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LOCK MECHANISM FOR VISE OR CLAMP

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5 Claims. (Cl. 74-424.8)

The present invention generally relates to vises or clamps such as C-clamps and more specifically pertains to a locking mechanism for the movable jaw thereof.

The primary object of the present invention is to provide a locking mechanism for vises or C-clamps wherein a tiltable nut is engaged with the threads on a jaw carrying rod or bar for effecting the locking of the jaw with a cam mechanism being associated with the tiltable nut for selectively moving the nut for permitting free movement of the bar, or permitting engagement of the teeth on the nut with the bar for permitting a fine adjustment to be provided or for urging the nut and bar to a locked position with the jaw moved to a clamping position thus facilitating the repetitive locking action which will be of a positive nature but yet which may be finely adjusted and completely released with a minimum of movement required.

Another object of the present invention is to provide a locking mechanism for the movable jaw of a vise or clamp in which a substantially straight line pressure is exerted on the jaw carrying rod or bar thus preventing excessive side pressure exerted on the locking bar for eliminating excessive wear on the locking bar housing.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a sectional view of the present invention showing the nut completely tilted to an unlocked position for permitting free longitudinal movement of the locking bar;

Figure 2 is a view similar to Figure 1 but showing the nut tilted to an intermediate position with the nut threads firmly engaged with the threads on the locking bar for permitting fine adjustment of the bar by rotation thereof and providing positive locking.

Figure 3 is a view similar to Figure 1 but showing the nut moved for moving the locking bar longitudinally for moving the movable vise jaw into gripping position;

Figure 4 is a transverse section view taken substantially upon a plane passing along section line 4-4 of Figure 1 showing the details of construction thereof;

Figure 5 is a transverse sectional view taken substantially upon a plane passing along section line 5-5 of Figure 4 showing the relationship to the recess and cam engaged therein;

Figure 6 is an exploded group perspective view of the tiltable nut and the cam member for tilting the same; and

Figure 7 is an end view of the tiltable nut illustrating the specific construction of the segmental threads.

Referring now specifically to the drawings, the numeral 10 illustrates a frame member which is stationarily mounted and may be conveniently mounted on a supporting base which is also provided with a stationary jaw, not shown. The frame 10 is provided with a longitudinal bore 12

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slidably receiving an elongated rod or bar 14 which is externally threaded and which is provided at one end thereof with a movable vise jaw or clamp jaw, not shown. The frame or body member 10 is also provided with an enlarged hollow area 16 through which the bar 14 also extends and a transverse bore 18 is provided in the frame 10 in communication with the enlarged hollow portion 16 with it being pointed out that one side of the bore 18 is recessed into the inner wall of the hollow portion 16 for forming a surface bearing area throughout the length of a shaft 20 having a cammed extension 22 on one end thereof. The free end of the shaft 20 extends exteriorly of the frame or body 10 and is provided with an elongated laterally extending spindle 24 for operation of the shaft 20. Also, the shaft 20 is provided with a peripheral groove 26 for receiving a substantially U-shaped retainer plate 28 secured to the frame 10 by fasteners 30 thereby maintaining the longitudinal relationship of the shaft 20 in relation to the frame 10 and maintaining the cam extension 22 interiorly of the hollow portion 16 with a portion of the cam 22 being co-extensive with the portion of the periphery of the shaft 20 for bearing engagement in the portion of a bore 18 in the outer wall of the recessed portion 16 thus rigidifying the shaft 20 and forming a support for the cam extension 22.

Disposed within the hollow area 16 in encircling relation to the bar 14 is a tiltable nut 32 having a generally flat rear surface 34 and an inclined forward surface 36. A compression coil spring 38 is disposed between the front surface 36 and the front wall of the hollow portion 16 with the spring 38 encircling the bar 14. The rear surface 34 is provided with a laterally extending recess 40 for engagement with the cam extension 22 on the shaft 20 as illustrated in Figures 1-3. An adjustable stop member 42 extends through the rear wall of the frame 10 and is provided with a slot 44 in the outer end thereof for engagement with a tool such as a screwdriver or the like for varying the position of the stop member 42. The inner end of the stop member 42 is rounded for engagement with the rear wall 34 of the nut 32 in generally diametrically opposed relation to the engagement between the cam extension 22 and the recess 40. It is noted that the cam extension 22 is always engaged in the recess 40 and will prevent rotation of the nut 32 whereby rotation of the bar 14 will effect a fine adjustment of the bar 14 inasmuch as the nut 32 is provided with segmental internal threads 46 which are diagonally opposed to each other with the nut 32 also being provided with a recessed area 48 in diametric relation to the segmental threads 46. When the nut is disposed in perpendicular relation to the bar 14, the segmental threads 46 will be engaged with the threaded bar 14 whereas when the nut 32 is tilted in the position shown in Figure 1, the recessed areas 48 will be disposed adjacent the threaded bar 14 for permitting longitudinal sliding movement thereof without interference from the nut 32. The segmental threads 46 are provided with abrupt ends rather than tapered ends thus eliminating the flat surfaces of the threads that would be caused by the tapered end thus assuring positive engagement between the threads and the locking bar 14. The threads should be of a relatively fine nature, that is, there should be a relatively large number of threads per inch in order to provide a greater bearing surface area between the nut 32 and the bar 14 and also for providing positive locking engagement at any point of engagement between the nut 32 and bar 14.

