

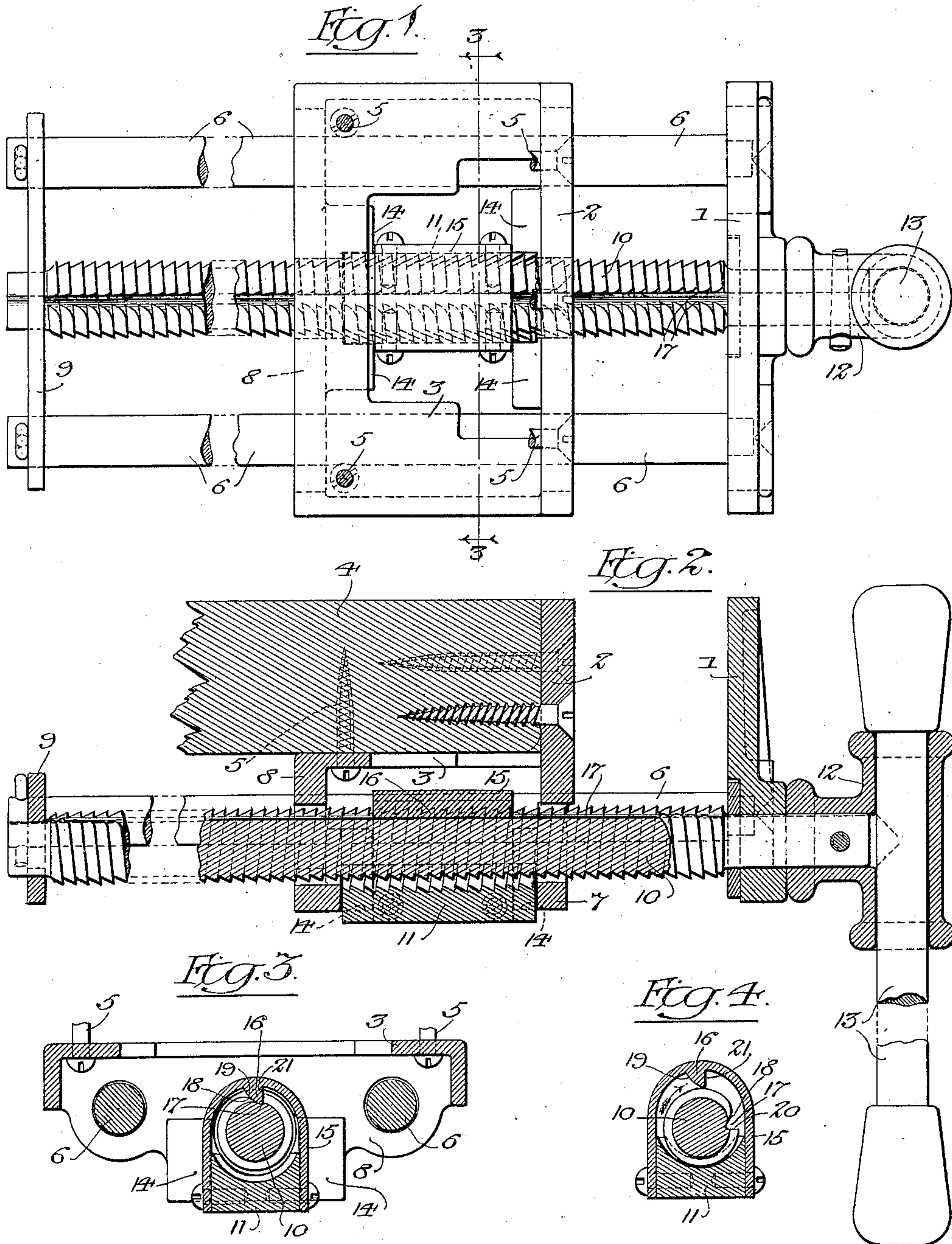
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To all whom it may concern:

Be it known that I, WILLIAM A. BOYLE, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Vises, of which the following is a specification.

The invention relates to vises and seeks to provide a simple and effective construction by which the jaws of the vise may be shifted quickly to and from each other and forced together to grip the work.

The invention consists in the features of improvement hereinafter set forth and more particularly pointed out in the appended claims.

In the accompanying drawings, which illustrate the preferred form of my invention, Figure 1 is a plan view. Fig. 2 is a longitudinal section on the line 2—2 of Fig. 1. Fig. 3 is a transverse section on the line 3—3 of Figs. 1 and 2. Fig. 4 is a detail section showing parts in a changed position.

