(No Model.) 2 Sheets—Sheet 1.

F. T. FORSAITH & D. L. HILDRETH.

Reversible Combination Vise.

No. 238,881. **Patented March 15, 1881.**

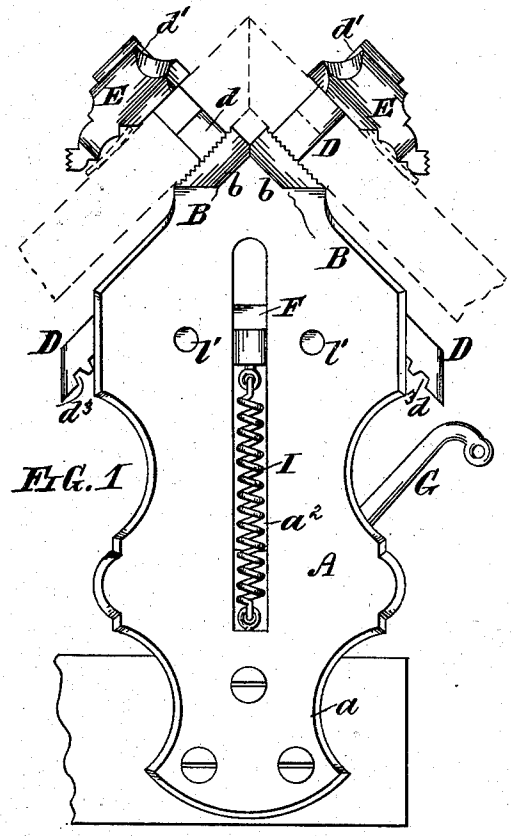


FIG. 1

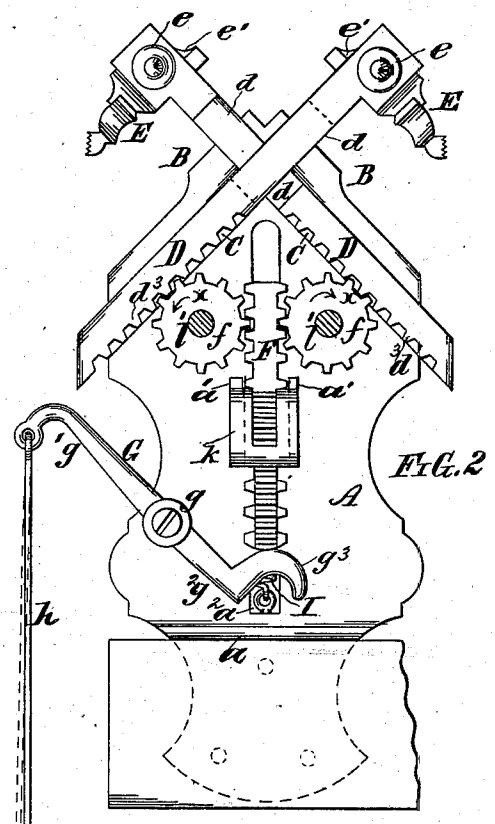
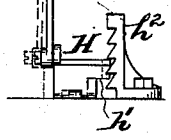


FIG. 2



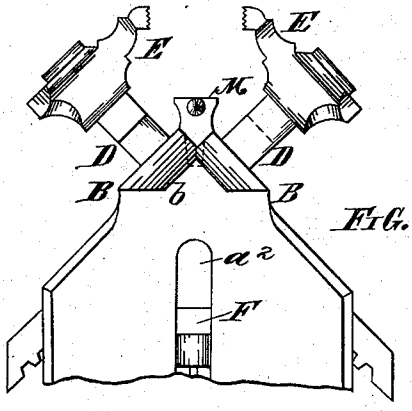


FIG. 3

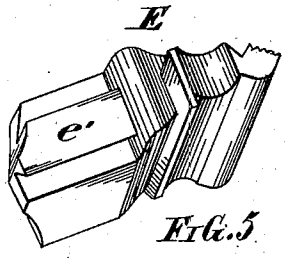


FIG. 5

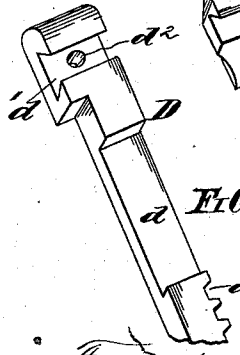


FIG. 4

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(No Model.) 2 Sheets—Sheet 2

F. T. FORSAITH & D. L. HILDRETH.

Reversible Combination Vise.

