(No Model.)

F. H. RICHARDS.

MILLING MACHINE VISE.

No. 419,884. Patented Jan. 21, 1890.

Fig. 1

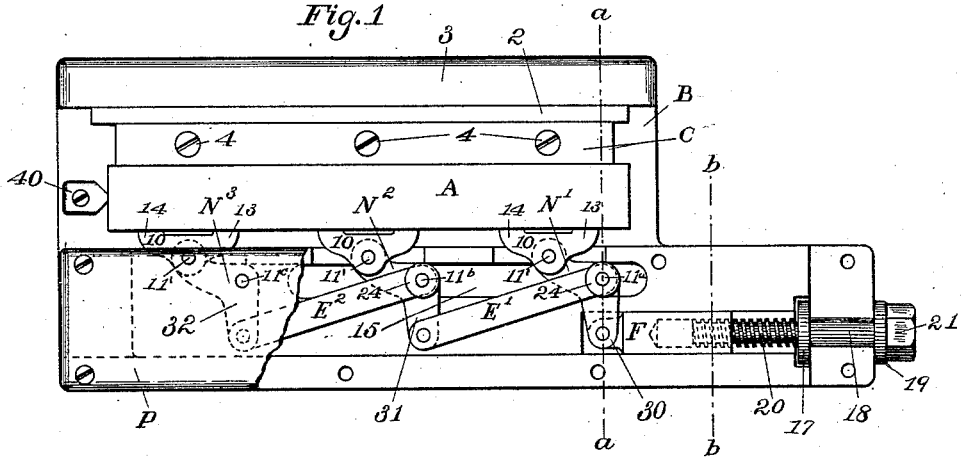


Fig. 2

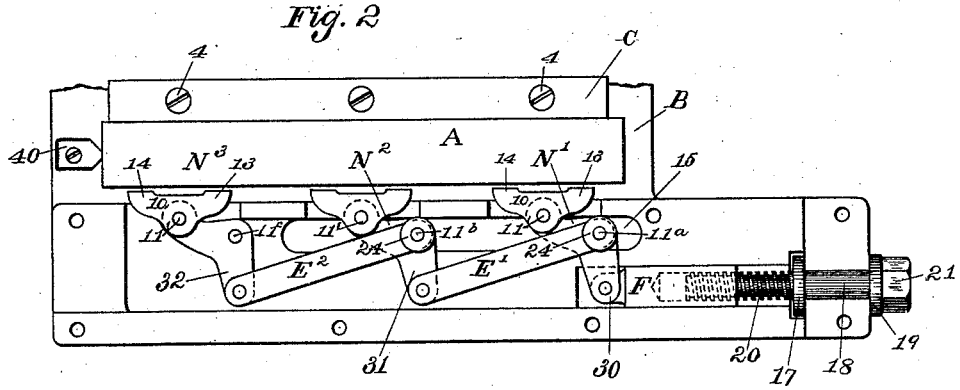


Fig. 3

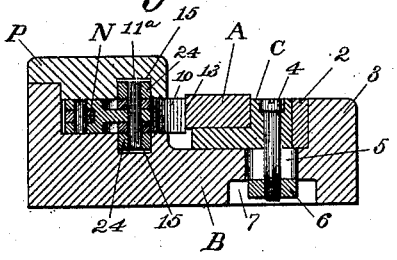
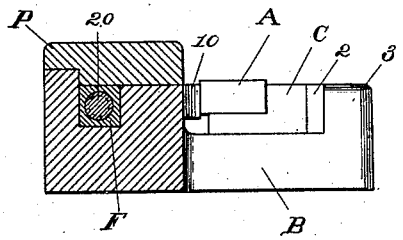


Fig. 4



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MILLING-MACHINE VISE.

SPECIFICATION forming part of Letters Patent No. 419,884, dated January 21, 1890.

Application filed February 6, 1889. Renewed December 13, 1889. Serial No. 333,595. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Milling-Machine Vises, 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.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan view, partially in section, of a vise 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.

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 nuts 6, 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 by a series of co-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 this to the third, and so on to the end of the series.

In the drawings, N designates, without choice, any one of a series of levers carrying the clamp-jaws, these levers being particularly referred to as N′ N², &c. Other duplicated details are referred to in the same manner. Each clamp-lever 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 11′ to the rearward or inner end of said lever N. Thus the pressure of the lever N is transmitted to the bar A at two points 13 14, and only half as many levers N are required as would be the case if each said lever bore directly on said bar.

The bed B forward of the clamp-jaws is channeled, as at 15, to receive the fulcrum-pins 11 of the levers N, which pins are preferably provided with rollers 24. The last lever N³ of the series, however, is pivoted (or fulcrumed) directly to the bed-plate, as shown in Fig. 2. The middle part of each lever is connected to the forward end of the next lever by a connecting-rod E, while a slide F is connected to actuate the first lever. This slide lies in a channel in the bed-plate, and for operating the same I make a screw-thread therein and provide a powerful screw 20, which is journaled in the bed-plate at 18 between collars 17 and 19 and has a head 21, whereby to turn the screw. By this or equivalent means, as a wedge or toggle-joint, (not shown,) a longitudinal movement in either direction may be imparted to the slide F. Said slide being connected to the forward end 30 of the lever N′, any forward movement (toward the left hand) of said slide will of course force the clamp 10 against the bar A, provided the fulcrum-pin of said lever does not also move; but when the said jaw comes in contact with said bar A the fulcrum 11ª of lever N′ does move, (the jaw at the same time sliding on the bar A,) and, guided by the channel aforesaid, acts through the thrust-rod E′ to similarly force forward the second lever N². In like manner the second set of devices are connected to actuate the next lever, and so on to the end of the series of devices. A cap P, covering the operative devices, serves to hold them in place, and has therein one of the guide-channels 15; but it should

be understood that such guides are not essential to my invention, for several well-known means are adapted to be substituted therefor.

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 slide F is operated to force lever E′ along until all the jaws 10 are driven out with a force sufficient to properly retain said piece A in place. A fixed stop 40 is usually provided for locating the piece A longitudinally of the vise.

It will of course be understood that the levers N may bear directly on the work held, the jaws 10 being dispensed with; hence I specify the levers N as adapted to bear against the work held in the vise, and do not limit myself to the use of the said jaws.

Having thus described my invention, I claim—

1. In a work-holder, the combination, with the bed-plate having a fixed jaw, of the clamp-levers adapted to bear on the work held, the fulcrum of one lever being connected to the end of the next lever, substantially as described.

2. In a work-holder, the combination, with a bed-plate having guides for the lever-fulcrums, of the series of levers, the last lever being fulcrumed on the bed-plate and the other levers guided at their fulcrums by said guides, and rods connecting the fulcrum of one lever to the end of the next lever, all substantially as described.

3. In a work-holder, the combination, with a bed-plate having guide 15, of the cap having a corresponding guide, levers N, guided at their fulcrums by said guides, connecting-rods E, and means, substantially as described, operating the first lever, substantially as described.

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