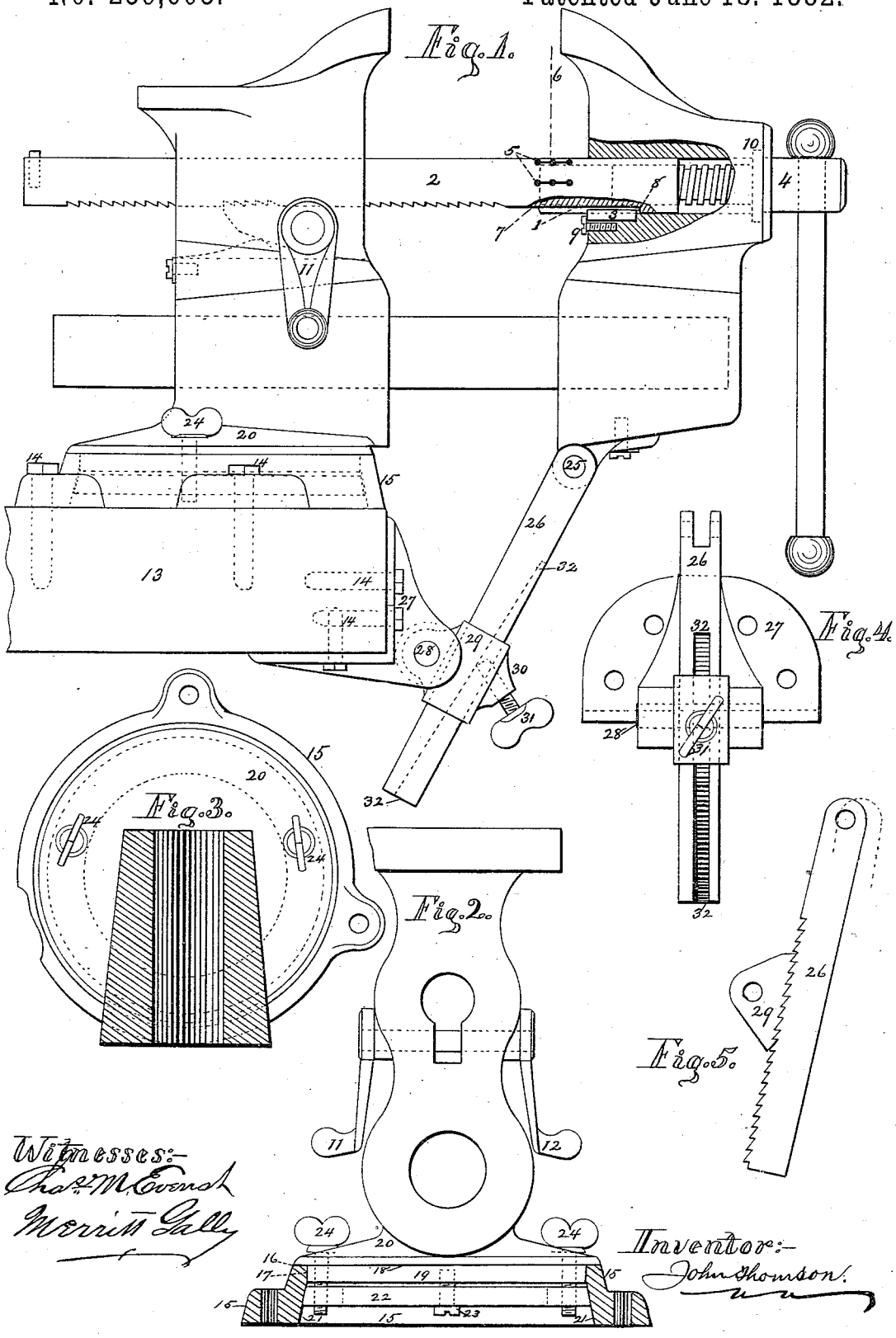
(No Model.)

J. THOMSON.

BENCH VISE.

No. 259,603. Patented June 13. 1882.



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UNITED STATES PATENT OFFICE.

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BENCH-VISE.

SPECIFICATION forming part of Letters Patent No. 259,603, dated June 13, 1882.

Application filed April 14, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN THOMSON, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Bench-Vises, which improvements are fully described and illustrated in the following specification and accompanying drawings.

My invention relates more particularly to quick-adjusting parallel bench-vises of that class fully described in my patent of March 28, 1882, No. 255,700.

The object of my present invention is, first, in restricting the amplitude of action of the screw to certain limits by a positive stop-piece in order that the screw shall not be subjected to strain when having but a few threads of bearing in the nut; second, in an improved journal swivel device, by means of which the vise may be quickly set from above the bench to any required angle in one plane, and, furthermore, in so locking the journal at its extreme outer edges, and in adapting the journal-box thereto, that the structure as a whole shall be as rigid as if made with a solid base bolted to the bench in the ordinary manner; third, in the addition of a supplementary support or brace attached to the front jaw, and adapted to be supported at the edge of the bench, for the purpose, when suitably locked, of relieving the slide-rods and base from excessive strain when clamping very large and heavy parts in chipping, &c.

