

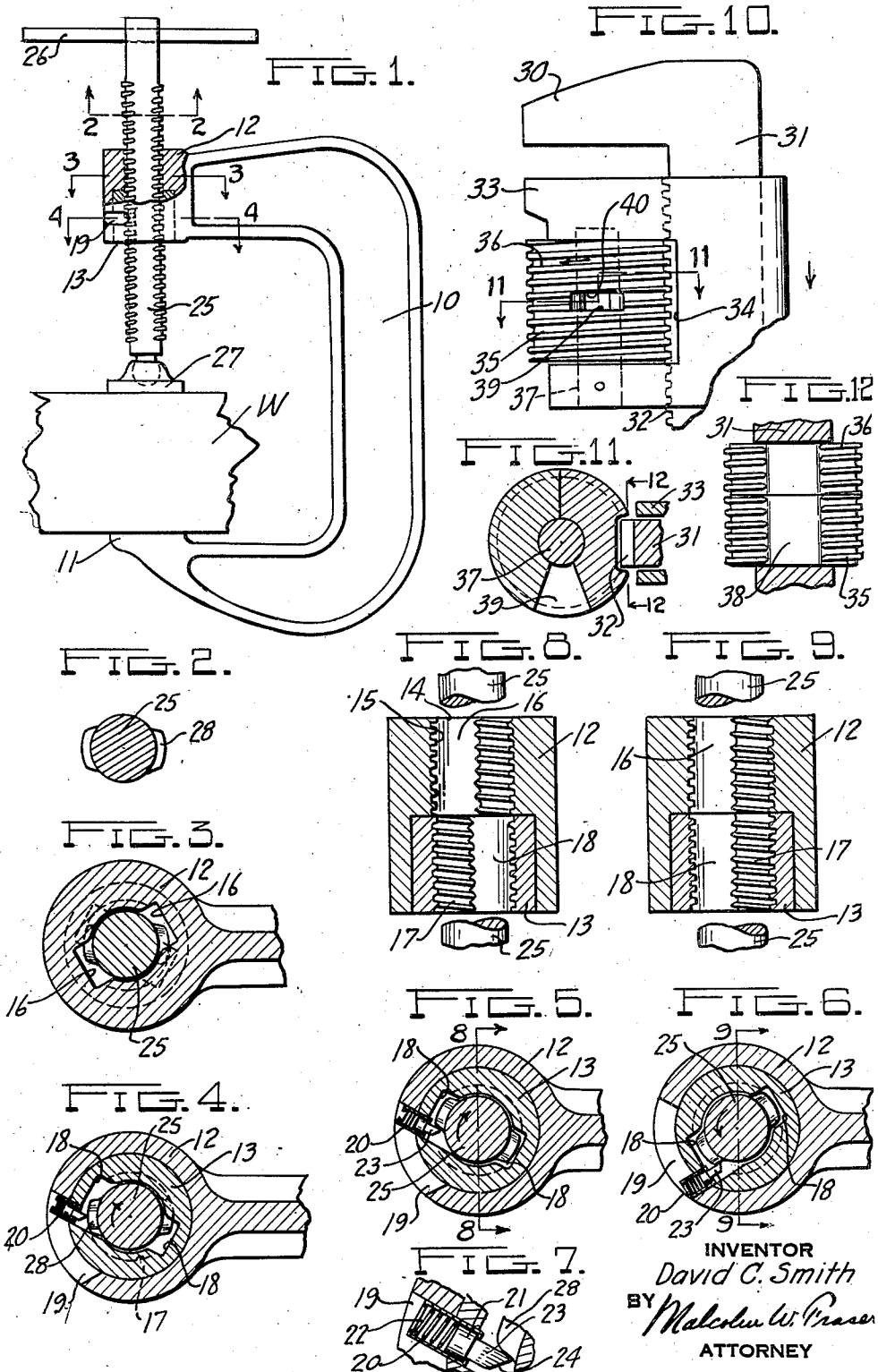
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ADJUSTABLE CLAMPING TOOL

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ADJUSTABLE CLAMPING TOOL

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This invention relates to adjustable clamping tools of the type having a pair of clamping members relatively movable toward and away from each other, one member being slidable in order quickly to engage the work and thereafter by a screw action afford the usual adjustment for securely tightening members against the work.

An object is to produce a clamping tool of the above character which can be readily and conveniently manipulated so that by turning a handle in one direction clamping members are adjusted toward the work in the usual manner but by a slight turning movement in the opposite direction the members are free to slide toward or away from the work thus enabling the work to be quickly clamped or as quickly released.

