

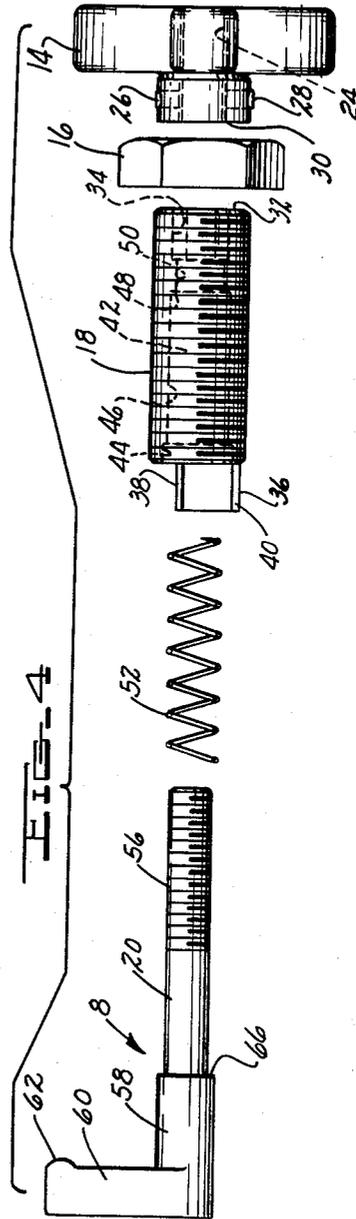
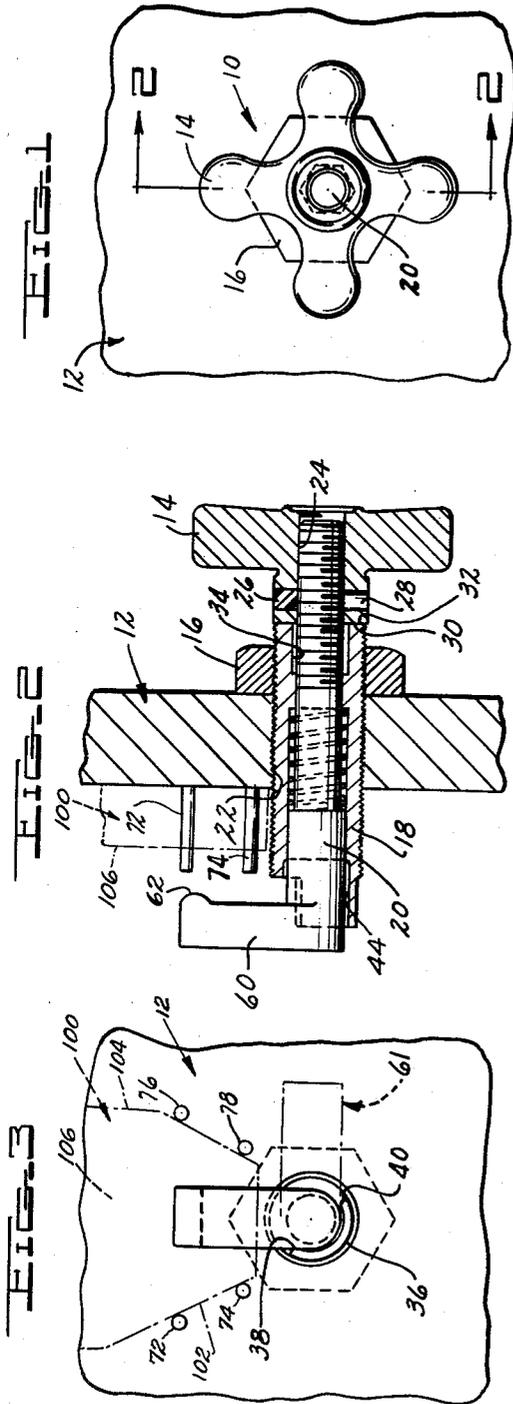
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BLIND CLAMPING DEVICE

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BLIND CLAMPING DEVICE

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The present invention relates to the new and useful improvements in clamping devices and more particularly to a blind mounted clamping device associated with positioning means.

Throughout the years, blind clamping has presented a serious problem to the tool and metal working industry. Materials and unfinished parts worth thousands of dollars are deposited in scrap bins each year because of the inadequacy of the existing clamping means.

It is therefore a principal object of the present invention to provide an efficient, inexpensive blind clamping device that will make possible the elimination of a large portion of today's scrap, which results from the use of inefficient clamping devices now on the market.

Another object of the present invention is the provision of a device which is not only simple and positive in action, but adjustable to receive and hold securely a large variety of parts which have a wide range of size and thickness.

Still another object of this invention is the provision of a clamp which can be manufactured, installed and adjusted with a minimum amount of time and expense.

Another object of this invention is a provision of a blind clamping device which is of such proportions that it can be used in blind spots, otherwise inaccessible.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawings:

FIG. 1 represents a front elevational view of the blind clamping means embodying the present invention.

