

WISE.

1,039,337.

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VICE.

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To all whom it may concern:

Be it known that I, ABRAHAM VANDERBEEK, a citizen of the United States, and a resident of 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.

The invention relates to vises and more particularly to a vise for use in connection with metal working machines for holding the work to be operated upon.

The object of the invention is to provide a vise the jaws of which may be readily slid up to and removed from the work to be held and made quickly adjustable to pieces of different forms and sizes.

A further object is to provide a vise in which the jaws may be moved up into close contact with the piece to be held and then readily "set up" to positively clamp the piece by a simple and slight movement of the clamping part and just as readily unclamped and removed.

A still further object is to provide a vise with a plurality of jaws which are universally adjustable and may be moved at various angles with relation to each other to clamp parts of irregular form.

Referring to the drawings: Figure 1 is a plan view of my improved device. Fig. 2 is a side elevation of the vise. Fig. 3 is a sectional view on the line $x-x$ of Fig. 1. Fig. 4 is a transverse sectional view on the line $y-y$ of Fig. 3.

It is important in vises, particularly those adapted for use in connection with metal working machines, to provide a ready and quick means for presenting the jaws of the vise to the piece to be held and means by which the jaws may be securely set up to firmly clamp the piece by a comparatively small effort and movement. The reason for this is apparent. For instance, in setting up a piece of work on a planer or drill press or other metal working machine it must be trued up to a precise position with reference to the bed of the machine, and the tool which is to operate upon it. It is difficult to hold up the piece to be operated upon while the jaws of the vise are being set up to hold the part in its leveled and fixed position. It is also desirable to provide a vise which will grasp and firmly hold with a comparatively long holding face pieces of irregular form.

For instance, angularly shaped pieces and pieces having a uniform section at one part and an angularly disposed section of different size at another point. If such a piece is held by a simple straight jaw, when the tool comes in contact with it as in planing, it is liable to vibrate and cause chattering of the tool and, therefore, imperfect work. If the same piece is held with a long gripping face position of several jaws each of which may be independently operated to so dispose the gripping faces as to grasp the various sections of the irregularly formed part, it is so firmly and positively held as to prevent vibration and the tool works smoothly and evenly when coming into cutting action with relation to it. Even if a long holding face is provided on a single jaw of a vise the desired result will not always be secured for the vise jaws may clamp several intermediate points of the piece to be held, and yet not have a firm and solid bearing against the body of the structure. In such a vise herein described the defect is obviated by providing a plurality of jaws several of which are absolutely independent of each other and may be set at any angle and in any position with reference to the co-operating jaws to grasp and exert a full holding pressure upon various parts of the piece which it is desired to clamp.

In the accompanying drawings the numeral 1 denotes a base-piece or bed which may be of any desired form, although preferably cored out to provide a light structure. This base-piece or bed has along one side a fixed jaw 2 which rises from a portion 3 of the base-piece arranged parallel with the bottom of the bed. The face 4 of the jaw 2 may be made of hardened material and roughened, corrugated or otherwise formed to present a non-slipping surface although a smooth jaw may, of course, be used if desired.

As shown herein the base-piece or bed is of substantially rectangular form and is provided with recessed ears 5 by which it may be secured to any desired machine or in any desired position. The upper face 3 of the bed is slotted as at 6 and 7 and on its under surface is provided with a rack 8 the teeth of which may be formed in any desired manner and as independent strips applied to the base, if so desired. A rack is preferably arranged upon both sides of

the slots 6 and 7 and extends across the under side of the upper part 3 of the base. Coöperating with these racks are rack blocks 9 provided at their upper faces with teeth 5 formed to engage the racks on opposite sides of the slots 6 and 7 and at their under sides with recesses 10 to fit upon a support 11.

Upon the upper portion 3 of the base 1 are arranged sliding blocks 12, 13 provided with jaw faces 14, 15 arranged to coöperate 10 with the stationary jaw face 4 to hold an article. Extending through the sliding blocks and angularly disposed with relation thereto are clamping bolts 16, 17 which are 15 preferably formed integral with the supports 11. In fact the supports 11 together with the bolts are of T-form, the supports extending outward from both sides of the clamping bolts 16, 17 and being of substantially circular form where they engage the 20 rack blocks 9. This construction is particularly advantageous and gives a self-adjusting connection between the clamping bolts and the rack blocks. The teeth of the 25 racks on the under surface of the base are preferably pitched to permit and induce a separation of the rack block and rack when the movable jaws are slid forward toward the stationary jaw, and they also resist the 30 backward movement of the rack block when the clamping bolts are drawn upward to force the jaws forward as by nuts 18, 19 which bear upon the sliding blocks. A spring *b* is secured to each of the bolts 16, 35 screws *c* being shown herein as the fastening means, each spring having a bent portion forming toes *d* resting upon and pressing against the rack blocks 9 to hold the rack blocks in proper angular position with 40 respect to the clamping bolts to permit ready movement of the parts.

It is to be noted that the clamping bolts pass through the sliding blocks approximately at their center and thus the blocks 45 may be turned upon the base about the clamping bolts to adapt themselves to any angle of the part to be held between the stationary jaw and the movable jaws.