Another object is to produce a clamp which can be slid toward or away from the work but can be adjusted for screw operation by the usual turning movement in a tightening direction and can be readily released from screw operation by a slight turning movement in a reverse direction, the action of effecting and releasing the screw action being automatic.

Other objects reside in details of construction, arrangement and operation hereinafter described and, for purposes of illustration but not of limitation, embodiments of the invention are shown on the accompanying drawing in which

Figure 1 is a side elevation of a clamp, parts being broken away to show a portion of the sleeve;

Figure 2 is an enlarged sectional elevation on the line 2—2 of Figure 1;

Figure 3 is an enlarged sectional elevation on the line 3—3 of Figure 1;

Figure 4 is an enlarged sectional elevation on the line 4—4 of Figure 1;

Figure 5 is a view similar to Figure 4 showing the position of the parts after the rod has been turned slightly in the direction of the arrow;

Figure 6 is a view similar to Figure 5 showing the position of the parts when the rod has been turned in a reverse direction to align the grooves for enabling the rod to be slid one way or the other;

Figure 7 is an enlarged detail view of the spring pressed plunger;

Figure 8 is a longitudinal sectional elevation on the line 8—8 of Figure 5 with the rod broken away;

Figure 9 is a longitudinal sectional elevation on the line 9—9 of Figure 6 with the rod broken away;

Figure 10 is a fragmentary elevation of a wrench showing another embodiment;

Figure 11 is a transverse sectional elevation substantially on the line 11—11 of Figure 10; and

Figure 12 is a sectional view substantially on the line 12—12 of Figure 1.

An embodiment of the invention shown on Figures 1 to 9 comprises an adjustable clamp having a body or frame 10 formed with an integral jaw or anvil 11 at one end and a head 12 at the opposite end. Socketed in the underportion of the head 12 is a sleeve 13. Extending through the head 12 in alignment with the opening through the sleeve 13 is an opening 14 having internal screw threads 15 which extend only a part way about the opening 14 leaving diametrically opposed grooves or relieved portions 16. The sleeve 13 is also formed with internal screw threads 17 of substantially the same pitch 20 and size as the screw threads 15 so as to provide a substantially continuous screw thread along the registering openings. The screw threads 17 are so formed that limited turning movement of the sleeve 13 may be effected relative to the threads 15 with the rod in engagement with both series of threads as will hereinafter appear. Formed in the inside of the sleeve 13 are diametrically opposed grooves or relieved portions 18 of substantially the same size as the grooves 16 with which they are adapted to align when the sleeve is turned to the proper position.

Formed on the outer side of the head 12 is an arcuate slot 19 which opens onto the outside of the sleeve 13. Secured to the sleeve 13 and extending therethrough with an outer portion disposed in the slot 19 is a tube or bushing 20, the inner end of which is positioned at one side of a groove 16. Mounted within the bushing 20 is a plunger 21 which is urged inwardly by a coil spring 22. Projecting outwardly from the plunger 21 is a stem 23 having a beveled surface 24. As clearly indicated in Figures 4 to 7, the stem 23 projects into the path of turning movement of the rod as will hereinafter appear. The bushing 20 limits the turning movement of the sleeve 13 in one direction or the other and when in the position shown in Figure 5, the grooves 18 and 16 are out of alignment but when the bushing 20 is in the opposite end of the slot 19 or in the position shown in Figure 6, the grooves 16 and 18 are in alignment.

Extending through the screw-threaded openings of the head 12 and bushing 13 is a rod 25 which has a handle 26 at the outer end and a

swivelly mounted foot 27 at the opposite end for cooperating with the anvil or clamping member 11 for clamping the work W therebetween. As indicated in Figure 2, the rod 25 is round and formed in diametrically opposed relation with two longitudinal rows of screw threads 28 of the proper size and pitch to engage the screw threads 15 and 17 of the head 12 and sleeve 13 respectively.

