W. H. SULLENBERGER.

Improvement in Vises.

No. 132,499. Patented Oct. 22, 1872.

Fig. 1.

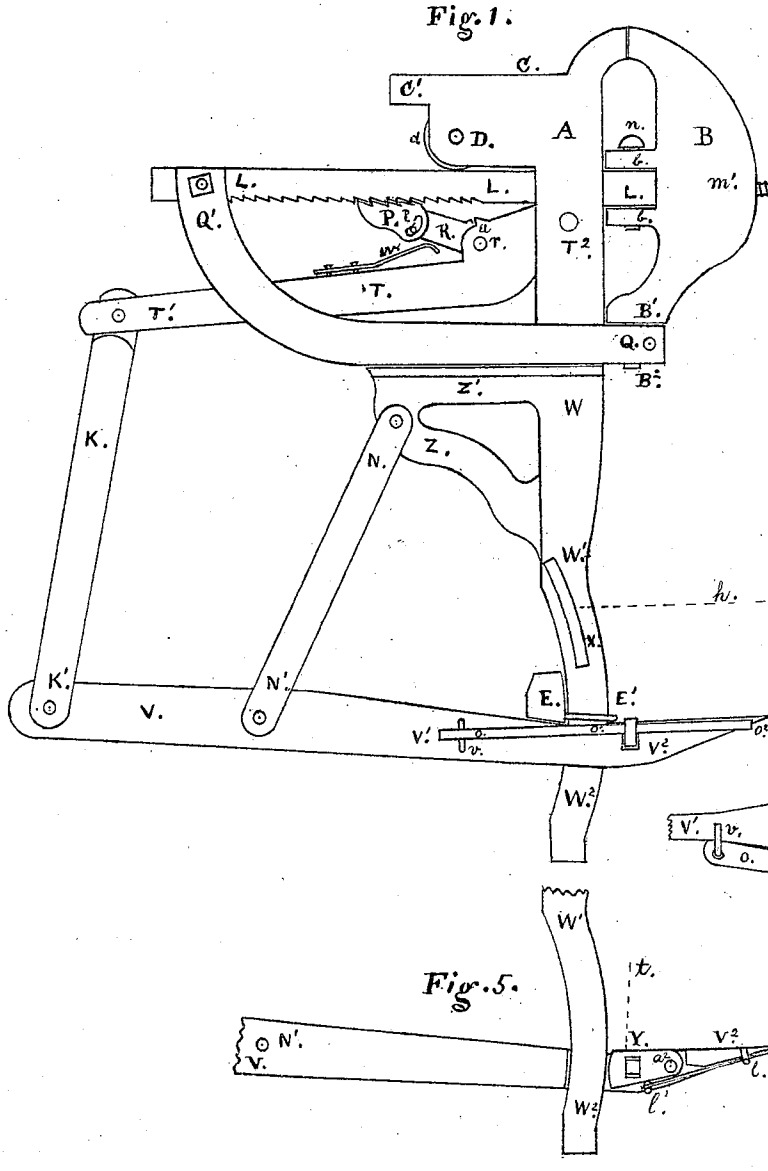


Fig. 2.

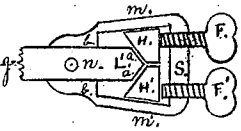


Fig. 3.

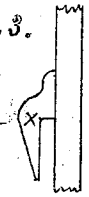


Fig. 4.

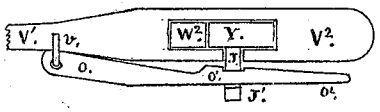
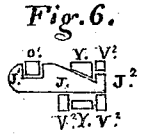


Fig. 5.

Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM H. SULLENBERGER, OF HARRISBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO JOHN KERPER, OF SAME PLACE.

IMPROVEMENT IN VISES.

Specification forming part of Letters Patent No. **132,499**, dated October 22, 1872.

To all whom it may concern:

Be it known that I, WILLIAM H. SULLENBERGER, of the city of Harrisburg, county of Dauphin and State of Pennsylvania, have invented an Improved Vise, of which the following is a specification:

The nature and object of my invention consist, first, in the peculiar construction or form of the major and minor jaw-limbs, whereby the former is adapted to support the jaw-compressing and the treadle-clamping mechanism, and the latter to receive the jaw-rotating devices; second, in hinging the minor jaw-limb vertically to a sliding frame; third, in securing the minor jaw in any desired position when rotated on said vertical hinges by means of sliding blocks and set-screws in the limb of the minor jaw, thus adapting it to hold bodies or work of regular or irregular form—that is, straight or tapered work; fourth, in a powerful compressing compound toggle mounted on the major jaw-limb used for closing the minor jaw; fifth, in a treadle-clamping device by which the toggle can be operated by foot-power, thus leaving both hands of the operator free to fix work in the vise.

