

March 10, 1936.

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2,033,303

JIG CLAMPING DEVICE

Filed Oct. 4, 1933

2 Sheets-Sheet 1

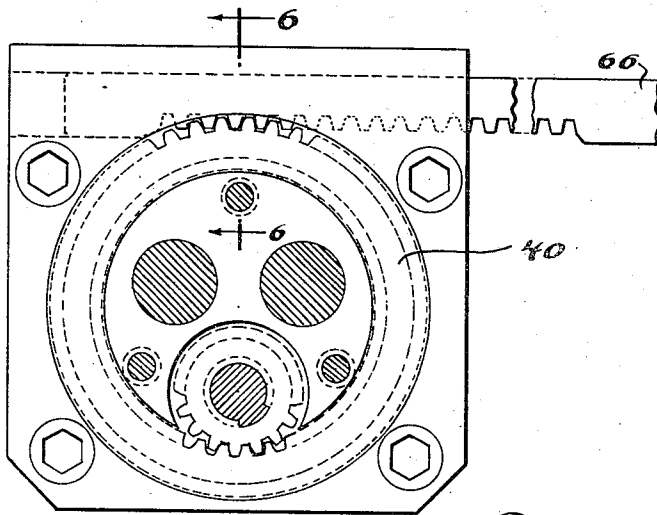


Fig. 5

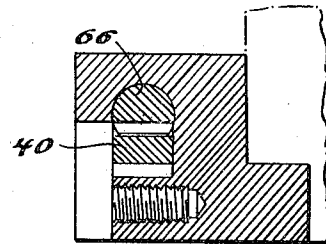


Fig. 6

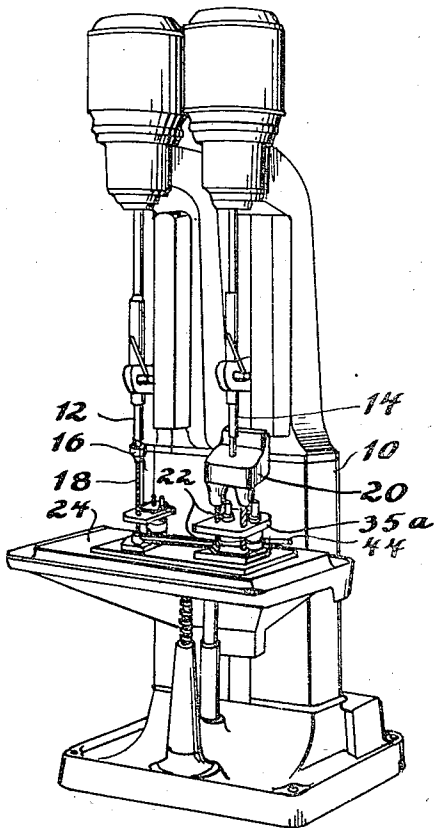


Fig. 1

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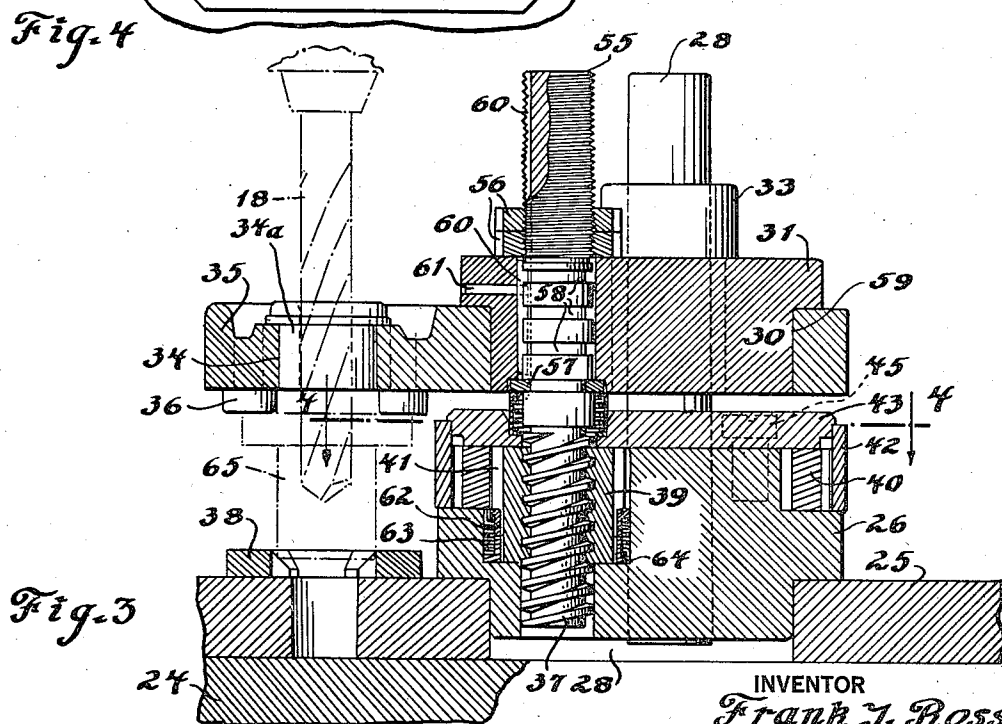
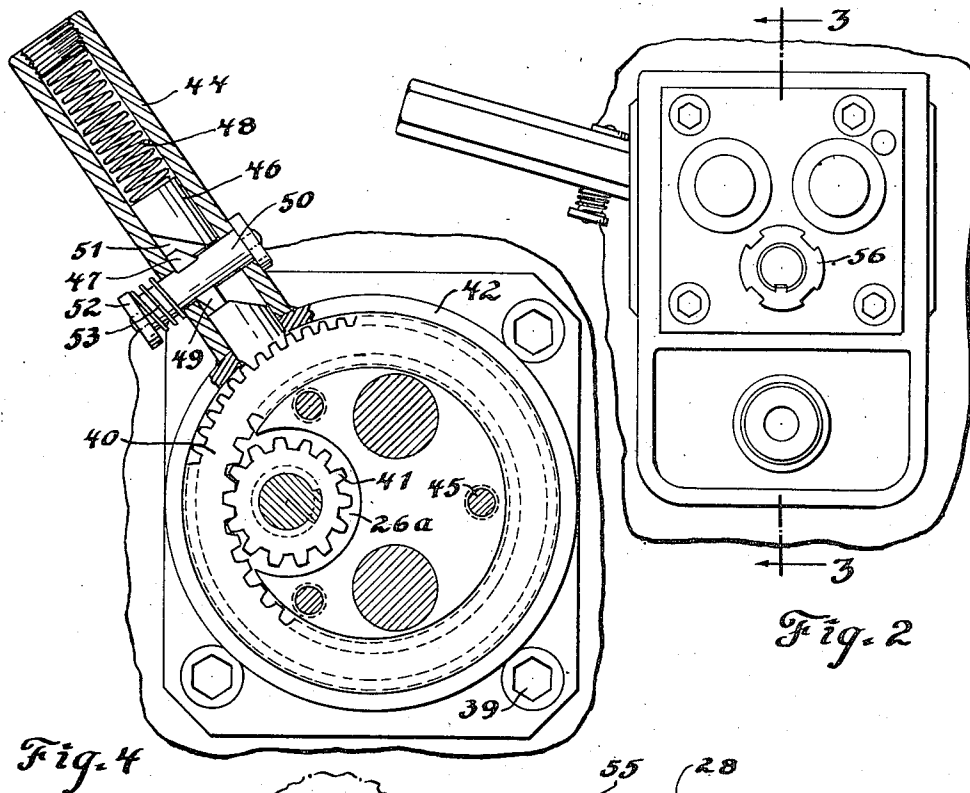
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2 Sheets-Sheet 2



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JIG CLAMPING DEVICE

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Application October 4, 1933, Serial No. 692,111

4 Claims. (Cl. 77-62)

This invention relates to fixture locks, of the sort used upon machine tools for positioning the work upon the bed or other work supporting portions of the machines while the work is being performed thereupon. An important object of the invention is the provision of a fixture lock which enables more positive and secure clamping of the work than has been possible with the constructions heretofore used, and the parts of which are so arranged that neither the operating handle nor any other portions of the clamping apparatus can interfere with the work. This feature will be appreciated by those familiar with the art as highly advantageous, inasmuch as the handles of fixture locks of the varieties now in common use are so located that they frequently interfere with proper positioning of the work; or the work prevents proper operation of the lock handle.

Another important object is the provision of improved fixture locks which may be installed in very close relation to each other, for use in conjunction with multiple or ganged tools, for example, and whereby also a plurality of locks may be operated by a single actuating mechanism if desired.

