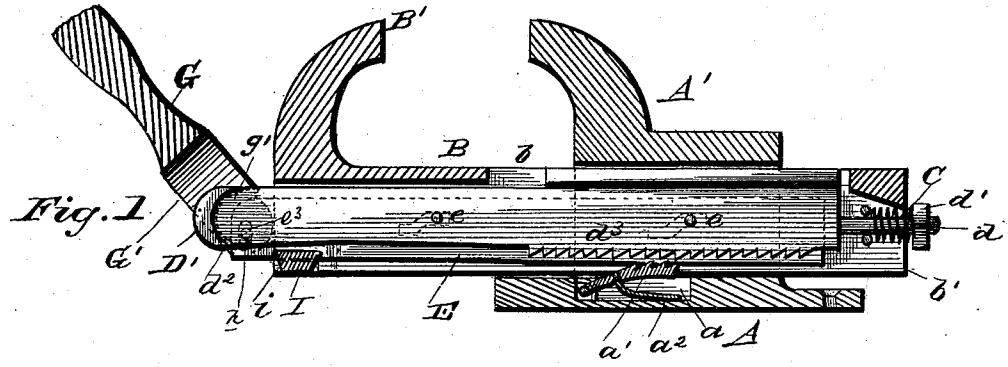
(No Model.)

M. CRAWFORD.

VISE.

No. 375,538. Patented Dec. 27, 1887.



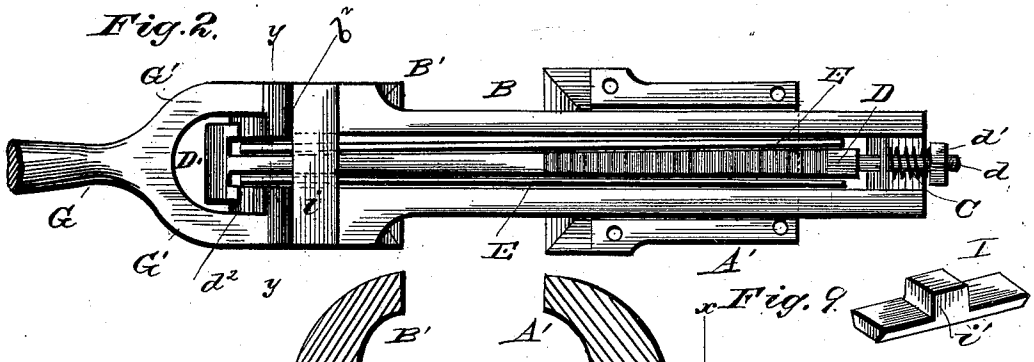
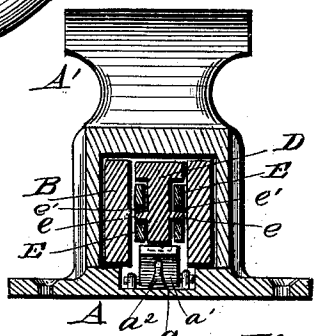
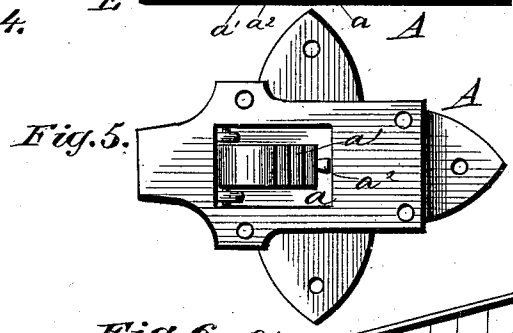
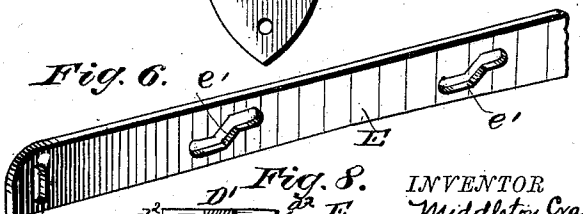
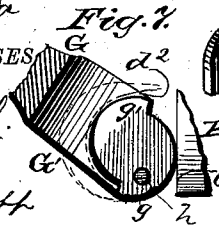


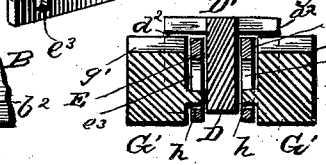
Fig. 4.