In the drawings, Figure 1 is an upright side elevation of my improved vise; Fig. 2, an upright front elevation of the back jaw detached, showing a portion in cross-section. Fig. 3 is a plan view of base of back jaw. Fig. 4 is a front view of the supplementary brace; and Fig. 5, a modification of the same in side elevation, detached.

As described in my patent hereinbefore referred to, the slot 1 of ratchet-rod 2 with spline 3, Fig. 1, are for the purpose of preventing the ratchet-rod from turning when the screw 4 is being operated. The slot, as also shown and described in said patent, is cut from the flattened portion of ratchet-rod lengthwise through the cylindrical portion, forming the nut to the end. Hence there is nothing to prevent the entire withdrawal of the ratchet-rod from the front jaw should the screw be entirely worked out, or the liability of subjecting the screw to severe strain when having but a slight bearing in the nut.

To obviate this objection I prevent the outward action of the ratchet-rod beyond prescribed limits by automatic means. In the present instance the slot is only cut through a portion of the length of the circular end of the ratchet-rod, starting from the flattened surface 7 and ending at 8, forming a solid wall or abutment at its terminus. The spline 3 is fitted closely, but not driven tightly, to its seat in the front jaw, and is locked against withdrawal by the projecting head of the screw 9. Both the side of front jaw and ratchet-rod being shown as cut away for clearness of illustration, it will be seen that any further outward action of the ratchet-rod is prevented, the solid abutment at the end of the slot acting as a stop against the spline, which is in turn held by the screw. The extreme amplitude of action of the ratchet-rod is from the position shown in the figure to the shoulder 10 of the screw. When desirable to remove the ratchet-rod from the front jaw it is only necessary to detach the screw 9, when both the ratchet-rod and the spline may be withdrawn together. I furthermore stamp or mark the ratchet-rod 5 in such design and position relative to the location of the screw in the nut that when the marks are in "line of sight" with respect to the face of front jaw, as 6, the operator will know at a glance if the adjustment is correct, and if not right can make the proper change by a few turns of the screw, without loss of time in experimenting.

The ordinary method of swiveling bench-vises is by means of a bolt secured to the center of the bottom of the back jaw, passing through and clamped from the under side of the bench; or the jaw is centrally pivoted to a supplementary plate secured to the bench. While such methods may provide convenient means for swiveling and securing the vise against rotative movement, the resisting leverage in such instances is but the radius of the base of the vise. Therefore it is evident that a degree of rigidity approximating that

of a solid immovable vise, in which the resisting leverage is the diameter of the base, cannot be readily obtained, if at all.

Figs. 1, 2, and 3 show my improved swiveling device.

To the bench 13 is firmly secured, by ordinary lag-screws, 14, a hollow circular cone-shaped box, 15, the upper edge of least diameter, 16, and inner side, 17, of which are finished at right angles to each other, as shown, forming an upright or end vertical bearing to and encompassing the correspondingly-finished shoulder or face 18 and journal 19, formed upon the outer circumference of the bottom of the base 20, all of which are accurately fitted to each other. As shown in the drawings, the box is of larger diameter than the base of the vise, the face or flange 18 being wide enough only to cover the upper edge of the box and insure a proper bearing thereon. The box is also finished beneath the vertical internal bearing, 17, but is turned to a taper with respect to said bearing, the angle tending outwardly, as 21. To this taper is fitted and placed within the box an annular clamping-ring or washer, 22, which is partially secured to the bottom of the base of the vise by screws, as 23, set to nearly cause an intimate contact of the two tapering surfaces. Passing through the base 20, with their shoulders seated thereon, are two hand or thumb screws, 24, the threads of which operate only in the annular ring. Now, although the vise is as yet free to be swiveled in either or both directions in a plane with the bench, it is self-evident that any other deflecting strain will be resisted, exactly as in the instance of any well-fitted vertical shaft-bearing secured against withdrawal, but free to be rotated; and, furthermore, that all displacement strains (as in clamping large parts, in heavy chipping, or filing) are exerted against and resisted by the extreme outer edges of the lower base, the leverage of the resisting means being the diameter of the box, or as between the lag-screws 14, and not, as in the case of previous inventions of this class, from a central bolt or pivot to the front, back, right or left hand side of the base, as the case may be, from which the strain is applied. To lock the vise against rotative movement it only remains to give a partial turn to the hand-screws 24, thereby drawing the ring slightly upward in the taper of the box and causing the two angular surfaces to grip very firmly together. It will be noticed that the ring is made to do double duty, acting both as a washer and stop against an upward lift on the vise and as a means for clamping or releasing the vise, as desirable.

