(No Model.) 2 Sheets—Sheet 1.

F. H. RICHARDS.

WORK HOLDER.

No. 419,073. Patented Jan. 7, 1890.

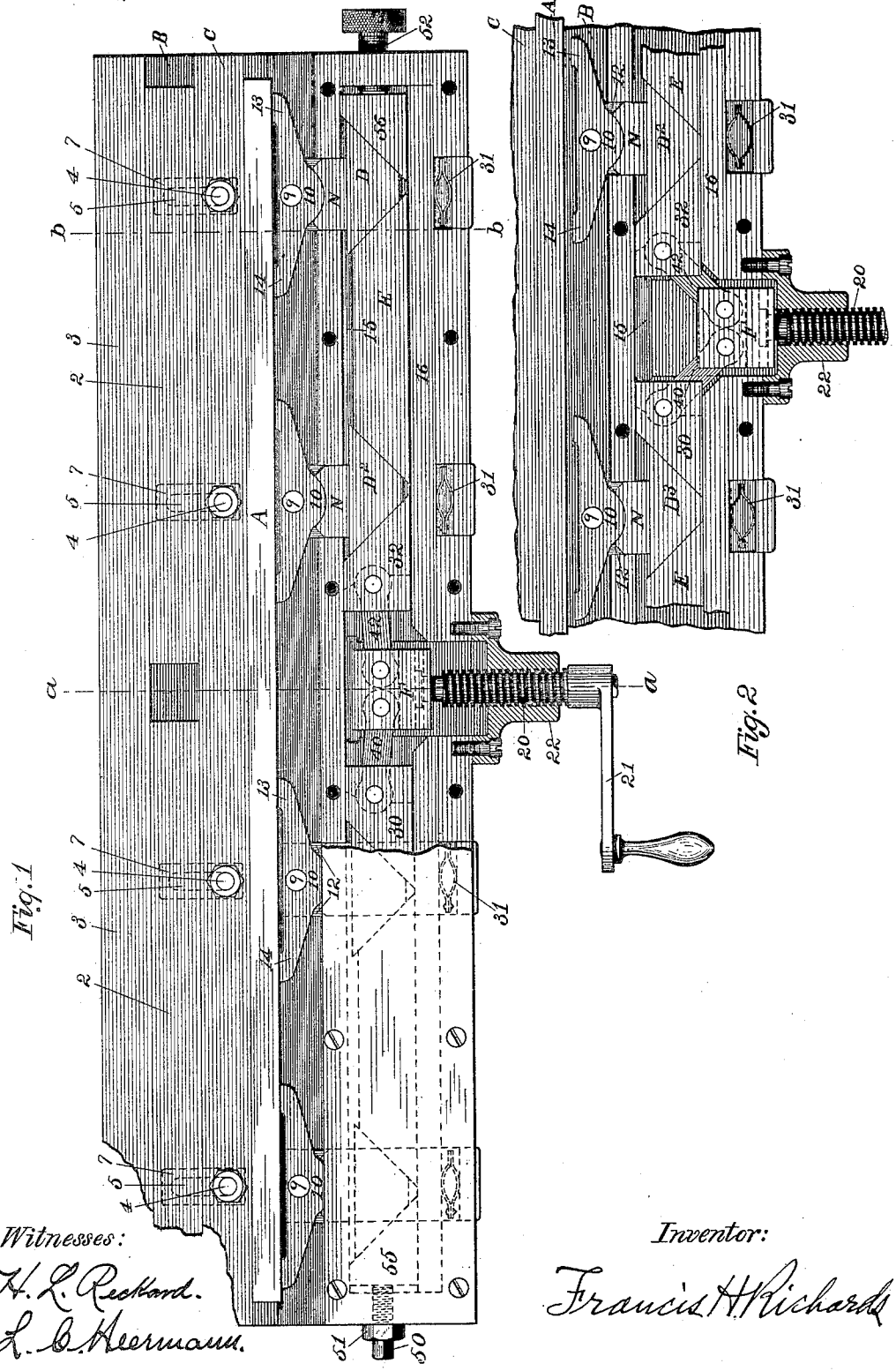


Fig. 1

Fig. 2

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(No Model.) 2 Sheets—Sheet 2.

F. H. RICHARDS.

WORK HOLDER.