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UNITED STATES PATENT OFFICE.

MIDDLETON CRAWFORD, OF BROOKLYN, ASSIGNOR TO WILLIAM R. BAIRD, OF NEW YORK, N. Y.

VISE.

SPECIFICATION forming part of Letters Patent No. 375,538, dated December 27, 1887.

Application filed June 16, 1886. Serial No. 205,316. (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' vises, and the novelty consists in the construction, arrangement, and adaptation of parts, as will be more specifically pointed out in the claims.

The invention is essentially an improvement upon the similar device embodied in allowed application, Serial No. 188,749, filed by me January 16, 1886, in which the ownership of interest is the same. In that device the rack-bar had a longitudinal recess in which was situated a single guard-bar connected to the operating-lever having a single cam by a link attachment. This device was a useful improvement in the art, but subsequent experiment and research has suggested alterations and improvements from which advantages accrue, and which are designed to be secured by patent in this application. In the former device the single guard-bar necessitated the separation of the rack-bar ratchets into two narrow rows, and the rack-bar being in action at every operation of the cam-lever was apt to become worn at its bearings. In the present device the rack-bar and ratchets are solid and continuous, and on each side of it are pivoted light thin guard-bars. I also dispense with the link-connection and make the attachment to the cam-lever direct, while at the same time I overcome the necessity for any readjustment of the bearings due to wear by having a coiled spring, which keeps the contact between the cam-lever and its bearings constant. In the present device I likewise replace the cam-lever by one having a double cam of peculiar construction, which forces the movable jaw twice the distance which it formerly did by the same stroke of the operating-lever. In this device I have, by means of the above-described mechanism, made a vise composed of few pieces, and those easily made and of great strength, of unusual cheapness, not liable to wear, and requiring little finishing in its manufacture.

In the accompanying drawings, which form part of this specification, Figure 1 is a longitudinal vertical section showing the ratchet disengaged. Fig. 2 is a bottom plan view with the base removed. Fig. 3 is a view corresponding to Fig. 1, with the ratchet engaged. Fig. 4 is a transverse section taken on the plane of the line $x\ x$ of Fig. 3. Fig. 5 is a top plan view of the base. Fig. 6 is a perspective detail of one of the guard-bars. Fig. 7 is an enlarged detail showing the action of the double cam. Fig. 8 is a transverse section taken on the plane of the line $y\ y$ of Fig. 2. Fig. 9 is a detail.

Referring to the drawings, A designates the base, and A′ the stationary jaw, of a vise. The shank B of the movable jaw B′ is slotted longitudinally at b and has a cross-support for the shank d of the rack-bar D. A spring, C, and nut d' serve to keep the rack-bar and cam-lever in constant contact with their bearings. The rack-bar D is provided at its forward end with a cross-head, D′, constructed to form a segmental bearing, d^2, upon either side of the bar, (this bearing is against the cam-lever, as will be more fully hereinafter described,) and it is provided with pins e, preferably cast upon and made integral with the rack-bar, which, working in doubled-planed slots e' in the guard-bars E, serve to cover or disclose the teeth d^3 upon the rack-bar, according as said pins occupy the upper or lower planes in said slots e'. The rack-bar has teeth d^3, which extend entirely across its lower face, and these teeth are adapted to engage the teeth of a pawl, a', located in a recess, a, formed in the base A, and held upward by the constant force of a spring, a^2. The toothed face of the pawl a' is considerably wider than that of the rack-bar, (see Fig. 4,) and the guard-bars E, when the pins e are in the up-

per planes of the slots e', press upon and serve to force the said pawl down and out of engagement with the teeth d^3. When the pins e occupy the lower planes of said slots, the guard-bars disclose the teeth d^3, and the spring a^2 forces the pawl a' to rise and engage with the rack-bar. By this construction the rack-face of the bar D is unbroken and embodies great strength. The guard-bars are guided by the pins on the rack-bar and are thrown directly upon the extended portions of the pawl a'.