In the accompanying drawing, Figure 1 is a side elevation of my vise with the jaws closed. Fig. 2 is a cross-sectional view of the minor jaw-limb taken in the line *g*, showing the plan of the adjustment blocks, set-screws, end of traction-bar, and box in which the parts are located. Fig. 3 is a front view of a section of the major-jaw limb taken in the line *h*. Fig. 4 is a top view of the clamping device on the front end of the treadle. Fig. 5 is a vertical section of the subject of Fig. 4. Fig. 6 is also a vertical section of the subject of Fig. 4, made by a plane in the line *t* at right angles to the section, as shown in Fig. 5.

In the description, A and B are the major and minor jaws, respectively. They are similar and in the usual form, but their limbs are dissimilar. The limb of jaw A is a long stationary standard adapted to form connections with the compound toggle, which it wholly supports, and to connect the vise itself with the work-bench; and it is further adapted to receive and guide the sliding rack by which jaw B is operated. The limb of jaw B is short and enlarged at its middle. It may be moved out and in by means of the sliding rack L Q Q′, to which it is hinged, and may be adjusted sidewise about said hinge by means of certain devices in a box formed in its enlarged part. C is a massive shoulder formed on the upper end of limb W W^1 W^2. It extends toward the rear far enough to afford room in its body for incasing a friction-roller, *d*, which is pivoted at D, and it terminates in a tail-piece, C′, by which the vise is fastened to the work-bench. Below shoulder C the limb is nearly straight to W^1, where it sweeps a curve to W^2, with N′ as its center. Immediately below shoulder C the limb is perforated to let a rectangular traction-bar, L, through it horizontally, and near the middle of the limb is formed on it a horizontal shelf, Z′, which extends to the rear of the standard W W^1, and extends forward on the sides of the same, thus forming a support or guides for two curved braces, Q Q′, which hug the standard W W^1 slightly on its sides, and are united in front by a bolt through them and an interposed block, in which is formed a bearing for the pivot B^2 of the limb B^1, as shown in Fig. 1, and are united at their rear ends by a bolt through them and the interposed traction-bar, as shown at Q′ L. The two braces Q Q′ and bar L constitute the sliding rack, to which the minor limb is attached by a vertical hinge-joint directly beneath the jaw-parting. Said joint consists of the pivot B^2 at the lower end of the minor limb, as stated, and a bolt, *n*, through ears *b* and the interposed traction-bar L in the vertical line of said pivot, and about midway up the limb. When the rack is slid back the minor limb may be swung to either side on said vertical hinge, and may be set in any desired position, as hereinafter explained. Below the shelf Z′ is returned, at its rear end, as a brace, Z, to which is attached the link N N′. In a recess, below the traction-bar L in the limb W W^1, are attached the levers T T^1 T^2 of the toggle. All the connections of the parts of the toggle with each other and with the limb W W^1 are effected by means of bolts which serve as pivots. The compound toggle consists of two simple toggles, an upper and a lower one, united at the pivot T^1. The upper toggle consists of the long lever T T^1 T^2, united at *r* with a short lever, R. A shoe, P, is loosely attached to the upper end of lever or prop R by a pin, *p*, in long eyes in the sides of the shoe. The sole or upper face of the shoe is toothed to impinge in teeth on the under side of the traction-bar L. A spring, *w*, on

the bar T T^1 T^2, near its middle, serves to regulate the contact of the shoe P in the act of engaging the teeth on the bar L. The upward throw of lever R, effected by said spring *w*, is stopped or limited by a shoulder on R and a lug on T T^2, as shown at *u*, in such manner that when the lever T T^1 T^2 is depressed in undoing the grip of the vise-jaws, the shoe P will also be depressed far enough to disengage the teeth, and the rack L Q Q′ may be slid in or out freely. The lower simple toggle is composed of the link K and the short end of the treadle-lever V V^1 V^2. They have a graduated connection at K′. The treadle has its fulcrum at N′, which is a fixed point, because the arc from W^1 to W^2 on the standard, against which the treadle rides, is described from N′ as a center. This arrangement of the parts of the compound toggle is a source of multiplied power. By depressing the end V^2 leverage is gained. This gain is greatly enhanced by the knee-joint of the parts K K′ and V N′. The upper toggle has a similar joint. By the union, therefore, of the two simple toggles the power is a product of the two simple toggles as factors.