The vise comprises the usual jaws 1 and 2 and, in the form shown the jaw 2 is provided with a laterally extending web 3 and is adapted to be secured to the edge of a work bench 4 by screws 5 or the like. The movable jaw 1 is fixed to the outer ends of a pair of guide rods 6 that slide longitudinally through suitable openings formed in depending flanges 7 and 8 of the fixed jaw 2. The inner ends of the guide rods are connected by a cross-piece 9.

A cooperating screw and nut are connected respectively to the vise jaws and forcibly, as shown, the screw 10 is rotatably connected to the movable jaw 1 and the nut 11 to the fixed jaw 2. The screw 10 is journaled at its opposite ends in the jaw 1 and in the cross-bar 9 and extends through openings in the flanges 7 and 8 of the fixed jaw 2. A hollow, T-shaped head 12 is fixed to the outer end of the screw 10 and is provided with the usual handle 13 which slides therethrough.

The nut 11 is a segmental or part nut, and is arranged to shift transversely to the axis of the screw into and out of engagement therewith. Preferably, as shown, the part nut 11 is arranged below the screw 10 and is arranged to move in vertical direction in guide ways or lugs 14 on the flanges 7 and 8 of the jaw 2 into and out of engagement

with the screw. The guideways or lugs 14 of the flanges 7 and 8 hold the part nut against its longitudinal movement so that, when the nut is in engagement with the screw and the screw is rotated, the jaw 1 will be moved.

The part nut 11 is held in position relatively to the screw 10 by a part 15 of inverted U-shape which is connected at its ends to the nut and extends over the screw as shown. The upper central portion of the U-shaped part 15 is provided with a depending rib or lug 16 which is arranged to engage the screw to hold the nut into engagement therewith, as shown in Fig. 4. The screw is provided with a longitudinal groove 17 which is arranged to cooperate with the lug or rib 16 to permit the disengagement of the nut 11 from the screw. That is to say, when the screw 10 is rotated to bring the mutilated portion or groove 17 into line with the lug or rib 16, the latter will drop into the groove and the part nut 11 will move out of engagement with the screw, as shown in Figs. 2 and 3, and the movable jaw 1 may then be quickly shifted to and from the fixed jaw 2 in accordance with the size of the piece of work to be placed in the vise. One of the side walls 18 of the groove 17 and one of the sides 19 of the rib or lug 16 are beveled or inclined as shown, to form cam faces so that, by rotating the screw from the position shown in Fig. 3 in right-hand direction, or in the direction of the arrow, these cam faces will operate to lift the lug or rib out of the groove and raise the part nut 11 into engagement with the screw. By this means, if the nut is disengaged, as shown in Figs. 2 and 3, it may be automatically moved into engagement with the screw by rotating the latter in proper direction to move the jaw 1 toward the fixed jaw 2.

In using the vise, the screw 10 is rotated through a part revolution in either direction to bring the slot or mutilated portion 17 thereof opposite the rib or lug 16 to permit the disengagement of the nut 11. The work is then placed between the jaws of the vise and the jaw 1 is quickly shifted to engage the work. The handle 13 and screw 10 are then rotated in right-hand or forward direction so that the part nut is automatically moved back into engagement with the screw by the cam faces 18 and 19 as described and

the jaw 1 is forced against the work. Only a partial revolution in right-hand or forward direction of the screw is usually necessary to firmly grip the work. Besides the cam faces 18 and 19, the groove 17 and the cooperating rib or lug 16 are provided with radial faces or side walls 20 and 21 so that the screw can only be rotated for a part of a revolution in left-hand or reverse direction, that is, in the direction necessary to move the jaw 1 away from the fixed jaw 2. By this arrangement, in removing a piece of work, it will be only necessary to shift the screw through a part of a revolution in reverse direction until the rib or lug 16 drops into the groove 17 and then the jaw 1 may be quickly moved away from the jaw 2 to release the work, the radial or abrupt faces 20 and 21 serving to arrest the screw in its released position.

From the foregoing, it will be seen that the nut and screw may be disengaged by rotating the screw in either direction when there is no work gripped between the jaws and by a part rotation of the screw in reverse or left-hand direction when there is work between the jaws. The beveled or cam faces 18 and 19 of the groove 17 and rib or lug 16, permit the rotation of the screw through any desired number of turns in right-hand direction. It is true, that if there is no work gripped between the jaws, the nut and screw will be disengaged once every revolution when the groove 17 is brought beneath the lug 16, but the nut and screw will be at once reengaged by the cam faces 18 and 19, so that in effect the movement of the jaw 1 will be continuous. It is often desired to exert pressure upon the work through a considerable distance as, for example, when a tenon is to be forced into a mortise. Under such circumstances, the screw may be continuously rotated in right-hand direction to cause the jaw 1 to exert pressure upon the work through a considerable distance. The nut will not, under such circumstances, be disengaged from the screw once every revolution for the pressure of the work upon the jaw 1 will force the threads of the screw 10 with considerable pressure against the threads of the nut 11 and the nut will be prevented from disengaging with the screw partly by the friction developed between it and the screw and partly because the continuous rotation of the screw will move the groove 17 thereof so quickly past the lug 16 that the nut will not have time to drop out of engagement. At most, under such circumstances, the nut will only drop partly out of engagement when the groove 17 is brought in line with the lug 16 and the cam faces 18 and 19 will then quickly restore the nut to its full engaged position.

