

No. 742,647.

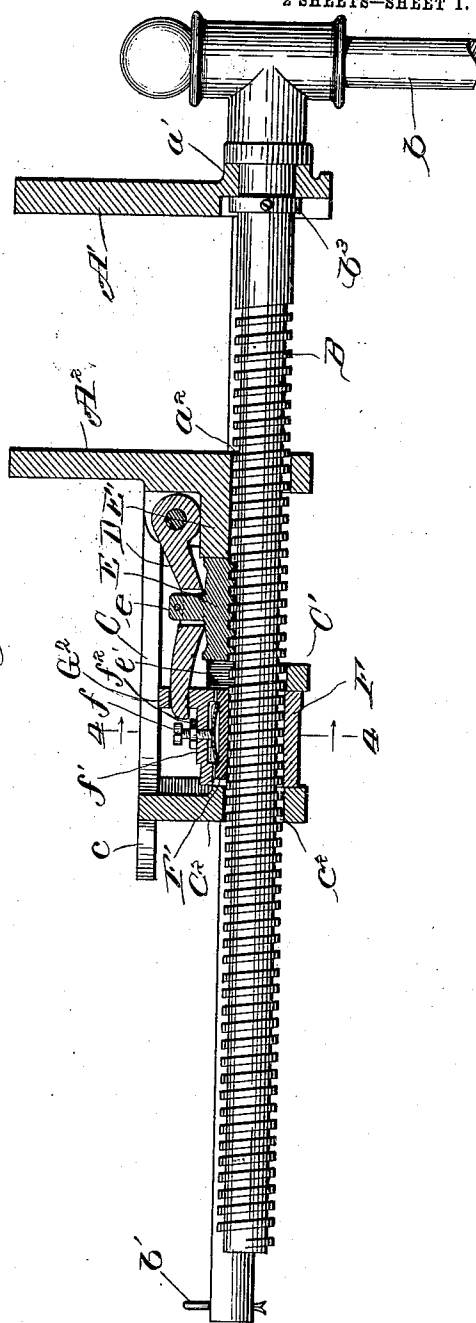
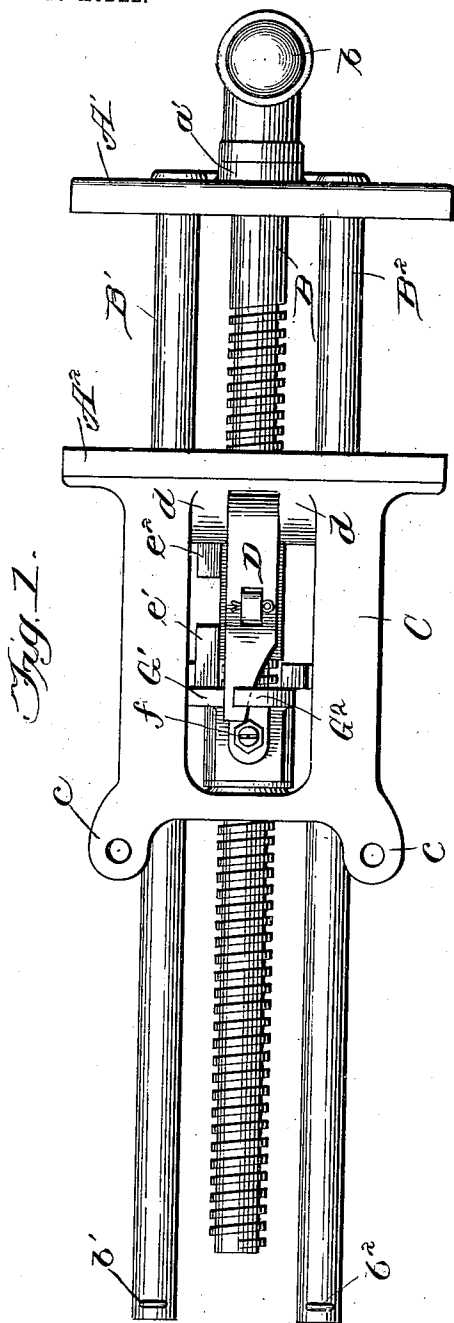
PATENTED OCT. 27, 1903.

C. A. HERRIMAN.
QUICK ACTING VISE.

APPLICATION FILED MAY 11, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



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2 SHEETS--SHEET 2.

Fig. 3.

