(No Model.)

M. CRAWFORD.

VISE.

No. 375,537. Patented Dec. 27, 1887.

Fig. 1.

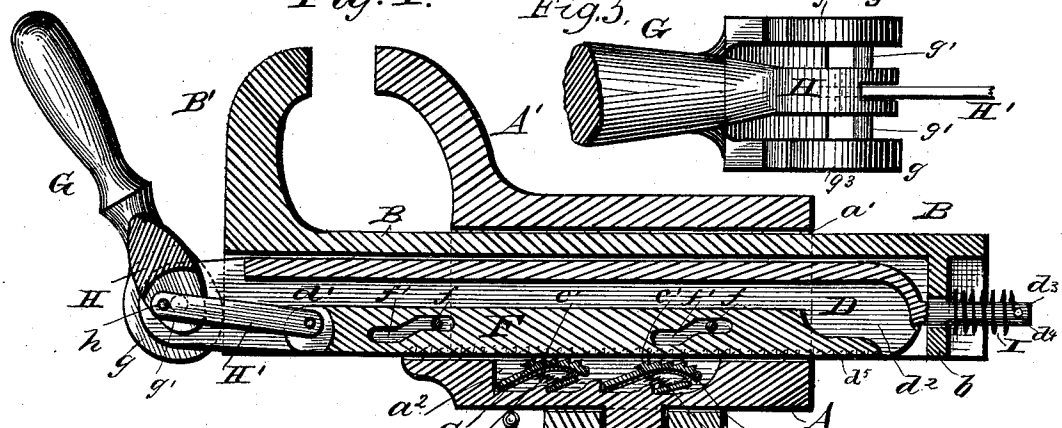


Fig. 5.

Fig. 2.

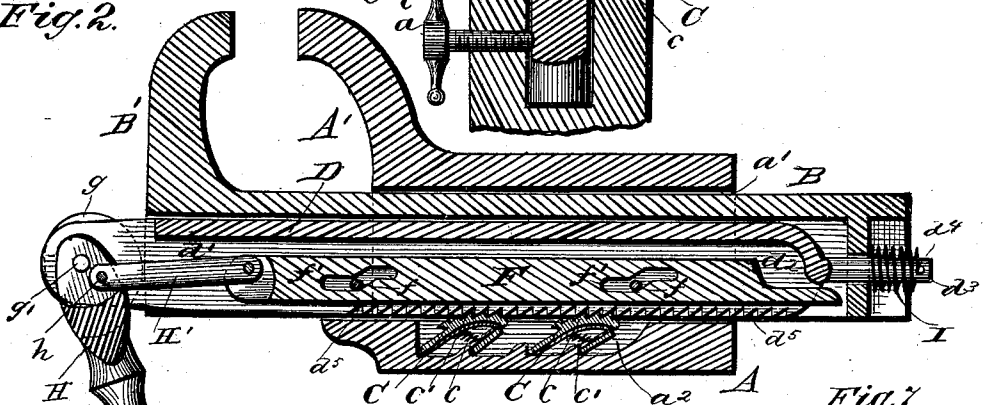


Fig. 4.

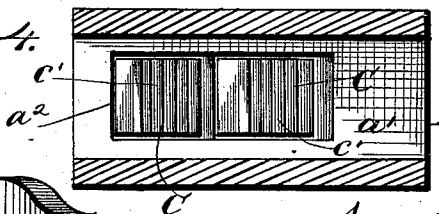


Fig. 7.

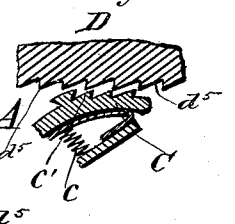


Fig. 3.

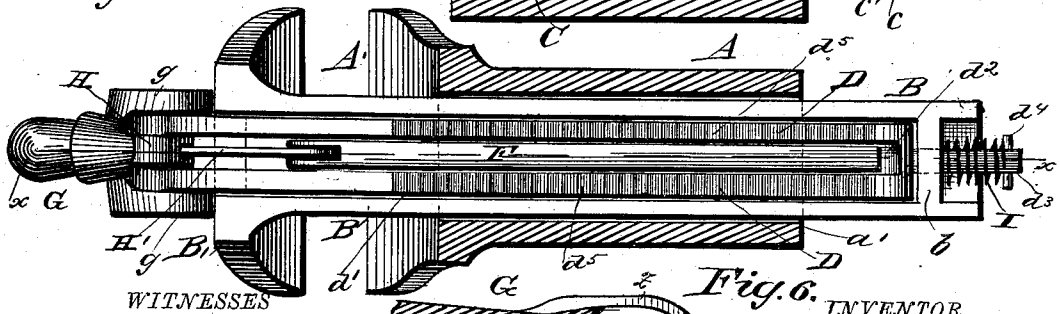
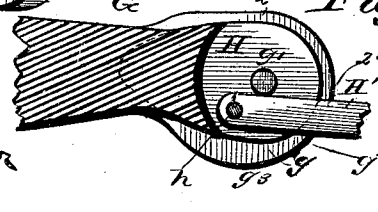


Fig. 6.



