(No Model.)

A. VANDERBEEK.

VISE.

No. 540,413. Patented June 4, 1895.

Fig. 1.

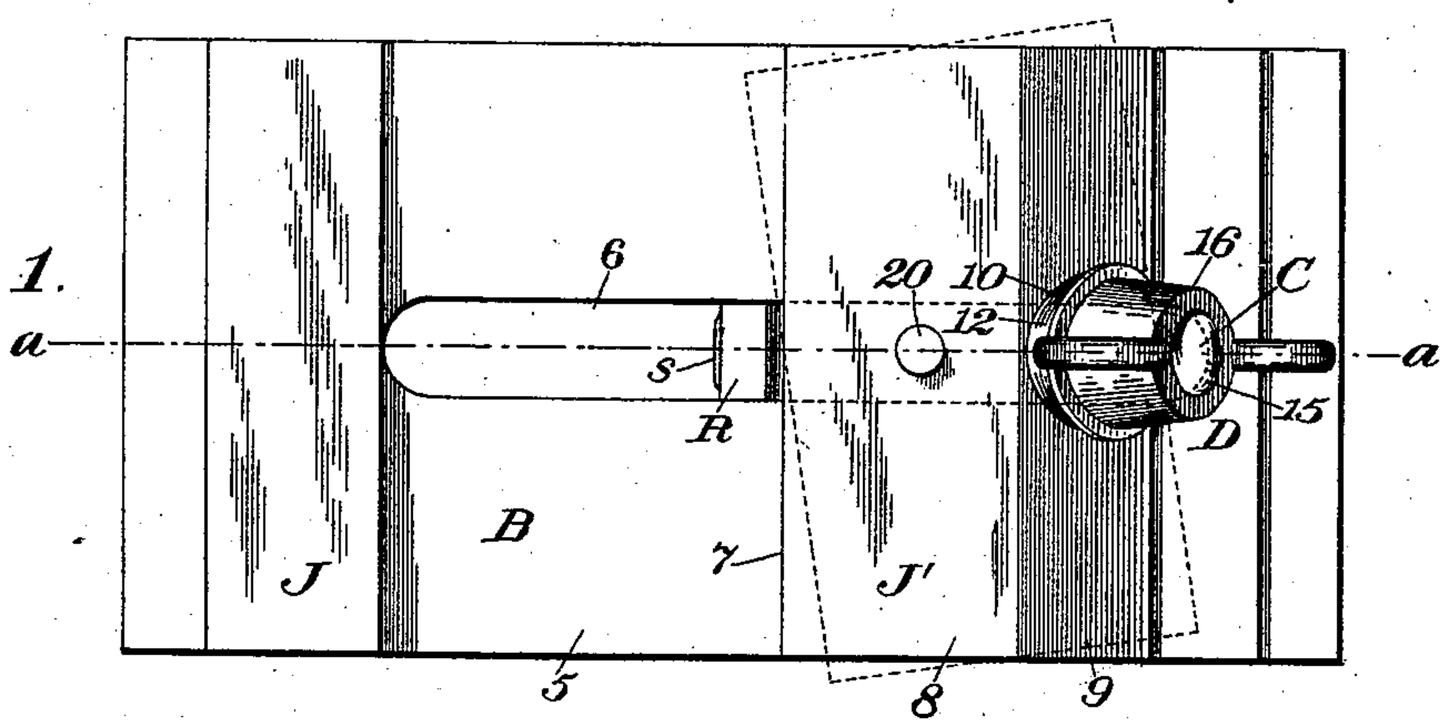


Fig. 2.

