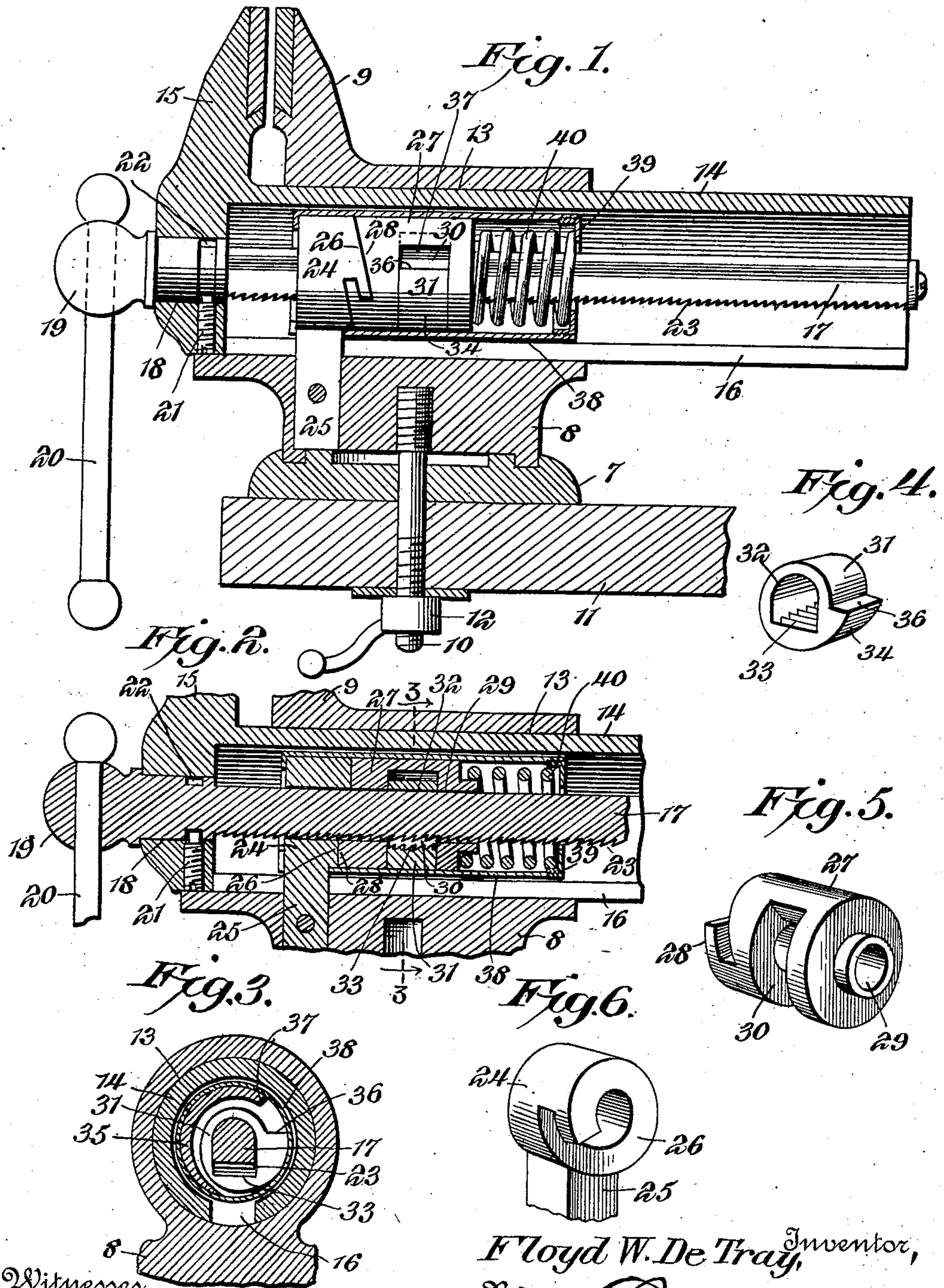
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WISE.

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To all whom it may concern:

Be it known that I, FLOYD WM. DE TRAY, a citizen of the United States, residing at Aurora, in the county of Kane and State of Illinois, have invented a new and useful Vise, of which the following is a specification.