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Fig. 3

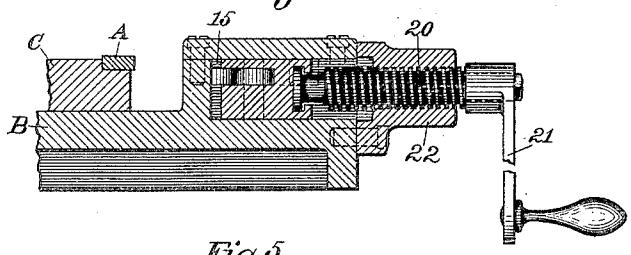


Fig. 4

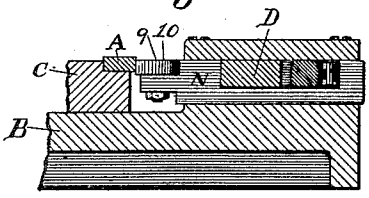


Fig. 5

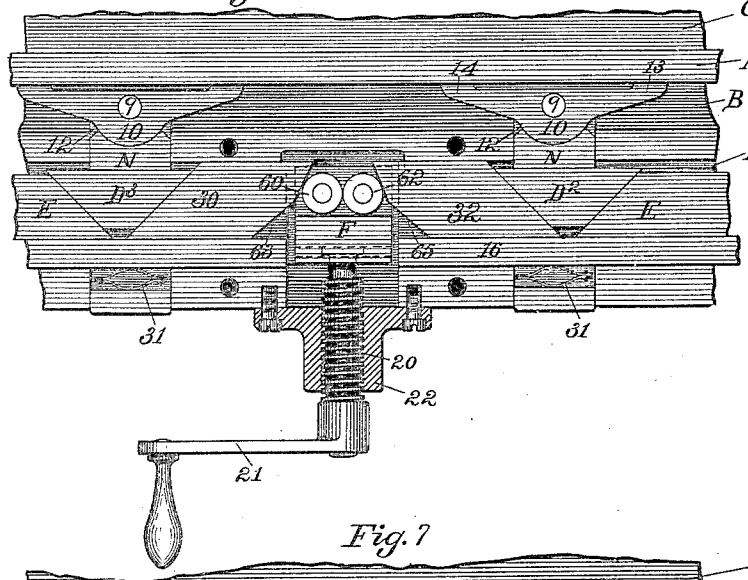


Fig. 6

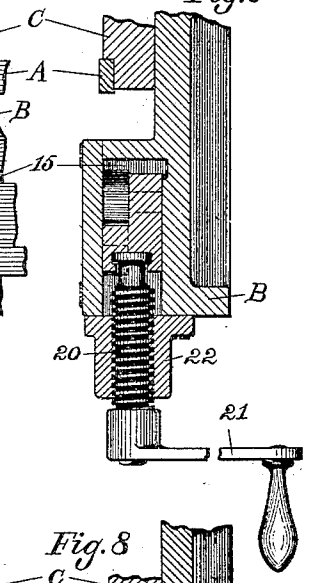


Fig. 7

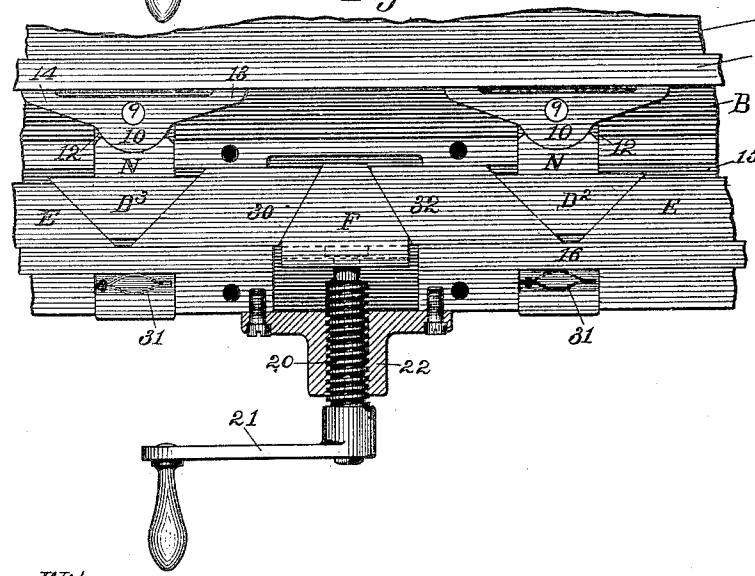
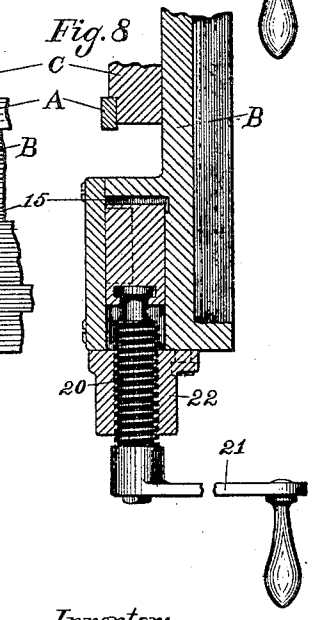


Fig. 8



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UNITED STATES PATENT OFFICE.

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WORK-HOLDER.

SPECIFICATION forming part of Letters Patent No. 419,073, dated January 7, 1890.

Application filed May 7, 1889. Serial No. 309,956. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Work-Holders, of which the following is a specification.

This invention relates to vises or work-holders for use on milling-machines, metal-planers, and multiple drills, and on other machines in which the pieces to be operated upon should be simultaneously clamped at several points in the length thereof, the object being to furnish such a vise in which the several clamps may be operated from a single actuating device, as a screw or spindle. It is in the nature of an improvement on the invention described in my application, Serial No. 292,846.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan view, partially in section, of a vise or work-holder embodying my improvements, and showing the jaws or clamps closed onto a piece of work held in the vise. Fig. 2 is a similar view showing the clamps opened. Fig. 3 is a section in line *a a*, Fig. 1. Fig. 4 is a section in line *b b*, Fig. 1. Fig. 5 is a plan view similar to Fig. 2, showing one modified form of the invention. Fig. 6 is a sectional view (similar to Fig. 3) of such modification. Fig. 7 is a plan view (similar to Fig. 5) of a second modification. Fig. 8 is another sectional view (similar to Fig. 3) of this modification.