It should be noted that the projection 16

is diametrically opposite the center of the part or half-nut 11 and is connected to both ends thereof by the U-shaped piece 15, so that the nut is shifted into engagement with the screw and is held in such position without any twisting strain upon the parts and without any binding between the threads of the nut and screw. Moreover, with the lug and nut so arranged and vertically guided in their transverse shift, the nut will quickly drop, by gravity, out of engagement with the screw as soon as the slot in the screw is brought into line with the lug by rotation of the screw in either direction, when there is no work between the jaws, or by a part revolution of the screw in left-hand direction when work is gripped between the jaws, and it is not then necessary to further reverse the screw in order to disengage the nut. The inclined faces of the slot 17 and lug 16 act to quickly jam the nut into engagement with the screw when the latter is turned in right-hand direction, while the abutting faces of the lug and slot arrest the rotation of the screw when it is turned in left-hand direction and the nut drops out of engagement therewith.

The threads of the screw and nut are provided with beveled or inclined and radial or abrupt faces. The radial faces act to securely force and hold the movable jaw 1 against the work, while the inclined faces permit the ready reengagement of the nut with the screw after it has been disengaged therefrom.

It is obvious that numerous changes may be made in the details set forth and the improvement applied to different forms of vises without departure from the essentials of the invention.

Having described my invention, what I regard as new and desire to secure by Letters Patent, is:—

1. In a vise, the combination with the vise-jaws, of a screw rotatably connected to one of said jaws, a half-nut arranged below the screw and vertically guided upon the other of said jaws into and out of engagement with the screw, said nut having a part extending about the screw with a lug thereon diametrically opposite the center of the half-nut and arranged to engage the screw to hold the nut into engagement therewith, and said screw having a longitudinal slot with which said nut engages to permit the disengagement of the nut, said slot and lug having cooperating cam faces for vertically shifting the nut into engagement with the screw when the latter is rotated in one direction, and said slot and lug having cooperating abrupt faces for arresting the rotating screw in the opposite direction as the nut is disengaged therefrom, substantially as described.

2. In a vise, the combination with the vise-jaws, of a screw rotatably connected to one

of said jaws, a half-nut arranged on one side of said screw and movable transversely in guideways in the other of said jaws, said nut having a part extending about said screw with a lug thereon diametrically opposite the center of the half-nut and arranged to engage the screw to hold the nut into engagement therewith, and said screw having a longitudinal slot with which said lug engages to permit the disengagement of the nut, said slot and lug having cooperating cam faces for shifting the nut into engagement with the screw as the latter is rotated in one direction, substantially as described.

3. In a vise, the combination with the vise-jaws, of a screw rotatably connected to one of said jaws, a half-nut arranged below said screw and engaging the other of said jaws, said latter jaw having guideways wherein said nut is vertically movable into and out of engagement with the screw, said nut having a part extending above said screw with a projection thereon diametrically opposite the center of said half-nut and arranged to engage the screw to hold the nut into engagement therewith, and said screw having a longitudinal slot with which said lug engages to permit the disengagement of the nut by gravity, said slot and lug having cooperating cam faces for lifting the nut vertically into engagement with the screw as

the latter is rotated in one direction, substantially as described.

4. In a vise, the combination with the fixed and movable vise-jaws, of a screw rotatably connected to the movable jaw, a half-nut engaging the fixed jaw and arranged below said screw, said fixed jaw having guideways wherein said nut is vertically movable into and out of engagement with the screw, and an inverted U-shaped part connected to the opposite ends of the half-nut and extending over said screw, said U-shaped part having a depending rib diametrically opposite the center of said half-nut and arranged to engage said screw to hold the nut into engagement therewith, and said screw having a longitudinal slot with which said rib registers to permit the disengagement of the nut by gravity, said rib and slot having cooperating cam faces for lifting the nut vertically into engagement with the screw when the latter is rotated in one direction, and said slot and rib having cooperating abrupt faces for arresting the rotation of the screw in the opposite direction as the nut is disengaged therefrom, substantially as described.

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