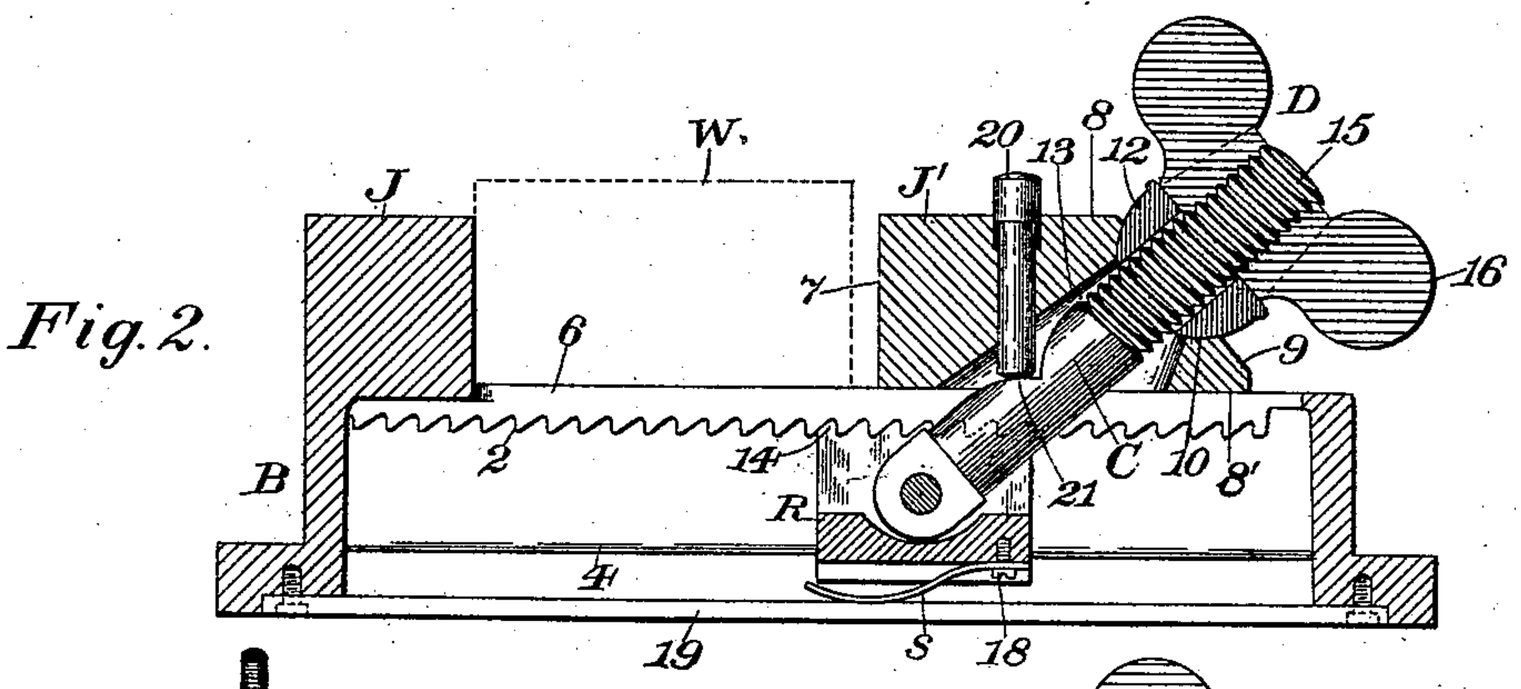


Fig. 5.

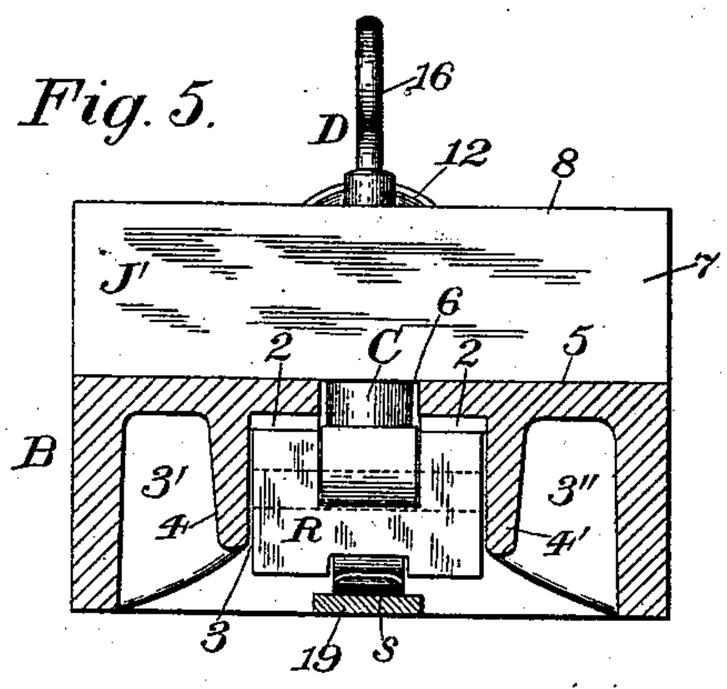


Fig. 3.