This invention relates to quick action vises, and more particularly those of the type wherein a rack stem is employed, and a latch or clamping device is provided that is movable into and out of engagement with the rack of the stem, though there are features not limited to this particular character of structure.

One of the principal objects is to provide an exceedingly simple structure, wherein mutilated threads and split nuts are unnecessary, and to so arrange the mechanism that the element which effects the final relative or clamping movement between the jaws also acts as actuating means for effecting the operative movement of the latch or clamping device that secures said element to the movable jaw, and prevents the free sliding movement of the latter.

The preferred but not the only form of construction is illustrated in the accompanying drawings, wherein

Figure 1 is a vertical longitudinal sectional view through the vise, showing the locking mechanism in elevation. Fig. 2 is a detail sectional view, illustrating said locking mechanism in section. Fig. 3 is a cross sectional view on the line 3—3 of Fig. 2. Fig. 4 is a detail perspective view of the latch or clamping device. Fig. 5 is a detail perspective view of the nut element. Fig. 6 is a detail perspective view of the abutment element.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

In the embodiment illustrated, a turn-table base 7 is employed on which is rotatably mounted a body 8, having an upstanding fixed jaw 9. The body is normally held against rotation on the base 7 by means of a stem 10, passing downwardly through the base and through the support 11, on which the same is located, said stem having a clamping nut 12 threaded on its lower end. The body 8 is provided with an opening 13 therethrough, constituting a guideway in which a reciprocating slide 14 is mounted that carries at its outer end a movable jaw 15 coacting with the fixed jaw 9 and movable toward and from the same. The slide 14 is

tubular in form, as clearly shown in Fig. 3, and is provided in its lower side with a longitudinally disposed slot 16.

A stem 17 extends longitudinally through the slide 14, being rotatably mounted at its front end, as shown at 18, in the lower portion of the movable jaw 15 and having a head 19 projecting beyond the front face of said jaw. A handle bar 20 is slidably mounted in the head 19. The stem is held against longitudinal movement in the jaw 15 by a suitable screw 21, threaded through the lower portion of the jaw, and having its inner end engaged in an annular groove 22, formed in the front portion of said stem 10 and permitting the free rotation of the stem, as will be evident. While this stem may be of any suitable shape, in cross section, as shown in Fig. 3, it preferably has substantially parallel sides, a curved upper face, and a flat lower face provided with a rack 23. Said stem passes through and is freely rotatable in an abutment element 24, having a central opening to receive the stem, said abutment element comprising a head having a depending shank 25 suitably fixed in the body 8, and passing through the slot 16 of the slide 14. Its rear face is in the form of an inclined bearing 26, as shown more particularly in Fig. 6. A nut element 27 is mounted on the stem in rear of the abutment element, and has an inclined front face 28 that operates against the inclined rear face 26 of said abutment element, the two bearing faces constituting in effect a screw, which preferably has a one-and-one-fourth thread, though the pitch thereof can be varied, as found desirable. The nut element has a central opening 29, through which the stem passes, said stem being rotatable in the opening, the nut, however, being capable of rotation with the stem.

The nut element 27 is provided with an intermediate socket 30, through which the stem 17 passes. A clamping device or latch, in the form of a cam yoke 31, is mounted in this socket, and has an opening 32, through which the stem passes. The opening corresponds substantially to the cross sectional shape of the stem, but is slightly deeper than the vertical width of said stem, the bottom wall of the opening 32 being serrated, as shown at 33. It will thus be evident that while the clamping device 31, of necessity, rotates with the stem 17, under ordinary conditions, the teeth 33 will be below and out

of interlocking engagement with the teeth of the rack 23, as clearly shown in Figs. 2 and 3. The clamping device, however, is provided with a cam face 34, disposed eccentrically to the axis of rotation of the stem 17, and one of the walls 35 of the socket of the nut element constitutes a bearing against which this cam face operates upon the turning of the stem. The said cam face terminates at its rear end in a sharp shoulder 36, and arranged in the path of movement thereof is a shoulder 37, constituting one of the end walls of the socket 30. The relation of the parts will be evident by reference to Fig. 3.