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VISE.

SPECIFICATION forming part of Letters Patent No. 375,537, dated December 27, 1887.

Application filed January 16, 1886. Serial No. 188,749. (No model.)

To all whom it may concern:

Be it known that I, MIDDLETON CRAWFORD, a citizen of Canada, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Vises; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures marked thereon, which form part of this specification.

This invention relates to smiths' and other vises; and the novelty consists in the construction, arrangement, and adaptation of parts, as will be more fully hereinafter set forth, and specifically pointed out in the claims.

I provide engaging and disengaging racks supported indirectly one upon each jaw of the vise, the rack which is identified with the movable jaw being provided with a guard-bar which, in one position of the vise, prevents its engagement. The operating-lever is pivoted to the movable rack, has a cam which operates the movable jaw, and has an arm which is pivoted to the guard-bar at a point eccentric to the pivots between the said lever and the movable rack; hence a movement of the lever gives to the rack and its guard-bar a differential movement.

Somewhat similar mechanical devices have been employed in vises of otherwise materially different construction; but in such devices known to me the operating-lever has been arranged to operate in a plane at right angles to the throw of the movable jaw, and such jaw has been operated through toggle-levers, the cam of the lever operating togglewise to force the movable jaw in the direction of the stationary jaw.

In my device I operate the lever in a plane corresponding to the traverse of the movable jaw. I arrange the engaging teeth differentially, so as to allow a finer adjustment. I do away with the use of toggle-levers, and operate the movable jaw, the rack, and its guard directly from the operating-lever.

The invention in its details is fully illustrated in the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a vertical longitudinal section, showing the operating-lever elevated, the guard-bar depressed, and the racks out of engagement. Fig. 2 is a similar view with the operating-lever depressed, the guard-bar elevated, and the racks engaged. Fig. 3 is a bottom plan view with the base removed. Fig. 4 is a top plan view of the base. (Figs. 3 and 4 are plan views looking in opposite directions from the line which separates the base from the movable part; but in practice the base and stationary jaw will comprise ordinarily a simple casting.) Fig. 5 is an enlarged detail view of portions of the operating-lever. Fig. 6 is an enlarged detail section taken at right angles to the plane of Fig. 5. Fig. 7 is a detail drawing showing the differential arrangement of the engaging teeth.

Referring to the drawings, in which similar letters of reference indicate like parts in all the figures, A designates a swiveled base, which may be arranged in any well-known manner to turn freely on a center and be secured at any point by means as *a*. It is preferably made integral with the stationary jaw A′, and has a horizontal aperture, *a′*, which receives the shank B of the movable jaw B′, and an interior vertical recess, a^2, which opens into said shank-passage *a′*.

Located within the recess a^2 is one or more racks, C, held normally upward by springs *c*, and having upwardly-projecting teeth *c′*. One rack with several teeth, or two racks with a less number of teeth each, may serve. It is important, however, for reasons which will presently appear that the teeth shall differ in location and relative arrangement from those of the rack with which they engage. (See Fig. 7.)

The shank B is closed on three sides and open below. It has a perforated vertical diaphragm, *b*, through which operates the arm d^3 on the rack D. I show this rack duplex—that is to say, divided by a longitudinal slot, *d′*, and considerably chambered out in the interior, as at d^2. Within this chamber are arranged pins *f f*, which correspond and work loosely in curved slots *f′ f′*, formed in a guard-

bar, F, said guard-bar working freely in the slot *d*. Each slot *f'* is formed to provide two planes, one higher than the other. When the pins *f* occupy the upper plane, the face of the bar F will be flush with or slightly below the extremities of the teeth *d* of the movable rack, and when in this position the bar F will have depressed the racks C until they are entirely disengaged from the rack D. When the bar F is forced in one direction, the action of the pins *f* in traveling to the lower plane will cause it to pass up in the slot *d'*, and the springs *c* will force the racks C again into engagement with the rack D. Upon these devices and the peculiar means which I employ for operating them largely depends the novelty and importance of the invention.