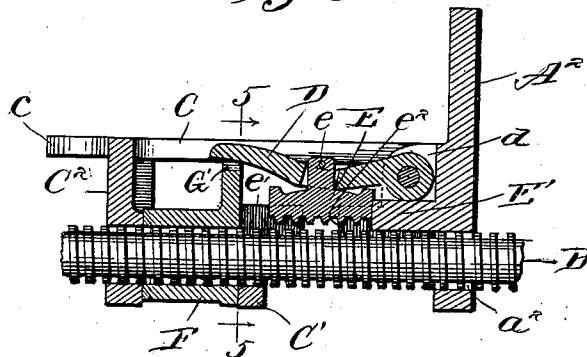


Fig. 4.

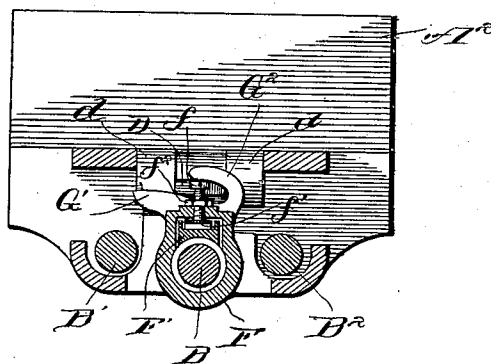
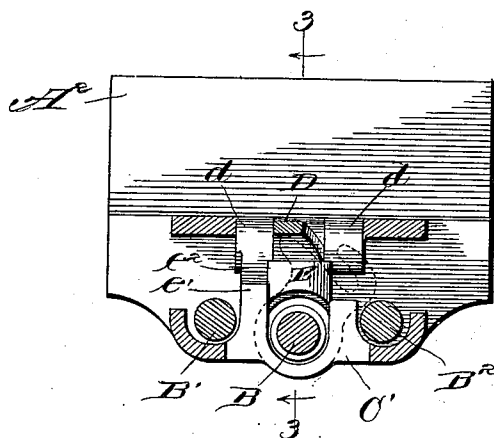


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES A. HERRIMAN, OF CHICAGO, ILLINOIS.

QUICK-ACTING VISE.

SPECIFICATION forming part of Letters Patent No. 742,647, dated October 27, 1903.

Application filed May 11, 1903. Serial No. 156,668. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. HERRIMAN, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Quick-Acting Vises; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates generally to vises, and more particularly to the type of vises commonly known as "quick-acting."

The primary object of my invention is to provide a vise the jaws of which may be quickly moved toward each other any desired distance into contact with the object or work which is to be held by the vise and which may then be slowly and forcibly moved toward each other to grip the object with the necessary pressure to firmly hold the same and which when the object is to be released may be quickly moved away from each other.

A further object of my invention is to provide a vise which will be simple in construction, inexpensive in manufacture, and efficient in use.

The embodiment of my invention herein disclosed comprises a pair of relatively movable jaws, a worm-shaft rotatably secured to one jaw and passing through an aperture in the second jaw, a pawl carrying a nut adapted to be swung into and out of engagement with the thread on the worm-shaft, and means frictionally supported upon the worm-shaft for operating the pawl, and thereby engaging the nut with and disengaging it from the worm-shaft.

My invention will be more fully described hereinafter with reference to the accompanying drawings, in which the same is illustrated as embodied in a convenient and practical form, and in which—

Figure 1 is a plan view thereof; Fig. 2, a central longitudinal section; Fig. 3, a longitudinal section on line 3 3, Fig. 5, showing the nut disengaged from the worm-shaft; Fig. 4, a cross-section on line 4 4, Fig. 2; and Fig. 5, a cross-section on line 5 5, Fig. 3.

Similar reference characters are used to

designate similar parts in the several figures of the drawings.

Reference-letters A' and A² indicate the jaws of the vise, which in the present instance is shown as of a type adapted for use by wood-workers. It is of course obvious that by slight modifications the vise may be rendered suitable for the use of metal workers and other mechanics.

Guide-rods B' and B² are rigidly secured at corresponding ends to the jaw A' of the vise and pass through openings in the second jaw A² and also through aligned openings formed in the rear plate C² of a frame C, carried by and preferably formed integral with the jaw A².

B' b² indicate stops of any desired construction—such, for instance, as cotter-pins—located at the ends of the guide-rods B' and B², adapted through their engagement with the outer surface of the plate C² of the frame C carried by said jaw to prevent the disconnection of the ends from the jaw A².