Other objects and advantages will be apparent from the following description, wherein reference is made to the accompanying drawings illustrating preferred embodiments of my invention, and wherein similar reference numerals designate similar parts throughout the several views:

In the drawings:

Figure 1 is a perspective view of a drill press provided with fixture locks incorporating the principles of this invention;

Figure 2 is a top plan view of one of my improved fixture locks;

Figure 3 is a vertical section taken substantially on the line 3-3 of Figure 2 and looking in the direction of the arrows;

Figure 4 is a horizontal section taken substantially on the line 4-4 of Figure 3 and looking in the direction of the arrows;

Figure 5 is a horizontal section, similar to Figure 3, of a somewhat modified embodiment, and

Figure 6 is a detailed vertical section taken substantially on the line 6-6 of Figure 5 and looking in the direction of the arrows.

Referring now to the drawings, reference character 10 designates generally a drill press, shown as of conventional construction and provided with two spindles 12 and 14, the former spindle carrying as by means of chuck 16 a drill 18, while spindle 14 is arranged to operate a double drill head 20 and so drive the two drills 22.

Upon the bed 24 of the press may be arranged one or more of my improved fixture locks. The lock mechanism includes a bed 25, secured to the bed of the machine in any suitable manner, as by clamps or bolts 27. The base portion 26 of the lock may, as best shown in Figure 3, be formed to partly fit within and be located by an aperture 28 in the bed 25. The body 26 is shown secured to the bed by cap screws 29. Rigidly carried by and projecting upwardly from the base 26 are pilot pins or posts as 28, upon which the clamping head 30 is vertically slidable, the slide apertures 33a in the head being preferably elongated by boss portions 33. The head is shown as rectangular and provided with an overhanging flange 31 beneath which and encircling the body of the head is a jaw member 35, secured thereto by cap screws 31a. Rigidly carried by the head, although adjustable in a manner presently to be described, is a vertical screw shaft 37 extending downwardly into the base, through which it passes freely save for its engagement with the adjusting or actuating nut 39, which is threaded upon the screw shaft and rotatable in but prevented from vertical movement relatively to the base. The member 39 also constitutes a spur gear, a toothed section as 41 being shown integrally formed upon its periphery and meshing with the internal teeth of a ring gear 40, which is toothed both internally and externally. The ring gear is directly journaled on the round outer surface of the reduced upper portion of the base 26. As best shown in Figure 4, the chamber 26a in the base in which member 39 is housed is open at the surface of the base upon one side, and the toothed section 41, projects therefrom into mesh with the ring gear 40. A metal ring or band 42 loosely encircles the gear 40 and carries at one point a radially projecting handle 44.

As best shown in Figure 4 the handle 44 is of hollow construction and a pawl 46 is readily slidable therewithin and urged against the outer teeth of the ring gear 40 by a spring 48 trapped behind it. The inner end of the pawl is toothed to mesh with the outer ring gear teeth, and the entire pawl may be so moved that its toothed section is urged against and retracted from the ring gear by means of cams 47-49 carried by a laterally slidable rod 50 terminating in a button 52 constituting a finger piece by which the cams may be shifted. A selectively formed slot 51 in the pawl is engageable by the cams, and as clearly shown in Figure 4 the slot and cams so interact that by movement of the finger piece the pawl may be moved into and out of engage-

ment with the ring gear teeth. When the button-like head 52 of the finger piece is depressed, the cam 47, acting against the angular rear face of the slot in pawl 46, moves the pawl clear of the ring gear teeth, while when the finger piece is allowed to move in the opposite direction under the influence of the spring 53, this spring, acting through cam 49, and the spring 48, combine to urge the pawl teeth into engagement with those of the ring gear, and to lock them in engagement when cam 49 reaches a point behind the straight transverse portion of the slot with which it is shown in engagement.

A shouldered cap 43 serves to position the gears 39—40 and handle ring 42, as well as form end bearings for these parts and complete the top of the base 26, being shown held in place by screws 45.

For adjusting the initial position of the screw shaft 37 relatively to the head 30, to change the capacity of the lock, the upper extremity of the shaft may be threaded as at 55 and provided with lock nuts as 56 which may be tightened against the top of head 31, while an opposing abutment carried by the screw shaft and engageable with the bottom of the head is formed by a split resilient ring 57 engaging in but projecting from one of a plurality of circumferential slots 58 in the shaft. It will be seen that by expanding the ring 57 and moving it to different grooves, the relative height of the head 30 for a given position of the actuating nut 39 may be varied to suit different requirements.

A key as 60 extends longitudinally of the upper portion of the screw shaft, and interfits with a key slot formed therein. The key may be locked in place by a pin 61 carried by the head and extending thereinto. The key will be seen to prevent accidental turning of the screw shaft during the tightening of the nuts 56. The jaw 35 may be apertured as at 34 for passage of a drill or other tool therethrough, a conventional bushing as 34a may be installed therein. Work-engaging and centering members as 36—38 may be carried by the jaw 35 and bed 25 respectively to engage and properly hold the work, which is shown in dotted lines and designated 65.