G designates the operating-lever, having a forked head, G', each arm of which carries a double cam, $g\,g'$, projecting inward. The cams g and g' are arranged opposite to each other, one cam, g, of each pair bearing directly against the front face, b^2, of the movable jaw, and the other cam, g', of each pair bearing against the concave d^2 of the cross-head D' of the rack-bar D. Pins h, extending inwardly from the inner faces of the forked head G', and preferably made integral therewith, serve to engage the vertical slots e^3 of the guard-bars E. (See Fig. 8.) These pins are eccentric to the axis of motion of the lever G, so that the position of the lever determines the position of the guard-bars and the engagement of the rack-bars with the pawl a'. When the cam-lever is in the position shown in Fig. 1, the narrowest diameter of the cam-heads lies between the bearing-point on the rack-bar cross-head and the face b^2 of the movable jaw. The guard-bars E, by reason of their movement against the pins h, have been forced toward the front of the vise until the pins e of the rack-bar occupy the highest plane of the slots e'. This action has depressed the pawl a' until its teeth are out of engagement with those of the rack-bar D, and the movable jaw may be drawn out as far as necessary to admit of the introduction of the piece of work between it and the stationary jaw. The work being then admitted, the cam-lever being still kept raised, the movable jaw is then forced inward as far as the work will permit. The lever G being now depressed, its first action is to move the guard-bars. As soon as the pins e ride down the incline of the slots e', the guard-bars rise, the spring forces the pawl upward, and its teeth engage with those of the rack, while the cams working against both the exterior face of the movable jaw and the concave bearing of the rack-bar cross-head have forced the movable jaw B' hard against the work. It is desirable that the throw of the movable jaw should be considerable with a relatively small motion of the cam-lever, and I therefore attach importance to the described arrangement of double cams oppositely placed, and I likewise attach importance to the fact that the operating-lever acts directly upon the guard-bars, thus securing a prompt engagement.

In order to support the rack-bar and guard-bars at the front end of the movable jaw B', I make a transverse dovetail recess, i, in its lower face, and fit snugly therein a cross-piece, I, having on its face a bearing projection, i', which serves to support the rack-bar, space being left on each side to admit of the vertical movement of the guard-bars E.

It is desirable that the pieces in a vise should be as few in number as possible, and it is especially desirable to be rid of screws and movable pivots, which work loose under the shocks to which the work operated upon is subjected. It will be seen that I have gotten rid of these objectionable features. The pivots used are made integral with the parts to which they are attached, and no screws or bolts are employed. The pieces are simple and cheaply made. The stationary jaw may be made of one piece of metal, and the movable jaw, with its shank, of another. The guard-bars and rack-bar and cam-lever may be cast at one operation or struck out with a die, and the parts are quickly fitted together.

This device has proven singularly efficient in practice. The throw of the cam-lever being in a vertical plane, its simple weight will keep the lever down and the "bite" constant while the work is being operated upon. The division of the bearing-surface between two cams makes it easy also to lift up the cam-lever and throw off the bite. A simple movement of one hand is sufficient to operate the vise, and the lever does not require to be driven into place by blows from a mallet, as is the case with somewhat similar tools known to me; and the simplicity of this construction enables the workman to use both hands at once.

What I claim as new is—

1. In a vise, the combination, with the jaws A' B', of an operating-lever having oppositely-arranged cams $g\,g'$, the said cams being constructed to bear one against the jaw B' and the other upon the jaw A' through intermediate connections, substantially as described, whereby the jaw B' is moved its maximum distance with a single stroke of the lever, as set forth.

2. The combination, with a stationary jaw, and with a rack-bar arranged to be locked thereto at will, and having a cam-seat, as d^2, of a movable jaw and an operating-lever having oppositely-arranged cams, one cam serving against the outer face of the movable jaw and the other cam serving simultaneously against the said cam-seat on the rack-bar to force the jaws together, as set forth.

3. In a vise, substantially as described, the combination of the stationary parts A A', having a toothed pawl, a rack-bar arranged to engage said pawl at will, a movable jaw, and a double cam operating between the movable jaw and the rack-bar, as set forth.

4. In a vise, substantially as described, the combination, with the stationary jaw and rack-bar, and with the movable jaw and double cam-lever, of two guard-bars arranged one

upon each side of the rack-bar, and having pin-and-slot connection with the cam-lever, and a pawl, *a'*, as and for the purpose set forth.

5. The combination of the movable parts B B', having dovetail recess *i*, and of the rack-bar, guard-bars, and cam-lever with the cross-bar I, having the projection *i'*, as set forth.

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

MIDDLETON CRAWFORD.

Witnesses:
F. E. SLADDEN,
L. M. DOSCHER.