The abutment element, the nut and the clamping device are preferably inclosed in a tubular casing 38, secured to said abutment element and extending in rear of the nut element, being located within the slide 14. A detachable screw cap 39 is threaded on the rear end of the casing 38, and has a central opening through which the stem 23 passes. Arranged within the rear portion of the casing and abutted against the cap 39 is a coiled spring 40 that surrounds the stem and has its front end bearing against the rear end of the nut element, said spring thus serving to yieldingly hold the nut element against the abutment element, and also constituting means for resisting the rotation of the nut element with the stem 17, as hereinafter described.

The operation of the structure may be briefly described as follows. Under normal conditions, the handle 20 will hold the stem in the position shown in the different figures. As a result, and as illustrated in Figs. 2 and 3, the clamping device will be in its lowermost position, and the teeth thereof will be out of engagement with the rack. The stem can therefore slide freely through said clamping device, and consequently through the nut element. Therefore the movable jaw 15 can be drawn freely away from or moved toward the fixed jaw 9. Consequently it will be evident that if an article is placed between the jaws, the outer or movable jaw can be pressed against the same, and the vise thus fitted thereto. When this preliminary engagement has taken place, the handle 20 is turned in the proper direction. As a result, the stem 17 is partially rotated, and as already stated, the clamping device 31 will rotate therewith. The nut element 27, however, will be held against rotation with the stem by its frictional and inclined engagement with the abutment element, this frictional engagement being assured by the spring 40. The result is that the cam face 34 of the clamping device will move against the bearing face 35, and said clamping device will be moved transversely of the stem, so that its teeth will interlock with the teeth of the rack, 23 of said stem. The nut element will thus be clamped to the stem and the jaw 15 be

locked against outward movement. A continued rotation of the stem by the handle 20 will now effect the rotation of the nut element, and the inclined face 28, operating against the inclined face 26 of the abutment, will serve to effect the final clamping action of the jaw 15 against the article to be held. To release the jaw to permit its free sliding movement, a retrograde rotation of the handle 20 is all that is necessary. This will carry the cam face 34 away from the bearing face 35, permitting the clamping device to drop out of interlocking or binding engagement with the stem, the shoulder 36 engaging the shoulder 37, and effecting the positive movement in case it does not drop by gravity. The parts are thus free as will be evident.

From the foregoing, it is thought that the construction, operation, and many advantages of the herein described invention, will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion, and minor details of construction, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. In a quick action vise, the combination with a fixed jaw, of a movable jaw coacting therewith, a fixed abutment, a nut element having an inclined bearing against the fixed abutment, a rotatable stem carried by the movable jaw and movable with respect to the nut element, and a clamping device for securing the nut element to the stem, said device being movably associated with the nut element and being moved thereby into engagement with the stem on the rotation of said stem.

2. In a quick action vise, the combination with a fixed jaw, of a movable jaw coacting therewith, a fixed abutment, a nut element having an inclined bearing against the fixed abutment, a rotatable stem carried by the movable jaw and movable with respect to the nut element, and a clamping device for securing the nut element to the stem, said device being rotatable with the stem and movable into and out of interlocking engagement therewith, and said nut element having a bearing that engages the clamping device and effects the movement thereof into interlocking engagement with the stem on the rotation of said stem.

3. In a quick action vise, the combination with a fixed jaw, of a movable jaw coacting therewith, a fixed abutment, a nut element having a screw bearing against the fixed abutment, a rotatable stem carried by the movable jaw and movable with respect to the nut element, a clamping device for securing

the nut element to the stem to effect their simultaneous rotation, said device being rotatable with the stem and movable into and out of binding engagement therewith, and
 5 said nut element having a bearing that engages the clamping device and effects the movement thereof into binding engagement with the stem on the rotation of said stem, and means for maintaining the nut element
 10 against rotation with the stem during the initial rotation of said stem and clamping device.

4. In a quick action vise, the combination with a fixed jaw, of a movable jaw coacting therewith, a fixed abutment, a nut element
 15 having a screw bearing at one end against the fixed abutment, a rotatable stem carried by the movable jaw and movable with respect to the nut element, a clamping device for securing the nut element to the stem to effect their
 20 simultaneous rotation, said device being rotatable with the stem and movable into and out of binding engagement therewith, and said nut element having a bearing that engages the clamping device and effects the
 25 movement thereof into binding engagement with the stem on the rotation of said stem, and a spring bearing against the opposite end of the nut element to that having the inclined bearing, said spring maintaining the
 30 nut element against rotation with the stem during the initial rotation of said stem and clamping device.