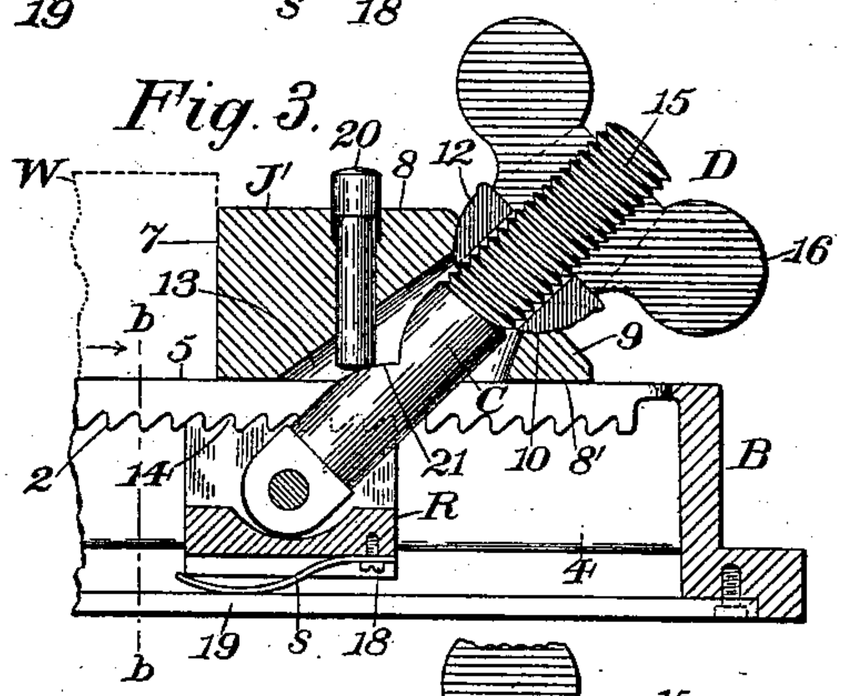
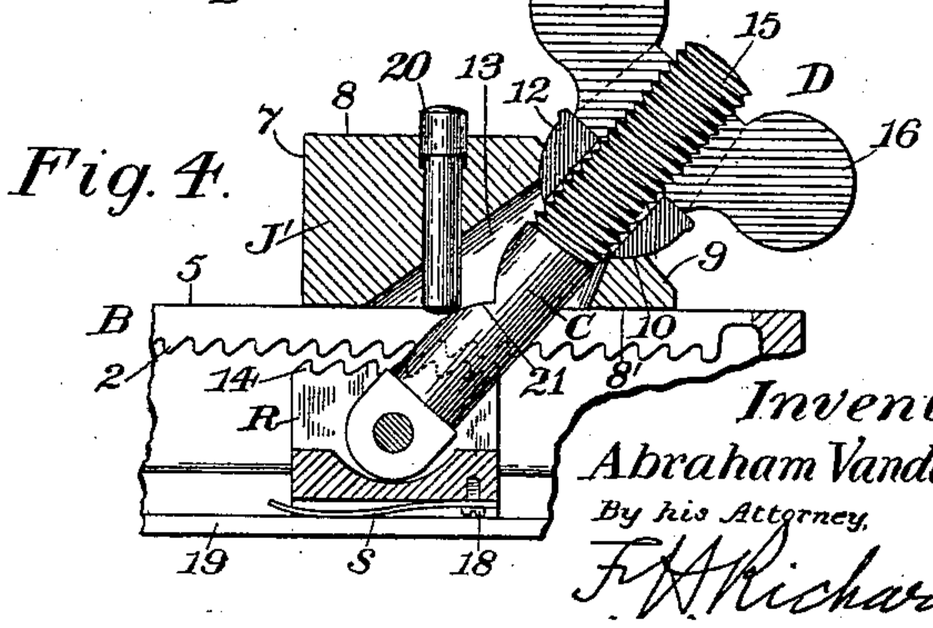


Fig. 4.



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UNITED STATES PATENT OFFICE.

ABRAHAM VANDERBEEK, OF HARTFORD, CONNECTICUT.

VISE.

SPECIFICATION forming part of Letters Patent No. 540,413, dated June 4, 1895.

Application filed February 15, 1895. Serial No. 538,576. (No model.)