No. 238,881. Patented March 15, 1881.

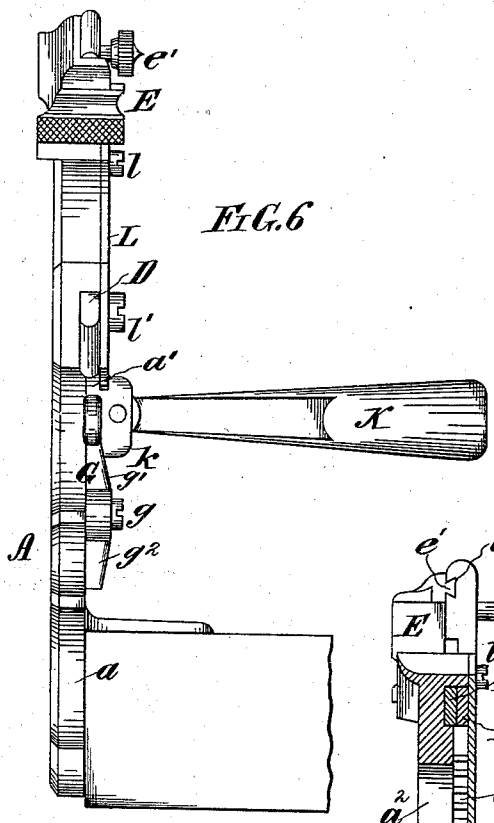


FIG. 6

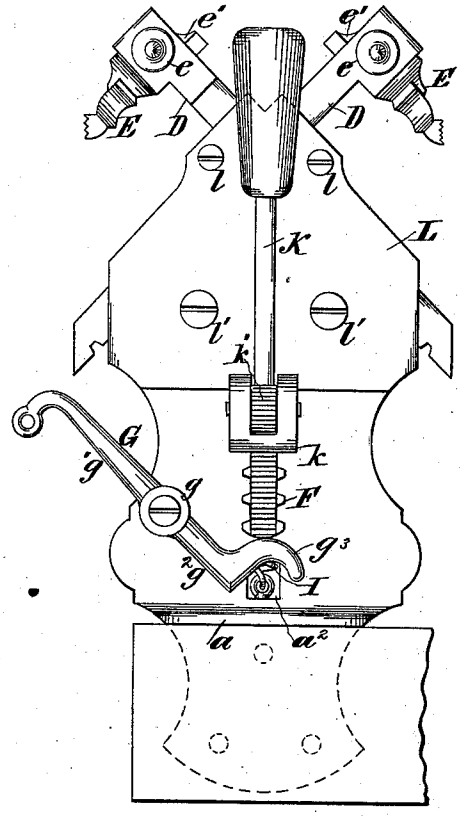


FIG. 8

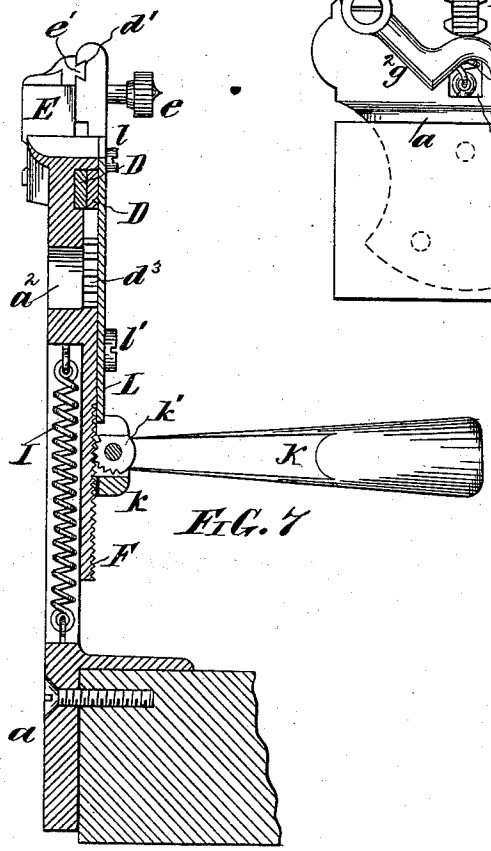


FIG. 7

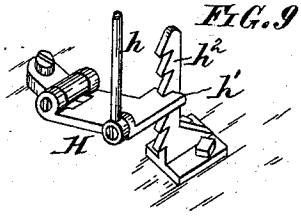


FIG. 9

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UNITED STATES PATENT OFFICE.