Constructed in the manner described, my device is easily manufactured, all of the bearing-surfaces in each part being turned in a lathe without change of position, and, as all of the lower portion of the base of the vise inclosed by the box may be cored out in casting, requires but little, if any, more material than in vises with stationary bases.

In using two or more hand-screws, as 24, the frictional contact of the clamping-ring is thereby more perfectly effected, though any one may be used independently of the other.

In clamping a piece of work requiring a wide extension of the jaws, particularly if the part be heavy and subjected to strong blows, as in chipping, the strain upon the slide-rods and base of vise is obviously very greatly increased over and above the normal strain of ordinary duty.

In Figs. 1, 4, and 5 is shown my improved supplementary brace for use in extreme cases similar to those just cited. To the bottom of the front jaw is pivoted, as at 25, a rod, 26. Attached to the front edge of the bench 13 is a bracket, 27, in which is pivoted, 28, a bearing, 29, for said rod. As thus far described, it will be seen that the front jaw of vise is free to be slid back or forth at will, the rod 26 being also carried back or forth with a vibrating motion, as permitted by its pivoted bearing and connection. In front and a part of the pivoted bearing 29 is a suitable hub, as 30, in which is a hand or thumb screw, 31, preferably inserted at an angle, as shown in the figure, the point of which projects into the wedge-shaped slot 32 formed in the brace. The point of the hand-screw 31 is preferably made flat or "cupped," leaving a sharp circular cutting-edge.

The operation is as follows: First insert and partially clamp the part between the faces of the jaws. Then turn the hand-screw 31 until its point is set snugly down upon the bottom of the slot 32, as shown by dotted outline, when add whatever additional pressure may be required to fully clamp the part in the vise, which it will be observed also tends to force the rod or brace downward against the point of the screw, but which, in consequence of the wedge-shaped bottom of the slot and sharp inclined edge of the screw, will only tend to grip the rod more tightly.

When desirable to swivel the vise with this attachment remove the pin 25, allowing the brace to drop in its bearing until held by the point of the screw at the terminus of the slot; but this attachment simply requires to be made with ball-and-socket joints at the points shown as being pivoted, 25 '28, in order to also adapt it to be swiveled with the vise and used in any position.

The bracket 27 may also be made as a part of the base of back jaw or of the box, extending down over the edge of bench and secured thereto after the manner shown.

Fig. 5 shows a modification of the foregoing, in which, assuming the pivoted bearing 29 and rod 26 as attached respectively to the bench and front jaw of vise, the operation would be as follows: Both rod and bearing are provided with ratchet-teeth adapted to engage with each other at a suitable angle for the duty intended. When in engagement, as shown in the figure, it will be seen that, under the hereinbefore-described condition, any tendency to

deflect the jaw downward will be restrained by the engagement of the ratchet-surfaces of the rod and bearing. In this device the act of unclamping the work also automatically relieves the brace, which, upon being drawn outward with the jaw, as indicated by dotted outline, will swing freely suspended from the bottom of front jaw so soon as relieved from the connection of the ratchet-teeth of bearing. To readjust to the position shown, the rod is simply swung up by the hand to meet the bearing, which, being also free to vibrate, adapts itself to the varying angles from which it may be met by the rod.

What I claim is—

1. In a quick-adjusting parallel bench-vise, the combination, with the front and back jaws, clamping-screw 4, spline 3, and locking-screw 9, of the ratchet-rod 2, in which is formed a slot, 1, having a solid terminus or stop, 8, for the purpose herein set forth.

2. In a quick-adjusting parallel bench-vise, the combination of the ratchet-rod 2, having a slot, 1, and solid terminus or stop 8, with the spline 3 and stop-screw 9, for the purpose herein set forth.

3. In a quick-adjusting parallel bench-vise, the combination of the front jaw, ratchet-rod 2, and screw 4, with the indicating-marks, as 5, for the purpose specified.

4. In a quick-adjusting parallel bench-vise, the combination, with the back jaw, on the bottom and outer circumference of which is formed an upright journal-bearing, 18 19, of the cone-shaped box 15, constructed as described and shown, and the annular clamping-ring 22, when said ring is situated within the box and secured at its outer side to the bottom of the base by screws, as 23, and manually operated from above the base by means of hand-screws, as 24, for the purpose specified.

5. In a parallel bench-vise, the combination, with the front jaw and bench, 13, of a bearing, 29, secured to the bench, and a supplementary brace, 26, attached to the jaw, and means for locking said bearing and brace together when desirable, for the purpose set forth.

6. In a parallel bench-vise, the combination, with the front jaw and bench, 13, of the bracket 27, bearing 29, supplementary brace 26, and hand-screw, as 31, for the purpose specified.

7. In a parallel bench-vise, the combination, with the front jaw and bench, 13, of the bracket 27, bearing 29, supplementary brace 26, in which is formed a tapering or wedge-shaped slot, 32, and hand-screw, as 31, for the purpose specified.

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