B indicates a worm-shaft extending through and rotatably mounted in the jaw A'.

a' indicates a collar formed integrally with the jaw A', which serves as a bearing for the worm-shaft.

b³ indicates a collar surrounding the worm-shaft and located in a recess formed on the inner face of the jaw A', which serves to retain the worm-shaft longitudinally immovable with respect to the jaw A'. The end of the worm-shaft which projects beyond the outer surface of the jaw A' is provided with a transverse tubular passage-way, within which is slidably located the usual vise-lever b. The worm-shaft B extends through aligned holes a² and c², formed, respectively, in the second jaw A² and in the rear plate C² of the frame C, carried thereby. The shaft B is freely movable longitudinally through the holes a² and c².

A pawl D is pivotally mounted upon the jaw A² of the vise by means of a pin extending through one end thereof and supported in lugs d, located on either side of the pivoted end of the pawl and preferably formed integrally with the jaw A². Carried by the pawl D is a nut E, provided with a thread corresponding in pitch to the thread on the worm-shaft B. The nut E may be formed

integrally with or supported by the pawl D in any desired manner—as, for instance, by a lug *e*, extending upwardly through a slot in the pawl D and retained therein by any suitable means—such, for instance, as a cotter-pin, as shown in Fig. 1.

A sleeve F surrounds the worm-shaft B and frictionally engages the same by means of a shoe F', located within a pocket formed in the sleeve. The interior surface of the sleeve and of the shoe F' conforms in curvature to the exterior surface of the worm-shaft. A spring *f*' is interposed between the shoe F' and the adjacent wall of the sleeve, thereby securing a frictional engagement between the interior surfaces of the sleeve and shoe mounted therein and the exterior surface of the worm-shaft. A set-screw *f* extends through the sleeve and engages the spring *f*' to vary the tension thereof, and thereby regulate the frictional contact between the shoe and the worm-shaft. The set-screw is preferably provided with a suitable lock-nut *f*². The sleeve F engages at one end with the interior surface of the plate C² of the frame C and at its other end engages a bridge-piece C', extending beneath the worm-shaft and supported by and preferably formed integrally with the frame C. The interposition of the sleeve F between the plate C² and bridge C' retains the same longitudinally immovable with respect to the frame C.

The bridge C' is provided with upwardly-projecting lugs, as shown in Fig. 5, one of which, *e*¹, is extended laterally, so as to lie adjacent to one side of the nut E near one end thereof. A second lug *e*² lies adjacent to the same side of the nut E near the other end thereof. The lug *e*² may conveniently be formed integrally with the jaw A². The end of the nut E engages a lug E', extending from the inner surface of the jaw A².

Fingers G' and G² are carried by the sleeve F, the former of which serves as a cam to elevate the pawl D, while the latter serves as a lock to retain the pawl in its lowered position. The end of the pawl D rests upon the cam-finger G' and is adapted to be received within the groove formed between the fingers G' and G².

The jaw A² may be conveniently supported beneath a work-bench by any suitable fastening means—such, for instance, as lugs *c*—through perforations in which screws may be passed into engagement with the under side of the bench.

The operation of my invention is as follows: When it is desired to separate the jaws, the worm-shaft B is given a partial turn in a reverse direction from that in which it is turned when the jaws are to be brought together. Such partial reverse rotation of the worm-shaft oscillates the sleeve F through the frictional engagement between the said sleeve and the exterior of the shaft, and thereby turns the cam-finger G' from the position shown in Fig. 4 to that shown in dotted lines

in Fig. 5. The pawl D is consequently elevated and the nut E, carried thereby, disengaged from the thread on the worm-shaft, as shown in Fig. 3. The jaw A' may then be moved quickly away from the jaw A² by a direct pull exerted upon the lever *b*. This reverse movement of the worm-shaft also permits the jaw A' to be quickly moved toward the jaw A² when it is desired to grip an object or piece of work between the jaws. After the movement of the jaw A' toward the jaw A² so that the object is engaged by both of the jaws the worm-shaft B is turned in the usual direction—that is, left to right. The movement of the shaft B carries with it the sleeve F, so that the cam G' permits the pawl D to fall from the position shown in Fig. 5 to that shown in Fig. 4. The second finger G² then occupies such a position above the top of the end of the pawl that it retains the same in its lowered position and prevents the nut E becoming disengaged from the worm-shaft during the rotation of the latter from left to right. The rotation of the sleeve F, with the worm-shaft, is limited by means of the engagement of the finger G² with the rod B², as shown in Fig. 5. When the nut is to be disengaged from the thread of the worm-shaft and when the worm is rotated in its usual direction, the movement of the sleeve therewith is limited by the engagement of the end of the pawl D with the finger G². The lug E' assumes the longitudinal strain imposed upon the nut E when an object is gripped between the jaws and relieves any strain which would otherwise be imposed upon the pawl D through the connection of the nut therewith. A strain in a rotary direction imposed upon the nut E is resisted by the lugs *e*¹ and *e*².