FIG. 2 is a cross-sectional view partially in elevation taken along line 2—2 of FIG. 1.

FIG. 3 is an end elevational view of FIG. 2.

FIG. 4 is an exploded elevational view illustrating the five parts of the present invention.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

FIG. 1 represents the blind clamping device 10 mounted on a fixture 12. A knob 14 is provided for rotating shaft 20 while a nut 16 on the threaded bushings is provided for locking the bushing 18 to fixture 12.

Referring now to FIG. 2, the fixture 12 to which a workpiece 100 is to be clamped has a threaded opening 22 therein which is adapted to receive the threaded cylindrical bushing 18. When the bushing 18 is properly positioned, lock nut 16 is secured against the surface of fixture 12 and the device is ready for use.

Looking now at FIG. 4, it is noted that the present invention is comprised generally of five parts. The knob 14 has a central threaded opening 24 extending axially thereof. Intersecting said threaded opening are two friction inserts 26 and 28 located in a transverse aperture in the knob intersecting the threaded axial opening, the inserts frictionally engaging the shaft 20 so that rotation of

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the knob will rotate the shaft. The end surface 30 of knob 14 is square with the axial threaded portion 24.

The threaded cylindrical bushing 18 has a central opening 42 therethrough which is adapted to receive the shaft member 20. The right end 32 of the bushing is square with the axial opening 42 and has a hexagon socket portion 34 depressed below the surface thereof. The hexagon socket portion 34 provides a means for adjusting the threaded bushing in fixture 12 before assembly. On the left hand end of the bushing 18, is a reduced diameter portion 36 which is cut away to form stops 38 and 40. These stops are for limiting movement of the clamping device. The central opening 42 extends coaxially of said threaded bushing 18 and has three distinct diameters. The largest diameter 44 is located at the extreme left hand end and provides clearance for the clamp means. The next portion 46 is of slightly less diameter so as to produce a spring seat 48 at the end thereof. The smallest diameter 50 is intermediate the socket portion 34 and spring seat 48 and provides a surface to guide the shaft 20.

The actuating spring 52 is a conventional helical spring of round, square, etc. wire and has an inside diameter slightly larger than shaft 20, while the outside diameter is slightly less than 46.

The clamping means 8 is L-shaped and comprises a cylindrical shaft 20 threaded on one end at 56. An enlarged portion 58 on the opposite end of shaft 20 is of the same outside diameter as the inside diameter 46 in the cylindrical bushing. The enlarged portion 58 on shaft 20 is adapted to be piloted in counterbore 46. Integral with and extending at right angles to said enlarged portion 58 is the L-shaped finger member 60 which forms the clamping means. Finger 60 has an arcuate end section 62 adapted to grip a workpiece 100.

Spring 52 is assembled over shaft 20 and is inserted into the threaded bushing 18, with one end of spring 52 seating against spring seat 48, while the other end seats against spring seat 66 located at the intersection of shaft 20 with the enlarged end portion 58 of the clamping means.

This assembly takes place after the threaded bushing 18 has been positioned in fixture 12. The threaded bushing 18 is rotated to the proper position by insertion of a socket wrench (not shown) into socket head 34 of the bushing and rotating the wrench until the desired position is reached. Lock nut 16 is then secured to the face of the fixture 12 to prevent removal therefrom. When the internally threaded knob 14 is threaded over the end of the threaded portion 56 of shaft 20 extending beyond the right end of the bushing, the clamping finger 60 will be drawn toward the knob until the finger 60 is positioned in the arcuate end stop portion 36 of the threaded bushing. With the finger so positioned friction inserts 26 and 28 by frictional contact with the shaft 20 cause rotation of the knob to impart rotation to the shaft and finger 60 between the stops 38 and 60. However, after the finger has engaged the stops so that shaft 20 can no longer rotate, further rotation of the knob will overcome the friction force between friction inserts 26 and 28 and the shaft so that the threaded knob rotates with respect to the threaded shaft to thereby effect axial movement of member 8. Workpiece 100 is moved to the position shown in FIGS. 2 and 3 while the finger is located in the position shown in phantom lines in FIG. 3 against stop 40. Thereafter the knob is rotated to rotate finger 60 against stop 38 and over the workpiece to the upright position shown in full lines in FIG. 3. Further rotation of the knob overcomes the friction between the friction inserts and the shaft to move the finger piece axially to the right against the workpiece to clamp the workpiece between the finger and the fixture 12. Rotation of knob

14 in the opposite direction loosens the clamped part and upon release of the workpiece the frictional members 26 and 28 again cause the finger member 60 to be rotated in the opposite direction to the horizontal position 61 (in phantom line in FIG. 3). Finger 60 then engages stop 40 to provide clearance and permit removal of workpiece 100 and entrance of the next successive workpiece. Locating pins 72, 74, 76 and 78 are positioned in fixture 12 to accurately position the workpiece being clamped.