To all whom it may concern:

Be it known that I, ABRAHAM VANDERBEEK, 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 Vises, of which the following is a specification.

This invention relates to vises of that class commonly known as "planer-vises;" the object of my invention being, primarily, to furnish an improved vise of this class having a pair of working-grasping jaws, one of which is adapted for movement toward and from the other, and to provide, in connection with the movable-jaw, an improved adjusting-and-locking device adapted for exerting a downwardly-inclined moving force upon said movable-jaw in the direction of the advancing movement thereof, thereby positively holding the jaw and work against lifting movement, relatively to the bed.

Another object of the invention is to furnish a planer-vise of such construction and organization that the movable jaw thereof may have a limited amount of transverse and oscillatory movement, relatively to the opposing jaw, to adapt the vise to irregular work, and may also be quickly shifted forward or backward, to adapt the vise for small or large work, without manipulation of the adjusting-and-clamping device, other than loosening the same.

In the drawings accompanying and forming a part of the specification, Figure 1 is a plan view of a planer-vise embodying my present invention, said figure showing in dotted lines an oblique position of the movable jaw. Fig. 2 is a vertical longitudinal section of the vise, taken in line *a a*, Fig. 1, and showing in dotted lines a piece of work between the two clamping-jaws of the vise, and showing the parts of the vise in the position they occupy just preparatory to the clamping adjustment of the movable jaw. Fig. 3 is a similar longitudinal section of a portion of the vise, showing the movable jaw and the clamping device in connection therewith in the positions they occupy when said jaw is tightly clamped against movement. Fig. 4 is a similar view of the parts shown in Fig. 3, showing the movable jaw released from its clamped position and the clamping device in position to permit free sliding movement of said jaw. Fig. 5 is a cross-sectional view of the vise, taken in line *b b*, Fig. 3, looking in the direction of the arrow in said figure.

Like characters represent like parts in all the figures of the drawings.

In the preferred embodiment of my invention, herein shown and described, the vise comprises, in part, a longitudinally-recessed bed or frame B, having a rack 2 upon the under side thereof, adjacent to the longitudinal recess, and having a fixed-jaw J at one end thereof; a movable jaw J′, supported upon said bed; a rack-block R, supported below and adapted for engaging the rack 2; a clamping bolt C, projected through the movable-jaw J′, and the bed B, at an inclination to the plane of movement of said jaw, and pivotally-connected at the lower end thereof to said rack-block R, and means carried by said bolt in position and adapted for tightly clamping the parts in adjusted position, all of which will be hereinafter fully described.

The bed B, and the fixed jaw J at one end of said bed, will preferably be formed integral with one another, as illustrated in the drawings, although it will be obvious that the jaw J, and bed B, might be separately constructed and secured together in any suitably manner. The bed B, which may be of any suitable general conformation, is herein shown, in the nature of a rectangular-block longitudinally-channeled at its under side, as shown at 3, 3′ and 3″, to form longitudinal flanges 4 and 4′, on each side the longitudinal center of said bed, which flanges, and the channel 3, intermediate thereto, constitute a guideway for the rack-block R, which is supported in said channel between said flanges. Formed through the upper wall 5 of the bed B, preferably midway between the two flanges 4 and 4′, and communicating with the channel 3, is an elongated longitudinal opening 6, and upon each side of said opening 6, in the under side of the upper wall 5, a series of notches or teeth, which, in the form thereof herein shown, constitute a divided-rack 2, which extends approximately from end to end of said bed, as clearly shown in Figs. 2 to 5, inclusive, of the drawings.

The movable-jaw J′, which is supported for sliding movement upon the upper face of the

upper wall of the bed, is herein shown in the nature of an oblong rectangular-block having the perpendicular work-grasping face 7, horizontal upper and lower faces 8 and 8′, and an inclined or oblique rear bearing-face 9. Formed in this inclined movable face of the jaw, is a spheriform-socket 10, which constitutes a seat for a correspondingly spheroidal bearing-block or washer 12, and formed through the lower face 8′ of the movable-jaw J′, and communicating at its upper end with the spheriform-socket 10, is a bolt-receiving opening 13, which, is preferably conical in form, it being enlarged or laterally-elongated, at the lower end thereof, to permit a limited play of the holding-down bolt or clamping-bolt C, which extends through said opening, and also permits the jaw J′ to swing sidewise in a horizontal plane, and through a moderate arc, around said bolt, to thereby adapt the jaw for engaging a piece of work of irregular contour.