5. In a quick action vise, the combination with a fixed jaw, of a movable jaw cooperating therewith, an abutment element, a rotatable nut element having a bearing against
 35 the abutment element, a rotatable stem carried by the movable jaw, a clamping device associated with the nut element and movable into binding engagement with the stem on the rotation of the latter, a casing carried by
 40 the fixed abutment and extending in rear of the nut element, and a spring located in the casing and bearing against the nut element to yieldingly maintain the same against the
 45 abutment element.

6. In a quick action vise, the combination with a fixed jaw, of a movable jaw cooperating therewith, an abutment element, a rotatable nut element having an inclined bearing
 50 against the abutment element at one end, a rotatable stem carried by the movable jaw, a clamping device associated with the nut element and movable into binding engagement with the stem, said nut element having a bearing that engages the clamping device to
 55 move the same into binding engagement with the stem on the rotation of the latter, a casing secured to the fixed abutment, said casing surrounding the nut element and extending in rear of the same, and a coiled spring located in the casing and bearing against the
 60 opposite end of the abutment to the inclined bearing, said spring yieldingly maintaining

the nut element against the bearing and constituting means for holding said nut element against rotation upon the initial rotation of the stem and clamping device.

7. In a quick action vise, the combination
 70 with relatively movable jaws, of means for holding the same against relative movement, said means including a rotatable stem, a nut element capable of rotation with the stem, a clamping device rotatable with the stem and
 75 movable into and out of binding engagement therewith, said rotatable nut element constituting means that engages the clamping device to move the same into said binding engagement, and means for holding the nut element
 80 against rotation during the initial rotation of the stem and clamping device to effect the movement of the latter into binding engagement with the former.

8. In a quick action vise, the combination
 85 with relatively movable jaws, of means for holding the same against relative movement, said means including a rotatable stem, a nut element mounted on the stem and capable of rotation therewith, said stem being also rotatable in the nut element, a clamping device
 90 also mounted on the stem and rotatable therewith, said clamping device being movable into and out of binding engagement with the stem, and said nut element and clamping device being provided one with a bearing disposed eccentric to the axis of rotation of the
 95 stem, the other with a portion that engages the eccentric bearing to effect the movement of the clamping device into binding engagement with the stem.
 100

9. In a quick action vise, the combination with relatively movable jaws, of means for holding the same against relative movement, said means including a rotatable stem carried by one jaw and having a rack, a nut element
 105 mounted on the stem and rotatable therewith, said stem being slidable through the nut element and capable of a limited rotation with respect thereto, the nut element being furthermore provided with a socket
 110 having a bearing face therein at one side of the stem, a clamping yoke mounted on the stem and located in the socket, said clamping yoke being rotatable with the stem and having a sliding movement transversely thereof,
 115 a cam carried by the yoke and movable into engagement with the bearing face of the nut element to move said clamping device into interlocking engagement with the rack of the
 120 stem, and means for holding the nut element against rotation with the stem during the initial rotation of said stem and clamping device.

10. In a quick action vise, the combination
 125 with a body having a fixed jaw, and a guideway, of a movable jaw coacting with the fixed jaw and having a slide arranged in the guideway, a fixed abutment element located in the guideway, within the slide and
 130

having an inclined rear face, a stem rotatably
mounted in the movable jaw and slide, said
stem havng a rack on one face, a nut element
mounted on the stem and rotatable there-
5 with, said nut element having an inclined
front face that bears against the inclined rear
face of the abutment element and being pro-
vided with an intermediate socket, a cam
yoke mounted on the stem and located in the
10 socket, said cam yoke being slidable trans-
versely of the stem and having a serrated
portion movable into and out of interlocking
engagement with the rack thereof, the cam
portion of the yoke being movable into en-

gagement with one wall of the socket to effect 15
the transverse movement of said yoke, and a
coiled spring surrounding the stem and bear-
ing against the rear face of the nut element to
resist its rotation with the stem and main-
tain it in engagement with the abutment ele- 20
ment.

In testimony, that I claim the foregoing as
my own, I have hereto affixed my signature
in the presence of two witnesses.

FLOYD WM. DE TRAY.

Witnesses:

A. C. LITTLE,
T. J. TURNEY.