The under sides of the sliding blocks are 50 recessed adjacent to the aperture for the clamping bolts and form a housing and cover for springs 20 which at one side bear upon the face of the base or support 3 and normally act through universal connecting 55 rods 22 to hold the rack blocks with their teeth in engagement with their racks. As shown herein the springs are illustrated as of bow form straddling the slots 6 and 7 and with the universal connections dependent from their medial points. Obviously 60 any form of spring may be used in lieu of that herein shown.

Passing through the sliding blocks are pins 24, 25 which at their lower ends rest 65 upon the springs 20 and form a means of

depressing said springs so that the teeth of the rack blocks may be disengaged from their corresponding racks to facilitate movement of the sliding blocks and movable jaws. As shown herein the clamping blocks are 70 drawn up into position by nuts engaging the screw threaded ends of the bolts, the outer surfaces of the sliding blocks being recessed to receive adjustable seats 30 having circular contact faces for permitting proper 75 adjustment of the parts as they are clamped. It is, of course, apparent that any form of nut may be used, and in lieu of nuts and interengaging screw threads other forms of cam may be provided which will have an 80 equivalent action to that of the screw threads.

It will be seen from the above description that the movable jaws of the vise may be drawn up against the work to firmly clamp 85 it against the stationary jaw, although the work may be of angular form, and in fact the jaws may assume any angular position with reference to the stationary jaw and at the same time exert a full holding effect 90 upon the intermediate work which is being held.

In the operation of the device the work is laid upon the bed adjacent to the stationary jaw and the several movable jaws are then 95 slid into position by pressure against the sliding blocks. When these movable blocks have been brought into approximate position to clamp the piece to be held the nuts 18, 19, or equivalent devices, are tightened up 100 drawing the teeth of the rack blocks 9 into engagement with the teeth of their corresponding racks and thus forcing the jaws firmly against the part to be held.

Any number of movable jaws may be used, 105 although but two are shown herein, and in fact it is not essential that any of the jaws shall be stationary as the invention will be present in any structure contemplating a plurality of jaws universally adjustable to 110 the work to be held and so arranged that the several jaws may assume positions angularly disposed with relation to each other for the purpose of holding irregular pieces.

There is a particular advantage in arranging 115 the spring support for the rack blocks within recesses at the under side of the sliding blocks, inasmuch as the base of the vise is ordinarily closed and the only part of the mechanism which is liable to become disarranged is the spring and connecting 120 parts. These are accessible by unlocking the clamping nuts and removing the sliding blocks.

I claim— 125

1. In combination in a vise, a base-piece or bed, a jaw thereon having a recess, a rack and rack block appurtenant to said jaw, a clamping device for rigidly clamping the jaw in position, a resilient member arranged 130

within the recess in the jaw, means for compressing said member, and means connecting the resilient member and the rack block.

2. In combination in a device of the class specified, a base, a rack operatively arranged upon the base, a rack block engaging said rack and having a transverse groove in its bottom surface, a plurality of jaws mounted upon the base and movable each independently of another, a clamping bolt extending through one of said movable jaws, and through the base and rack block and provided at one end with an integral T-shaped projection located in said groove in the bottom of the rack block, and means for drawing the movable jaw toward the rack block.

3. A vise including a base piece, a supporting jaw, a jaw movable toward and from the supporting jaw, a rack and rack block appurtenant to said movable jaw, clamping means for drawing the rack block into engagement with the rack and rigidly holding it in place, and means for resiliently suspending the rack block from said movable jaw.

4. A vise including a base piece, a supporting jaw, a jaw movable toward and from the supporting jaw, a rack and rack block appurtenant to said movable jaw, a clamp bolt movably connected to the rack block, a spring for holding the bolt in one position with respect to the rack block, one end of said spring having an opening, and a suspension rod with its end engaging said spring through said opening to retain the bolt in position.

5. A vise including a base piece having a slot therein, a jaw movably arranged upon the base, a rack on the underside of the base adjacent to said slot, a rack block to engage said rack, a bolt supporting the rack block and projecting through said slot and movable jaw, means for drawing the bolt to cause the rack block to engage the rack, a

bow spring located within a recess underneath the movable jaw and straddling said slot, suspension means for the rack block, said suspension means being secured to said bow spring, and means for releasing the tension of said bow spring to disengage the teeth of the rack block from said rack.

6. A vise including a base piece having a slot therein, and a rack on its under surface adjacent to said slot, a supporting jaw, a jaw movable toward and from the supporting jaw, a rack block located underneath the base, a bolt pivotally secured to the rack block and projecting through said slot and movable jaw, means for drawing the bolt to cause the block to engage the rack, a spring for holding the bolt in one position with respect to the block, the end of said spring projecting and having an opening, a bow spring located within a recess underneath the movable jaw and straddling said slot, a suspension device secured to said bow spring and within the opening in the other spring whereby the rack block is suspended, and means for releasing the tension of the bow spring.

7. A vise including a base piece having a slot therein, a jaw movably arranged upon the base, a rack on the underside of the base adjacent to said slot, a rack block to engage said rack, a bolt supporting the rack block and projecting through said slot and movable jaw, means for drawing the bolt to cause the rack block to engage the rack, a spring in said movable jaw, suspension means for the rack block, said suspension means being secured to said spring, and means for releasing the tension of said spring to disengage the teeth of the rack block from said rack.

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