As a convenient means for facilitating the quick adjustment of the movable jaw J′, relatively to the fixed jaw J, so as to accommodate said jaws to work of varying sizes, at the least possible expense of time, I have provided in connection with the movable-jaw and bed, an oscillatory clamping-device, designated in a general way by D, which is adapted to be quickly thrown into operative engagement with the bed, when it is desired to tightly clamp the movable-jaw against a piece of work (as W), and is adapted to be quickly thrown out of engagement with said bed, when it is desired to open or close the jaws of the vise, preparatory to clamping them against a piece of work. This clamping-device for the movable-jaw J′, in the form thereof herein shown, consists of the holding-down bolt or clamping-bolt C, extending diagonally through the recess 6 in the bed B, and through the bolt-receiving opening 13 in the movable jaw J′; a rack-block R, pivotally-carried at the lower end of the inclined bolt C, which block is supported for traversing movement in the channel 3, between the guide-flanges 4 and and 4′ below the rack 2, and has a rack 14, at the upper face thereof, the teeth of which are adapted for engaging the teeth of the rack 2 of the bed; a spheroidal bearing-block 12, carried upon the upper screw-threaded end 15 of the bolt C, and normally bearing against the corresponding spheriform wall of the socket 10, and a clamping-nut or thumb-nut 16, adjustably fitted to the extreme outer end of the clamping-bolt C, as will be readily understood by reference to Figs. 2, 3 and 4, of the drawings. In the preferred form thereof herein shown, the center of curvature or axis of the spheroidal bearing-block and the spheriform-socket in which said bearing-block is normally seated, is located, during the clamping action of the bolt C, at a point approximately in alignment with the upper plane of the movable jaw J, or at a point considerably above a horizontal line drawn midway between the upper and lower faces of said jaw, so that, when clamping a piece of work between the jaws J and J′, the pressure against the upper edge of the working face 7 of the sliding-jaw J′, is taken directly by the clamping-bolt C, and does not tend to lift the jaw. It will also be seen, by reference to Fig. 2, that pressure exerted upon the working face of the movable-jaw J′ at any point below the upper edge of said working face, will, owing to the location of the axis of the spheroidal bearing-block above the point by which pressure is exerted, tend to directly hold down the working end of said jaw, while the rearward end of said jaw will be held down by the downward stress of the bolt C.

For normally holding the rack-block R, in engagement with the rack 2 of the bed B, some suitable spring will preferably be provided. In the present instance, this spring designated by *s*, is shown secured at one end to the lower face of the block by means of a screw 18, and has its free end bearing upon a longitudinally-disposed bar 19, which is fixed at opposite ends thereof to the under side of the bed B, as shown in Figs. 2 and 5. This construction and arrangement allow a free sliding movement of the rack-block when thrown out of engagement with the rack 2 of the bed, and bar 19, and will also prevent the rack-block from dropping out of place, should the spring *s*, be broken, and also limits the releasing movement of said rack-block.

As a convenient means for depressing the lower end of the clamping-bolt to throw the rack-block R out of engagement with the rack 2 of the bed B, for the purpose of quickly shifting the movable-jaw toward or from the fixed-jaw J, I have provided in connection with the movable jaw, a pressure-pin, or plunger 20, which is seated for vertical movement in a vertical recess in said jaw J′ with its lower end projected into the bolt receiving recess 13, in position for bearing against a shoulder 21, formed on the clamping-bolt C. In practice, this shoulder 21, will preferably be formed by notching the upper face of the bolt C, as clearly shown in Figs. 2, 3 and 4, of the drawings. The depressing-pin or plunger 20, will preferably be shouldered at the upper ends thereof, and the recess in which said plunger works, will have an internal abutment to limit the depressing movement of said pin.

In practice, when it is desired to throw the rack-block R, out of engagement with the rack 2 of the bed, to effect a quick shifting movement of the movable jaw J′, it is simply necessary to loosen the clamping-nut 16, and bear down upon the depressing-pin 20, which will depress the lower end of the bolt C, and disengage the rack-block R, from the rack 2, as shown at Fig. 4 of the drawings. In some cases, however, especially when a thumb-nut of convenient size is used on a bolt, said bolt may be depressed or tipped downwardly by

using the thumb-nut as a lever for this purpose.