From the foregoing description it will be observed that I have invented a quick-acting vise, the jaws of which may be quickly moved toward or away from each other by merely given the vise-lever a partial reverse rotation to disengage the nut from the worm-shaft and which when the jaws have been moved into contact with an object may readily grip the object with any desired degree of pressure by rotating the shaft B from left to right, such rotation of the shaft initially moving the sleeve F to such a position that the pawl falls by gravity and is positively retained in such lowered position, thereby insuring the continued engagement of the nut with the thread on the worm-shaft during the rotation of the worm-shaft from left to right.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form, the proportion of parts, and the substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit of my invention.

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

1. In a vise, the combination with two jaws, of a worm-shaft rotatively secured to one jaw and passing loosely through the second jaw, a worm-nut pivotally mounted upon the second jaw, and means actuated by the rotation of said worm-shaft to positively swing said nut upwardly or downwardly to disengage said nut from and engage said nut with the worm-shaft.

2. In a vise, the combination with two jaws, of a worm-shaft rotatively secured to one jaw and passing loosely through the second jaw, a gravity-pawl pivotally mounted upon the second jaw, a worm-nut carried by said pawl and having a thread conforming in pitch to the thread on said worm-shaft, and means actuated by the rotation of said worm-shaft for swinging said pawl upwardly or downwardly to disengage said nut from and engage the same with said shaft.

3. In a vise, the combination with two jaws, of a worm-shaft rotatively secured to one jaw and passing loosely through the second jaw, a worm-nut pivotally mounted upon said second jaw, means actuated by a partial reverse rotation of said shaft for swinging said nut out of engagement with said worm-shaft, and means actuated by the initial rotation of said shaft in its normal direction to positively retain said nut in engagement with said shaft.

4. In a vise, the combination with two jaws, of connecting mechanism between said jaws permitting relative movement thereof and comprising a worm-shaft secured to one jaw and a worm-nut pivotally mounted upon the other jaw adapted to mesh with said shaft, and means frictionally mounted upon the worm-shaft and operated by a reverse rotation of said shaft to disengage said nut from the shaft thereby permitting said jaws to be freely relatively moved.

5. In a vise, the combination with two jaws, of connecting mechanism between said jaws permitting relative movement thereof and comprising a worm-shaft secured to one jaw and a worm-nut pivotally mounted upon the second jaw adapted to engage the thread on said worm-shaft and thereby prevent movement of the jaws apart, and a cam frictionally supported upon said shaft and adapted to engage said nut to lift the same out of engagement with the worm-shaft upon a reverse rotation of said shaft.

6. In a vise, the combination with two jaws, of connecting mechanism between said jaws effecting relative movement thereof and comprising a worm-shaft rotatively secured to one jaw and a worm-nut having a thread conforming in pitch to that of said shaft mounted upon the other jaw, a gravity-pawl upon which said nut is carried pivotally mounted upon said second jaw, a cam frictionally mounted upon said worm-shaft adapted to engage said pawl and lift said nut out of engagement with the thread on said worm-shaft upon a reverse rotation of said shaft.

7. In a vise, the combination with two jaws, of connecting mechanism between said jaws effecting relative movement thereof and comprising a worm-shaft relatively secured to one jaw and a worm-nut mounted upon the second jaw and having a thread the pitch of which conforms to that of said worm-shaft, a gravity-pawl upon which said nut is mounted pivotally secured to said second jaw, a cam frictionally mounted upon said worm-shaft adapted to engage said pawl and lift the nut out of engagement with the thread on said shaft upon a reverse rotation of said shaft, and lugs carried by said second jaw and engaged by said nut to assume the strain imposed upon the nut during the operation of the vise.

8. In a vise, the combination with two jaws, of connecting mechanism between said jaws effecting relative movement thereof and comprising a worm-shaft rotatively secured to one jaw and a worm-nut having a thread conforming in pitch to that of said shaft mounted upon the other jaw, a gravity-pawl upon which said nut is carried pivotally mounted upon said second jaw, a cam frictionally mounted upon said worm-shaft adapted to engage said pawl and lift said nut out of engagement with the thread on said worm-shaft upon a reverse rotation of said shaft, and a finger carried by said cam adapted to engage said pawl upon an initial rotation of said shaft in its normal direction and thereby retain said nut in engagement with said shaft.

In testimony whereof I sign this specification in the presence of two witnesses.

CHARLES A. HERRIMAN.

Witnesses:

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C. C. CUNNINGHAM.