Similar characters designate like parts in all the figures.

The bed-plate of the vise is designated by B, and is preferably furnished with a supplemental bed or adjustable jaw C, on which to place the piece A to be operated upon. Said jaw C is backed up by a blocking-piece 2, which is to be changed to accommodate various widths of pieces A, and the blocking 2 is supported against lateral movement by the abutment 3 of the bed-plate. The jaw C is or may be held down by screws 4, which pass through slots 5, and are furnished with the usual nuts adapted to slide in the chambers 7, formed in the under side of the bed-plate.

For clamping the bar or piece A against the jaw C, I employ a series of clamp-jaws, which are operated, respectively, by a series of slides operating thrust devices, in which series the first said device operates the first jaw and at the same time transmits force to the second device, and so on to the end of the series.

In the drawings, N designates, without choice, any one of a series of slides carrying the clamp-jaws, these slides being particularly referred to as N′ N^2, &c. Other duplicated details are or may be referred to in the same manner. Each slide N, as a means for lessening the number of jaws required in any particular case, has on the inner end thereof a swivel-jaw or clamp-jaw proper 10, pivoted in the center thereof at 9 to the rearward or inner end of said slide N. Thus the pressure of the slide N is transmitted to the bar A at two points 13 14, and only half as many slides N are required as would be the case if each said slide bore directly on said bar. The forward part of the bed B is channeled, as at 15, to receive a series of thrust-blocks D and corresponding wedges E, through which said blocks are operated. Forward of the wedges E, I usually place a steel shoe 16, (fastened in place by usual means, not shown,) on which the wedges may slide, and to reduce the friction. Springs 31 are or may be provided to retract the jaws. The bearing-faces of the said wedges and blocks are made inclined at about forty-five degrees to their lines of movement, and the opposite ends of the same block (or wedge) is inclined in opposite directions, so that the wedge E tends to force the block D in two directions with about the same force in each.

Between the central pair of blocks D^2 and D^3, I place a divided wedge, whose oppositely-disposed parts 30 32 are adapted to be forced apart by apparatus especially designated therefor, and which may vary in construction within the scope and limits of my invention.

Figs. 1 to 3, inclusive, show the preferred mode of constructing this apparatus. A thrust-block F is actuated by a screw 20, which is turned by a crank 21, or otherwise, in the nut 22, which is affixed to or formed

on the bed B. Thrust or toggle-joint links 40 42 are connected to said block and said parts 30 32, respectively, and together serve as a toggle to operate said parts. This will be fully understood by comparison of Figs. 1 and 2, showing the vise-jaws closed and open, respectively.

Adjustment of the working position of the jaws is effected, within certain limits, by a stop screw or screws 50 52, whereby one or both of the abutments 55 and 56 may be moved. The screw 50 is preferably set by a check-nut 51, while the screw 52 is furnished with a milled head for convenient and quick adjustment, having a fine thread adapted to sustain a heavy pressure without the screw being turned thereby.

In preparing to use the vise the position of jaw C is first adjusted by suitable blocking at 2, so that only a slight movement of the jaws 10 is required. The piece A being then laid on said stationary jaw, the screw 20 is turned to force back the block F, which drives apart the parts 30 32, which in turn actuate the wedges and blocks to force out the jaws and clamp said piece A in place. It will of course be understood that the slides N may bear directly on the work held, the jaws 10 being dispensed with; hence I specify that said slides are adapted to bear against the work held in the vise, and do not limit myself to the use of said jaws.

Instead of the links 40 42, I may use rollers 60 62 on block F, as in Fig. 5, which rollers act on the cam-faces 63 65 of the blocks or parts 30 32, respectively; or instead of said links or rollers I may construct the said block of a wedge shape, as in Fig. 7, wherein it is shown bearing directly against and between said parts 30 32. With either form of construction shown there is a symmetrical system of thrust devices operated by a central element, whereby the actuating-crank or like device is located directly at the front of the work-holders and in the most convenient and desirable position.

Having thus described my invention, I claim—

1. In a work-holder, the combination of a bed-plate and fixed jaw, movable jaws, the divided wedge having its parts actuated toward and from each other, substantially as described, and devices, substantially as described, actuating the movable jaws from the divided wedge, substantially as described.

2. In a work-holder, the combination, with the bed-plate, of jaws N, wedges 30 32, block F, arranged and actuated, and actuating said wedges, substantially as described, the abutments and devices, substantially as described, intermediate, to said abutments and wedges, and means, substantially as described, adjusting one or both of said abutments, substantially as described.

3. In a work-holder, the combination of the movable jaws N, wedges 30 32, actuating said jaws, block F, links 40 42, and screw 20, substantially as described.

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