The device employed to clamp and release the treadle at its front end is composed of a latch, O O^1 O^2, and eccentric pawl, Y, a wedge, J, a spring, *l l′*, keeper X, and weight, E E′. The latch O O^1 O^2, shown in Figs. 1, 4, and 6, is hinged to the treadle at V^1, extends along its side to its front end V^2, and has a scalloped cut at O^1, shown in Fig. 4, into which the wedge-formed keeper X, Fig. 3, enters when the treadle is thrown up. The latch is thus forced out sidewise by said keeper to free the eccentric-lever, as hereafter set forth. The latch lies flush in a cut near O^1 in the wedge J J^1, as shown in Figs. 4 and 6. The wedge-body loosely plays in a tapered hole in the pawl Y, as shown in Fig. 6, and has a hook, J^2, to prevent it from jumping out of place, unless the parts are designedly arranged to free its egress. A forward thrust of the wedge into said tapered hole lifts the end of pawl Y next the standard W^2 up or away from the standard, the other end of the pawl being pivoted in a long rectangular recess, made for it and the standard, in the treadle. When the pawl is thus lifted the treadle is freed, and, if work has been clamped in the vise-jaws, it will bound up the full length of the arc from W^2 to W^1 by the spring of the parts freed from tension. A backward thrust is thus given the wedge J by the latch O O^1 O^2, which is forced out by the keeper X. The eccentric-pawl Y is thus released from the wedge, and a spring, *l l′*, draws it down ready for the next act of the treadle. The latch is struck by the foot on the side to release the treadle, and pressure on the end V^2 of the treadle depresses it to close the vise-jaws, which can also be done by the foot of the operator. The clamping device holds the treadle in all positions on the arc W^1 W^2. The weight E E′, shown in Fig. 1, is a block, which matches the curve W^1 W^2 on the side next the standard, to which it is loosely held by a stirrup, E′. This weight is used and thus applied to counteract the concussions of blows on work when griped in the jaws A B. The effect of repeated blows on work thus griped is to undo the treadle-clamp, owing to the inertia of the parts in contact with the standard. The reaction of said blows is taken from the treadle by the weight, which jumps up at each blow and reseats itself by gravity. The parts of the toggle to the rear of pivot N′ overbalance the treadle in front of it when thus weighted.

The devices shown in Fig. 2 remain yet to be explained. The minor jaw-limb is enlarged at its middle to form a wedge-form box, *m m′ s*, in which are inserted two sliding blocks, H H′, beside each other, and in front of them the traction-bar L′ extends into the middle of the box, presenting a bluntly-beveled end, whose faces *a* are cut vertically to match the similarly beveled front faces of the said incased blocks. The depth of said box is more than sufficient merely to incase these parts, thus leaving the blocks free to slide in and out a limited distance. Two set-screws, F F′, regulate their position in relation to the faces *a* of the bar L′. The jaw B can thus be set to suit the work, and said screws, when the blocks are firmly screwed up to the faces *a*, rigidly prop the jaw in any fixed position, thus adapting the vise-jaws to hold tapered or irregular work, not only when the work is full in the whole breadth of the jaws, but also when the jaws may gripe it only on their sides.

The advantages gained by this vise have already been nearly all explained. The vise is under control of the foot of the operator, except the setting of the screws to gage the bevel of the work. This leaves both the hands of the operator free to insert and adjust work, which would otherwise often be too unwieldy for one man, and in all cases greater precision is gained in inserting. The jaws being adapted to hold work without canting them at their sides as well as at their center, the gripe on beveled or straight work is unyielding and sure. The sliding of the front jaw to close proximity to the work before the treadle is depressed saves much time, and the release of work from the vise is equally speedy.

I claim—

1. The combination of the sliding blocks H H′, set-screws F F′, bar L′, and box *m m′ s*, when arranged to operate substantially as and for the purpose hereinbefore set forth.

2. The treadle-clamping device, consisting of the latch O O^1 O^2, wedge J, pawl Y, spring *l l′*, and weight E E′, all combined and arranged as and for the purpose hereinbefore set forth.

WILLIAM H. SULLENBERGER.

Witnesses:

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PETER STUCKER.