The locating pins 72, 74, 76 and 78 may be positioned on the fixture 12 in any desired position. In each instance, the pins are positioned with respect to the shape of the member clamped. The flat workpiece 100 which is clamped in the present instance, is of irregular shape. However, each of the flat edges 102 and 104 of the workpiece 100 engage the locating pins 72, 74, 76 and 78. The workpiece 100 is clamped by clockwise rotation of handle 14 as aforesaid. Thus, rotation of the handle 14 moves finger 60 off of stop 40 and into engagement with stop 38. As clockwise rotation continues, the radial end 62 of the finger 60 engages the outside flat surface 106 of workpiece 100, thereby securing the part to the fixture.

To release the part, the reverse action takes place. The friction members causes the finger 60 to move off of the stop 38 and into engagement with stop 40 with counter-clockwise rotation of the handle 14.

Having thus described my invention, I claim:

1. In a clamping device, the combination of a bushing adapted to be mounted to a fixture; a coaxial passage through said bushing; clamping means extending through said passage; said clamping means adapted to be moved axially in said passage to clamp a workpiece intermediate its end and said fixture; rotatable means secured to said clamping means for rotating said clamping means upon rotation of said rotatable means; and stop means limiting rotation of said clamping means to thereby effect axial movement of said clamping means to clamp said workpiece as aforesaid upon further rotation of said rotatable means.

2. A device according to claim 1, said clamping means being rotated against a part of said stop means and axially moved to clamping position as aforesaid by rotation of said rotatable means in one direction, rotation of said rotatable means in an opposite direction effecting rotation of said clamping means in an opposite direction against another part of such stop means and effecting movement of said clamping means axially in a direction opposite from the direction of said axial movement to clamping position, to release said workpiece.

3. A device according to claim 2, said clamping device comprising an L-shaped member, one leg of which comprises a shaft rotatably and reciprocally received in said passage and the other leg of which comprises a clamping finger to clamp said workpiece as aforesaid, said stop means comprising a cut away end portion of said bushing having a pair of longitudinally extending edges forming said parts of said stop means and between which said finger is adapted to rotate by rotation of said rotatable means, the end of said one leg opposite from said clamping finger protruding beyond the other end of said bushing, being threaded and having threaded thereto said rotatable means, said rotatable means comprising a knob having friction means for frictionally engaging said one leg to transmit rotation of said knob to rotation of said shaft between said edges of said cut away portion forming said stop means, whereupon further rotation of said knob effects axial movement of said shaft against the friction force of said friction means.

4. A device according to claim 3, including a spring acting between said clamping means and said bushing to

urge said clamping means in said opposite axial direction, said bushing extending through said fixture with said clamping finger located at one side of said fixture and said knob located on the other side.

5. In a clamping device, the combination of a threaded cylindrical bushing adapted to be mounted to a fixture; a coaxial passage through said threaded bushing; a cut away section forming a stop located on an end of said bushing; an L-shaped clamp member; said clamp member having a threaded shaft portion received in said coaxial passage; a spring interposed between said L-shaped clamp member and said cylindrical bushing; said clamp member adapted to be moved axially in said passage to clamp a workpiece intermediate its end and said fixture; a knob affixed to said threaded shaft portion; said knob effecting rotation of said shaft portion upon rotation of said knob, said rotation of said clamp member being limited by said stop to effect axial movement of said clamp member to clamp said workpiece as aforesaid upon further rotation of said knob.

6. In a clamping device, the combination of a bushing adapted to be mounted to a fixture; a central coaxial passage through said bushing; a step in said passage; one end of said bushing having a flat surface thereon, said surface square with said coaxial passage; a socket depressed below said flat surface; the opposite end of said bushing being cut away to form a stop portion; a threaded shaft having an enlarged diameter on one end thereof, said shaft being adapted to be supported and reciprocated in said coaxial passage; clamping means on said enlarged diameter adapted to engage a workpiece intermediate said clamping means and said fixture; a spring positioned on said shaft and interposed between said clamping means and said step in said passage; a knob threadedly affixed to said threaded shaft; friction means on said knob to effect rotation of said shaft upon rotation of said knob, said rotation of said shaft being limited by said stop portion to effect axial movement of said shaft and clamping means upon further rotation of said knob.

7. In a clamping means for use on a fixture, the combination of a threaded cylindrical bushing; a central coaxial passage through said threaded bushing; parallel end surfaces on said bushing and perpendicular to said central passage therethrough; a hexagon socket portion depressed in an end of said bushing and coaxial with said central passage; stop means on the opposite end of said bushing; an L-shaped clamp means; said clamp means having a threaded shaft portion; a spring interposed between said L-shaped means and said cylindrical bushing; locking means for positioning said threaded bushing on a fixture; a knob affixed to said threaded shaft portion; rotation of said knob being effective to move said shaft portion axially to clamp a workpiece intermediate an end of said L-shaped clamp means and said fixture; said knob having friction means therein to effect rotation of said shaft portion with said knob upon rotation of said knob, said rotation of said shaft portion being limited by said stop means to effect said axial movement of said shaft portion against the friction force of said friction means upon further rotation of said knob.

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