In operation, if the thum-nut 16, is turned to advance the movable-jaw forward, the rearward upward end of the bolt C, will, of course, move forward with the jaw, while the lower end of said bolt remains at a fixed point, relatively to the bed, by reason of its connection with the rack-block, which block, during the clamping operation, is in fixed engagement with the rack 2 of the bed of the vise. The advancing movement of the jaw, through the medium of the thumb-nut 16, and bearing-block 12, owing to the inclined position of the bolt, not only changes the inclination of the bolt, relatively to the working face of the jaw, but lifts the projecting end thereof, so that the nut, when screwed down, will traverse a greater distance than will the jaw J′, proportionate to the hypotenuse and the vertical side of the triangle. This increase of movement of the thumb-nut on the bolt, relatively to the movement of the jaw on the bed, has the effect of multiplying the power of the nut for the clamping of a piece of work between the jaws of the vise, so that a coarser and stronger thread may be used on the bolt, than would otherwise be the case and maintain a given amount of power. The relation of the shoulder 21, and the bolt, to the depressing-pin 20, will be such as to positively insure a bearing-contact between said pin and shoulder, when the rack-block is in engagement with the rack 2 of the bed.

By the construction and organization of clamping means herein shown and described, it will be seen that a turning of the thumb-nut downward upon the bolt C to effect a clamping action of the jaw J′, will draw the rack-block upward and backward and into locked engagement with the rack 2, and that the movable-jaw J′ will be simultaneously forced downward and forward, in opposition to the locking movement of the rack-block; the backward movement of the rack-block being, of course, relatively small, as compared with the forward movement of the jaw J′, as will be readily understood by a comparison of the figures of the drawings.

Having thus described my invention, I claim—

1. The herein-described vise, comprising a longitudinally-recessed bed having a fixed-jaw at or near one end thereof, and having a rack below the upper face of said bed; a movable-jaw supported upon said bed, and having an inclined bolt-receiving opening therethrough, and a clamping-device for said movable-jaw, consisting of a clamping-bolt extending inclinedly through the bed and through the recess of said jaw, a rack-block pivotally-carried at the lower end of said bolt below, and in position for engaging, the rack of the bed; and an adjusting-device carried at the upper projected end of the bolt in position, and adapted for bearing against the movable-jaw, substantially as described, and for the purpose set forth.

2. In a vise of the class specified, the combination with the vise-bed having a fixed, work-engaging jaw, and having a rack the teeth of which depend below the upper face of said bed; of a movable-jaw supported upon said bed; a rack-block supported below and in normal engagement with the rack of the bed; and means in connection with the movable-jaw, and pivotally engaging the rack-block, for moving the rack-block into locked engagement with the rack of the bed, and for simultaneously moving the movable-jaw longitudinally of the rack and in opposition to the locking moving of the rack-block, substantially as described, and for the purpose set forth.

3. In a vise, the combination with the bed having a fixed work-engaging jaw, of a longitudinally-disposed rack; a movable-jaw supported above said rack; a rack-block supported below said rack, and normally in engagement with said rack; a bolt pivotally engaging said rack-block and extending through the sliding-jaw, and a thumb-nut carried by said bolt in position and adapted, through the medium of the bolt, for forcing the rack-block and movable-jaw in opposite directions, substantially as described, and for the purpose set forth.

4. In a vise of the class specified, the combination with the bed having a fixed work-engaging jaw; of a movable jaw; a rack in the bed below said movable jaw; a clamping device carried bv said movable jaw, and extending inclinedly through the bed and movable jaw, and embodying a pivoted rack-block in normal engagement with the rack, substantially as described.

5. In a vise of the class specified, the combination with the bed having a fixed work-engaging jaw, and having a rack below the upper face of said bed; of a movable-jaw supported upon said bed; a clamping-device carried by said movable-jaw, and having a pivoted rack-block embodying a rack extending upon opposite sides of the pivot of said rack-block, and in position and adapted for engaging the rack of the bed; and means in position and adapted for normally retaining the rack-block in engagement with the rack, substantially as described, and for the purpose set forth.