FRANK T. FORSAITH, OF NORTH TROY, VERMONT, AND DARIUS L. HILDRETH, OF PHILADELPHIA, PENNSYLVANIA.

REVERSIBLE COMBINATION-VISE.

SPECIFICATION forming part of Letters Patent No. 238,881, dated March 15, 1881.

Application filed July 20, 1880. (No model.)

To all whom it may concern:

Be it known that we, FRANK T. FORSAITH and DARIUS L. HILDRETH, citizens of the United States, residing, respectively, at North Troy, in the county of Orleans and State of Vermont, and at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Reversible Combination-Vises, of which the following is a specification, reference being had to the annexed drawings, wherein—

Figure 1 is a front elevation of our invention. Fig. 2 is a like view of the rear side of the same with back plate removed. Fig. 3 is a broken elevation, showing the jaws reversed in position to form a vise with a single set of jaws. Fig. 4 is a broken perspective of one of the sliding bars. Fig. 5 is a perspective of one of the reversible jaws of the vise. Fig. 6 is a side elevation of the vise. Fig. 7 is a transverse vertical section of the same. Fig. 8 is a rear elevation with back plate in its position; and Fig. 9 is a detail perspective of treadle and retaining mechanism.

Our invention has for its object to provide a vise the jaws of which may be closed by foot-power, so as to leave the workman the use of both hands, said jaws opening automatically by means of a spring when relieved of foot-pressure.

A further object of our invention is to provide a vise having two sets of jaws placed at right angles to each other, whereby two sides of a picture or like frame may be securely held while being fastened at the miter or joint.

A further object of our invention is to provide a vise which shall be convertible from one with two sets of jaws to one with but a single set, whereby the vise is rendered adaptable to all the uses to which ordinary vises are put.

Our improvements accordingly relate to the following points: First, to the combination, with a vise-stock, of two sliding bars adapted to receive jaws and actuated, through the medium of racks and pinions, from a lever which is operated by foot power or pressure; second, to the combination, with such bars, of a spring for sliding the same outwardly when relieved of foot-pressure, in order to open the jaws automatically; third, to the combination, with a vise-stock having stationary jaws, of sliding bars and movable jaws secured thereto, whereby a vise with two sets of jaws at right angles to each other is provided; fourth, to the combination, with a vise-stock having jaw-bars set at right angles to each other and adapted to move upon one another, of reversible jaws adapted to be opposed to the stationary jaws on the stock, so as to form a vise with double jaws, or to be opposed to each other, so as to form a vise with a single set of jaws; fifth, to certain details of construction and combination hereinafter more fully set forth.

Referring to the accompanying drawings, A indicates a vise-stock having a suitable bracket-plate or equivalent fastening, *a*, whereby it can be secured to a bench or table. The two upper sides, B B, of said stock are at right-angles to each other and form fixed jaws, being suitably broadened and ribbed, as shown at *b b*.

C C are grooves near the upper edges of the stock A, which receive sliding bars D D, which are set and move at right angles to each other. Said bars are cut away or recessed on their adjacent sides at *d d*, so as to fit and move upon one another in the same plane. Near their outer extremities they have dovetailed grooves *d' d'*, to receive movable jaws E E, and openings d^2 d^2 for screws *e e*, which serve to fasten said jaws in position. Said bars are also formed on their inner edges with teeth d^3 d^3, which mesh with pinions *f f*, which gear with a rack-bar, F, centrally located on the vise-stock, and moving between guide-lugs *a'* *a'* thereon.