G designates the operating-lever. It is formed with two cam-plates, *g*, the sides of which bear against the outer face of the movable jaw B B'. A pivot through these cam-plates (seen at *g'*) connects the lever G with the rack D, and an arm, H, rigid with the lever, is connected by a pivot, *h*, with the outer end of the guard-bar F through a link, H'. The lever G moves upon the pivot *g'*, while the pivot *h* in the arm H is eccentric thereto. To correspond with this arrangement of the pivots *g' h* the bearing-edges of the cam-plates *g* are concentric to the pivot *g'* from the point *z*, Fig. 6, to the point *z'*, same figure. From the latter point *z'* downward is formed a cam, g^3, on each plate *g*.

A spring, I, arranged between a cross-arm, d^4, on the arm d^3 of the rack D and the diaphragm *b* of the shank B, serves to hold the edges of the cam-plates in contact normally with their bearings on the outer face of the movable jaw; hence, from the position in which the lever G is shown in Fig. 1 to the position in which it is indicated in Fig. 5 the concentric surfaces g^2—those lying between the points marked *z z'*—ride over their bearings on the movable jaw without causing any change in the positions of the rack and movable jaw relatively to each other; but such a movement upon the part of the lever, by reason of the eccentricity of the pivot *h*, causes the bar F to move backward and upward in the slot *d* and to uncover the teeth *d'*, allowing the action of the springs *c* to throw the teeth *c'* into engagement therewith. At the time in the downward movement of the lever G when this engagement between the teeth *c' d'* has been effected, the cam g^3 commences to change the relation between the parts B, B', and D, and the part D being for the time held stationary to the base the two jaws are brought together as the action of the cam is exercised and the spring force of I is overcome.

This construction is simple, comparatively inexpensive of manufacture, and peculiarly efficient in service. The operator with one hand can readily throw up the lever G into the position shown in Fig. 1, when the racks are disengaged, and may manipulate the jaw B B' to accommodate any work held by the other hand. When the article has been engaged between the jaws a simple movement of the lever downward efficiently clamps it.

It is important that the plane of action of the lever, its cam, and of the movable jaw correspond. The cam acts directly upon the jaw, and not through expensive and unreliable toggles.

It will be noticed that the teeth *c'* are arranged at "thirds" with the teeth d^5, (see Fig. 1,) and that a tooth, *d'*, will be engaged with one of the teeth *c'* whenever the rack D has been moved to a distance equal to one-third the distance between one tooth d^5 and the next. This feature, in connection with that of having the movable jaw operated directly by the cam, is important in some classes of work, allowing a very nice adjustment to be obtained, and allowing delicate work to be handled without injury. These proportions may be varied to secure different degrees of delicacy for different classes of work.

The handle G is made readily removable, allowing one to be replaced by another having, for instance, a more magnified cam to clamp articles of soft material—as wood.

In using my improved vise the operator stands facing the machine and in the best possible position to handle both work and vise.

What I claim as new is—

1. In a vise, the combination, with a stationary jaw and racks supported in stationary bearings, of a movable jaw carrying a movable rack, a guard-bar for throwing the racks out of engagement, and an operating-lever working in a plane corresponding to that of the traverse of the movable jaw, and having a cam operating directly on such jaw, as set forth.

2. In a vise, the combination, with the movable jaw and rack D and with the stationary jaw and rack C, of the operating-lever working in a plane corresponding to that of the traverse of the movable jaw, and having a cam, as g^3, the pivot *g'*, connecting the lever with the rack D, and a guard-bar connected to the lever by a pivot eccentric to the pivot *g'*, and arranged to throw the racks out of engagement when the cam is out of operation, as set forth.

3. In a vise substantially as described, the combination, with the two jaws and their respective racks, of an operating-lever pivoted and centered upon the movable rack, a guard-bar, as F, pivoted eccentrically to the said lever, a concentric bearing, g^2, between the lever and movable jaw, corresponding to the throw of the guard-bar, and a cam, g^3, arranged to move the movable jaw and its rack independently when said rack is uncovered by the guard-bar, as set forth.

4. The combination, with the movable jaw and the racks C, of the rack D, having slot *d* and chamber d^2, the guard F, supported loosely in said rack by pins *f*, the lever G, working in a plane corresponding to that of the traverse of the movable jaw, and having cam-surface g^3

and concentric surface g^2, the pivots g' h, arranged upon different centers, and the spring I, as specified.

5. The rack D, having slot d, the guard-bar F, and lever G, as described, combined with the shank B, having perforated diaphragm b, the pin d, and spring I, and with the rack C, as and for the purpose set forth.

6. The combination, with the swiveled stationary jaw A A', having recesses a' a^2, and with the movable jaw B and its shank B', having perforated diaphragm b, of the rack D, having slot d^2 and cross-arm d^3, the spring I, guard-bar F, the links H', and the lever G, having bearings g^2 g^3, arm H, and pivots g' h, as and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

MIDDLETON CRAWFORD.

Witnesses:

WM. H. SLOAN,

JOSEPH L. SCHOFIELD.