It will be seen that when the button 52 is released so that the pawl is locked in engagement with the outer teeth of the ring gear, moving the handle 44 in either direction results in turning the gear 39 upon the screw 37, and so raising or lowering the head. When the finger piece is depressed and the pawl retracted, on the other hand, the handle may be moved freely without moving the ring gear, thereby enabling free movement of the handle to a new starting position. Frictional drag is preferably imposed upon the gear 39 to prevent accidental turning of that gear while the pawl is retracted. The friction means may comprise a pair of flanged rings as 62 secured upon the hub of the combined gear and nut member 39 and having an expanding spring 63 trapped between them. The ends of the spring are turned into suitable apertures or slots as 64 in the rings, in which they fit loosely enough to permit the spring to expand into engagement with the wall of the cylindrical gear chamber 26a, although turning the gear, as by operation of the handle, will be seen to tend to wrap the spring and so reduce the friction.

As best shown in Figure 5, in place of the ring 42 and handle 44, the outer teeth of the ring gear 40 may be arranged to mesh with other suitable driving mechanism such as the rack 66, which

may if desired drive any number of other similar units as well. Obviously the rack may be driven by any suitable means, and any desired number of units may be driven by suitable interconnected rack and gearing arrangements. The locks may moreover be fitted closely together without interference, whether they be individually operable by separate handles or ganged. As also shown in Figure 1, the upper jaw may be provided with a plurality of drill holes, one therein shown and designated 35a being provided with two. The jaws, as will be readily appreciated, may be of any desired length and form.

It will also be seen that the operating mechanism including the guide posts and gearing, is formed as a unit independent of the work-engaging fixture bed and jaw portions 25—35, and that different beds and jaws may be easily substituted to enable securing entirely different work to the machine by the same clamping means. The apertures 28—59 in the bed and jaw may be standardized to enable ready interchange of these parts, and it will be understood that not only may one clamping mechanism be made to serve many fixture portions in this way, but that the work-holding portions of a machine may be changed very quickly and simply, and that moreover the fixture portions may be economically preserved to enable again performing the same work at a future date upon the machine whenever desired. This is of course not economically practicable with present constructions because of the expensive nature of the parts which would have to be preserved.

While it will be apparent that the illustrated embodiments of my invention herein disclosed are well calculated to adequately fulfill the objects and advantages primarily stated, it is to be understood that the invention is susceptible to variation, modification and change within the spirit and scope of the subjoined claims.

What I claim is:

1. In a clamping device, a fixed supporting body element, and a head element movable relatively thereto, and means for moving the head element including a screw shaft fixably carried by the head element and projecting into the body element, interfitted guide portions for said head and body elements separate from said screw shaft, an actuating nut rotatably arranged upon the screw shaft within the body element and having a gear toothed periphery, an internally toothed ring gear meshing therewith and also encircling and axially immovable relatively to the body element and rotatable about an axis parallel to but spaced from that of the screw shaft, and means including a handle adapted to be coupled to the ring gear to turn the same and also independently swingable about the axis thereof.

2. In a clamping device, a fixed body portion, a clamping portion movable toward and from the body portion, means including a screw carried by one of said portions and movably projecting into the other for moving one relatively to the other, and means for rigidly but adjustably fixing the screw in position relatively to said portions by which it is carried, including a threaded portion carried by the shaft, a jam nut fitted thereon, an abutment member also carried by said shaft and spaced from the jam nut, means for fixing the abutment member in any of various positions along the shaft, the shaft projecting through the portion to which it is fixable, the abutment and jam nut being arranged upon opposite sides thereof, and keying means for preventing unde-

sired rotation of the shaft when the jam nut is loosened.

5 3. In a clamping device, a fixed body element, a clamping element movable toward and from the body element, means including an interfitting screw and nut carried one by the body element and the other by the clamping element for moving one relatively to the other, a jaw carried by each element, means for turning the nut relatively to the screw, including a gear connected to the nut, a ring gear having internal teeth

meshing with said first mentioned gear and encircling and axially immovable with relation to one of said elements and lying within the extended planes of the jaws, and means adjustably connectable with said ring gear for turning the same. 5

4. A clamping device as set forth in claim 1 including a jaw carried by each element and in which the ring gear lies between the extended planes of said jaws. 10

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