G is a lever fulcrumed at *g* on the stock A, its long arm *g'* being designed to be fastened by a link-connection, *h*, to a treadle or foot-lever, H, while its short arm g^2, which is curved at g^3, meets the lower end of rack F, so as to move the latter upwardly.

I is a spring located in a vertical slot, a^2, in the stock A, and having its ends secured, respectively, to said stock and to the rack-bar F, as shown, so as to move said bar downwardly when not held up by foot-pressure acting through lever G.

K represents a lever fulcrumed in a knuckle, *k*, on the stock over the rack-bar F. The lower

end of said lever forms a cam, k', which binds upon the face of the rack-bar F, and it and said rack-bar have their contiguous faces similarly toothed, so as to mesh together.

L is a back plate fastened to the stock A by screws l l, which enter near the upper edges of said stock and by other screws l' l', which form shafts for the pinions f f.

The jaws E E are formed with dovetailed tongues e' e', which enter the grooves d' d' in the outer extremities of the bars D D. If these tongues are caused to enter said grooves from the lower sides of the bars D D the jaws E E are then opposed to the fixed jaws B B, as shown in Figs. 1, 2, and 7, and a vise is provided with two sets of jaws at right angles to each other. If, however, the tongues e e are caused to enter said grooves from the upper sides of said bars, the jaws E E are then opposed to each other, as shown in Fig. 3, and a vise is thus provided having but a single set of jaws, which may be used in the ordinary manner.

An anvil, M, may be located on the stock A, as shown, and connection h may be combined with a pawl and rack, h' h^2.

The operation is as follows: When the jaws are adjusted as shown in Fig. 1 the vise is specially adapted for holding picture or other like frames while being fastened at their joints, two sides of such frames being held between the movable and fixed jaws. The frame sides being duly introduced between the jaws, foot-pressure is applied to the treadle or lever H. This produces a depression of the long arm of lever G and throws its short arm g^2 upwardly, elevating the rack-bar F and rotating the pinions f f in the direction of the arrows x x. The pinions f, acting on the bars D D, cause them to slide downwardly and bring the jaws E E toward the fixed jaws B B, thereby clamping the frame sides between the same, while the workman has free use of both hands. If it be desired to fasten the jaws E E now so that they cannot move outwardly the lever K is moved downwardly to the position shown in Figs. 6 and 7. This movement of the lever first elevates the rack-bar F slightly, thereby drawing the jaws E inwardly still further, and then clamps the rack-bar, so that it can move neither up nor down until relieved. This moving of the lever K will seldom be necessary, as ordinarily the foot-pressure on lever H will be sufficient to hold the jaws E E in their closed position. To open the jaws the lever K (if it has been operated) is first thrown up and pressure removed from lever H. The spring I then draws down the rack-bar F, and in so doing reverses the previous motion of the pinions, thereby opening the jaws.

When the jaws are adjusted as in Fig. 3 the method of operating them through levers G, H, and K is the same as that just described, said jaws moving toward each other when foot-pressure is applied to lever H and separating when such pressure is relieved. When lever H is depressed pawl h' engages with rack h^2 and holds it down, keeping the jaws closed until disengaged, as it may be by a motion of the foot.

What we claim as our invention is—

1. The combination, with the stock A, formed with or having stationary jaws b b, and the adjustable jaw-carrying arms D D, arranged at right angles to the inner or stationary jaws b b, of the reversible jaws E E, having clamping faces on two adjacent sides, substantially as described and shown.

2. In combination with vise-stock A and sliding bars D D, carrying jaws E E, the rack F, pinions f f, lever G, and spring I, whereby the vise-jaws may be closed by pressure applied through the medium of said lever and opened automatically by said spring, as set forth.

3. In combination with stock A, jaws E E, bars D D, and pinions f f, and rack F, the cam-lever K, whereby said rack may be clamped to prevent the movable jaws E E from opening or losing their adjusted position.

4. In combination with the fixed jaws B B, the sliding bars D D, arranged at right angles to each other, and having grooves d' d', the jaws E E, having tongues e' e', whereby they may be reversed so as to oppose the fixed jaws B B or each other, substantially as and for the purpose set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 12th day of July, 1880.

FRANK T. FORSAITH.
DARIUS L. HILDRETH.

Witnesses:
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S. J. VAN STAVOREN.