In operation when the rod 25 is turned in a counterclockwise direction (Figures 4 to 6), the teeth in one row 28 engage the unbeveled side of the stem 23 and positively turn the sleeve to the position shown in Figure 6 in which position, as above indicated, the pairs of grooves 16 and 18 are in alignment. This enables the rod 25 to be slidably moved toward or away from the work W. Assuming that the rod 25 has been moved into engagement with the work W, then by turning the rod 25 in a clockwise direction, the frictional engagement between the rod 25 and the stem 23 will be sufficient to cause the sleeve 13 to turn in a clockwise direction until the bushing or sleeve 20 is brought into engagement with the opposite end of the slot 19. Continued turning movement of the rod 25 in the same direction will force the foot 27 into more intimate engagement with the work W, the pin or stem 23 yielding or being forced inwardly by engagement of the threads 28 with the beveled side 24 of the pin or stem 23. Thus, the rod can be turned in the usual manner to tighten the clamp against the work but as above indicated a partial turning of the rod 25 in the opposite direction, which movement is limited by engagement of the sleeve or bushing 20 with the opposite end of the slot 19, enables the rod to be abruptly slid away from the work. Attention is drawn to Figures 8 and 9, the former showing the position of the sleeve relative to the internal threads 15 of the head 12 and showing the grooved portions 16 and 18 out of alignment whereas Figure 9 shows the grooved portions 16 and 18 in alignment.

In the embodiment of the invention shown on Figures 10 to 12, a wrench is provided having a relatively stationary clamping member 30 integral with the longitudinal bar 31 on the inner longitudinal side of which are formed a row of screw threads 32. Slidable along the bar 31 is a relatively movable clamping member 33 formed with a lateral opening 34 in which are disposed a pair of externally screw-threaded adjusting members 35 and 36 rotatably mounted on a pin 37 carried by the clamping member 33. The members 35 and 36 threadedly engage the threads 32 on the bar 31 and when these members are rotated together the clamping member 33 is adjusted toward or away from the member 30 depending upon the direction of rotation. Each of the screw-threaded members 35 and 36 is formed with a grooved or relieved portion 38 which portions, when brought into alignment with each other, bridge over the screw threads 32 and enable the clamping member 33 to be slid along the bar 31 toward or away from the clamping member 30. As indicated in Figures 10 and 11, the screw-threaded members 35 and 36 are formed respectively with cutout portions 39 and 40 which enable these members to have limited rotative movements relative to each other, such movements being sufficient to bring the grooved or relieved surfaces 38 into and out of registra-

tion for the purpose above indicated. Thus, the clamping member 33 can be abruptly moved toward and away from the clamping member 30 and when adjusted to the desired position by imparting the relative movement between the screw-threaded members 35 and 36 and thereafter turning these members simultaneously, the clamping member 33 can be tightened against the work or adjusted closer to the clamping member 30.

Although I have shown and described embodiments of my invention as applied to C clamps and wrenches, it is to be understood that the invention has much wider application. For example, it can be embodied in various kinds of adjustable clamp tools and is admirably adapted for surgical instruments, calipers, pliers, jigs and fixtures, and other tools of similar nature. The above description is given by way of illustration and numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention especially as defined in the appended claims.

What I claim is:

1. An adjustable clamp comprising a frame having a fixed arm and a head, a sleeve socketed in said head, said head and sleeve having interior screw threads adapted to be aligned with each other to provide a continuous threaded portion and longitudinal grooves adapted to register with each other, a rod having mutilated threads engaging the threads on said head and sleeve when the grooves are not in registration, said rod being adapted to slide relative to said head when the grooves are in alignment with the threaded portion of the rod, and means operable upon turning of said rod in one direction or the other to impart limited turning movements to the sleeve to bring said grooves into or out of alignment respectively.

2. An adjustable clamp comprising a support having internal screw threads and opposed longitudinal relieved portions, a sleeve carried by said support having internal screw threads and longitudinal relieved portions adapted to be aligned with the relieved portions in the support, a rod having a pair of opposed longitudinal rows of screw threads meshing with the threads in the support and sleeve when the relieved portions in said support and sleeves are not in alignment, said rod being slidable longitudinally when said relieved portions are aligned with the rows of screw threads, and means for turning said sleeve to bring said relieved portions into and out of alignment.

3. An adjustable clamp comprising a frame having internal screw threads, a sleeve mounted in said frame for turning movements and having similar screw threads, said frame and sleeve each having diametrically opposed longitudinal grooves adapted to be moved into and out of registration upon turning of the sleeve, a rod having oppositely disposed longitudinal rows of screw threads meshing with the threads in the frame and sleeve when said grooves are not in alignment and slidable relatively thereto when said grooves are brought into registration with said grooves, and a spring-tensioned pin carried by said sleeve and engaging said rod for turning the sleeve in one direction or the other upon corresponding rotation of said rod.

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