The rod 20 is provided with any suitable mechanism for maintaining and positioning the same in the three positions of the nut and this means may be three arcuately arranged recesses with a spring urged detent on the shaft 20 or handle 24 for engagement with the indentations for indicating and maintaining the position of the nut 20.

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Beginning with the movable jaw in remote relation to the stationary jaw device and the nut 32 tilted to a position released from the bar 14 as shown in Figure 1, the low spot of the cam 22 will be engaged in the recess 40 as shown in Figure 5 thus permitting the spring 38 to cause the nut 32 to tilt away from the bar 14 since all pressure has been released from the nut 32 and the nut 32 has engaged the abutment or stop member 42 which will also cause tilting thereof as a diametrically opposed edge of the nut 32 proceeds toward the rear wall of the recess portion 16. In the initial movement of the cam surface 22 in the recess 40 as the shaft 20 is rotated, the nut 32 will ride on the cam surface and move to a position perpendicular to the rod 14 for engaging the segmental threads 46 with the rod 14. This condition is shown in Figure 2 with it being pointed out that the nut 32 has not yet moved out of engagement with the abutment 42 and with the spring 38 being compressed only a very slight amount. In this condition, a fine adjustment may be made by rotating the bar 14 in any suitable manner. After the bar 14 has been adjusted to dispose the jaws in the desired relation, a multiplicity of articles may be subsequently clamped between the jaws by moving the nut 32 towards the front of the recess portion 16 by moving the cam 22 to bring the high part thereof into registry with the recess 40 as illustrated in Figure 3, which will cause the desired longitudinal movement of the bar 14. Thus, there has been provided a locking mechanism that is easy and simple to manufacture and easily and quickly adjusted and is positive in its locking action and long wearing.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A locking mechanism for the jaw-carrying bar of a clamping vise comprising a hollow frame, a threaded jaw-carrying bar slidably extending through said frame, a tiltable nut disposed in said frame, said nut having diagonally disposed segmental threads for engagement

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with the bar when the nut is arranged in perpendicular relation thereto, said nut also having recessed areas arranged diagonally for registry with the bar when the nut is tilted, spring means biasing said nut to a tilted position, and cam means engaged with the nut for permitting the nut to move to a tilted position and for moving the nut into perpendicular relation to the bar for locking the nut and the bar together for moving the bar longitudinally for selective movement of the movable jaw for clamping engagement with a workpiece, said cam means including an operating handle disposed exteriorly of the frame.

2. The combination of claim 1 wherein said spring means includes a compression coil spring encircling the bar with one end engaging the nut and the other end abutting the interior of the hollow frame, an adjustable stop member extending into the hollow frame for engagement with the nut in opposition to the spring, said stop member being offset from the bar whereby the spring will serve to retract the bar and tilt the nut when the cam means is released.

3. The combination of claim 2 wherein said cam means includes a shaft extending in radial relation to the bar with the inner end terminating adjacent the bar and engaging the nut on the same end as the stop member but in diametric opposition thereto, said inner end having a cam surface on the periphery thereof, said nut having a recess in the same end thereof for receiving the cam surface for preventing rotation of the nut whereby longitudinal force exerted on the nut will be in a straight line adjacent and parallel to the bar for reducing wear between the bar and frame.

4. The combination of claim 3 wherein the frame is provided with a radial bore rotatably receiving said shaft with the surface of the bore extending to a point adjacent the bar for providing a bearing surface throughout the length of the shaft.

5. The combination of claim 5 wherein said threads in the nut extend less than one-half of the circumference of the internal bore therein with the threads terminating in sharp end thus eliminating any flattened ends on the threads in the nut.

No references cited.