6. In a vise of the class specified, in combination with a longitudinally-recessed bed having a series of transverse notches on the under face of the upper wall thereof adjacent to the longitudinal recess, and having a fixed-jaw; a jaw movably-supported upon the bed, and adapted to co-operate with the fixed-jaw, a bearing-block supported below and having teeth adapted for engaging in the notches in the upper wall of the bed; and a bolt pivotally-connected with the rack-block and projected diagonally to the upper wall of the

bed and through the movable-jaw, and carrying means in position and adapted for moving the rack-block into locked engagement with the notched portion of the bed, and for simultaneously moving the movable-jaw toward the fixed-jaw, and in opposition to the locking movement of the rack-block, substantially as described, and for the purpose set forth.

7. In a vise of the class specified, the combination with the bed having a fixed jaw and a longitudinally-disposed rack of a rack-block supported below and in position for engaging said rack; a bolt pivotally-connected with said rack-block and extending upwardly at an inclination to said bed; a jaw having an inclined bolt-receiving recess, and movably-carried by said bolt; and adjusting means carried by said bolt in position and adapted for bearing against said movable-jaw, substantially as described, and for the purpose set forth.

8. In a vise of the class specified, the combination with the bed having a fixed longitudinally-disposed rack below the upper face thereof and having a fixed work-engaging jaw; of a movable-jaw having a laterally-elongated bolt-receiving opening therethrough, inclined in the direction of movement of said jaw; a rack-block supported below and adapted for normally engaging the rack of the bed; a clamping-bolt pivotally-connected at its lower end with said rack-block, and having a screw-threaded upper end projecting inclinedly through the laterally-elongated recess in the movable-jaw; and adapted for swinging movement therein; a bearing-block carried at the upper end of said bolt and bearing against the movable-jaw; and a thumb-nut carried by said bolt and bearing against said bearing-block, substantially as described, and for the purpose set forth.

9. In a vise of the class specified, the combination with the bed, having a longitudinally-disposed rack, and with the rack-block and the clamping-bolt pivotally-connected therewith; of the movable-jaw supported upon said bed, and having an inclined bolt-receiving opening therethrough which terminates at its upper outer end in a spheroidal socket; a spheroidal bearing-block seated in said spheroidal socket and carried by said clamping-bolt, and a thumb-nut carried by said clamping-bolt and bearing at its inner end against the outer face of the spheroidal bearing block, substantially as described, and for the purpose set forth.

10. In a vise of the class specified, the combination with the bed and its longitudinally-disposed rack, and with the movable-jaw; of a clamping-device carried for oscillatory movement by said movable-jaw and embodying a spring-actuated rack-block in normal engagement with the rack, and means carried by said movable-jaw in position and adapted for engaging and depressing the clamping-device, to release the rack-block from engagement with the rack, substantially as described.

11. In a vise of the class specified, the combination with the bed having a longitudinally-disposed rack, and with the movable jaw, of a clamping-device carried for lateral movement, in and by, said movable-jaw, and embodying a rack-block located in position for engaging the rack on the bed; means in position and adapted for normally retaining the rack-block in engagement with the rack; and means carried by said movable-jaw in position and adapted for engaging and depressing the clamping-device, to release the rack-block from engagement with the rack, substantially as described, and for the purpose set forth.

12. In a vise of the class specified, the combination with the bed having a fixed work-engaging jaw and an inclinedly-recessed movable-jaw having a spheroidal bearing-socket the axis of which is located approximately in the plane of the upper face of said jaw, and with a fixed longitudinally-disposed rack, of a rack-block carried by said movable-jaw in position and adapted for normally engaging the longitudinally-disposed rack; a clamping-bolt pivotally-connected to said rack-block, and extending inclinedly through the movable-jaw; a spheroidal bearing-block seated in the bearing-socket in the movable-jaw and having the axis thereof approximately in the plane of the upper face of said jaw; and a thumb-nut carried at the upper outer end of said bolt, and adapted for exerting an advancing force upon the bearing-block at an inclination to, and in the direction of movement of, said movable-jaw, substantially as described, and for the purpose set forth.

13. In a vise, the combination with the bed having a fixed work-engaging jaw and a longitudinally-disposed rack, and with the movable-jaw upon said bed, carrying a clamping-device embodying a rack-block in normal engagement with the rack of the bed, of a clamping-device actuator consisting of a depressing-pin or plunger seated in an opening in the movable-jaw and having the lower end thereof in normal engagement with the clamping-devices, substantially as described, and for the purpose set forth.

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