March 19, 1946. C. D. BURBANK ET AL 2,396,823

PRESSURE UNIT

Original Filed May 25, 1942

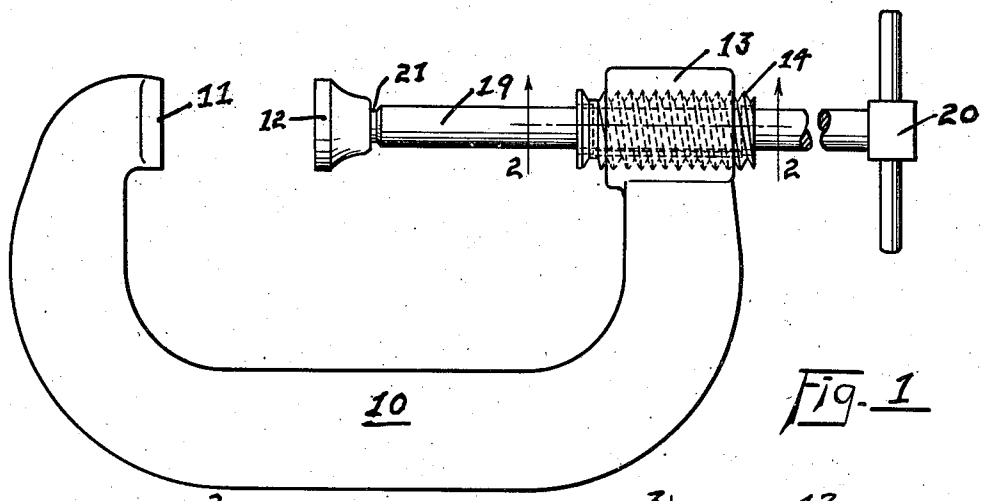


Fig. 1

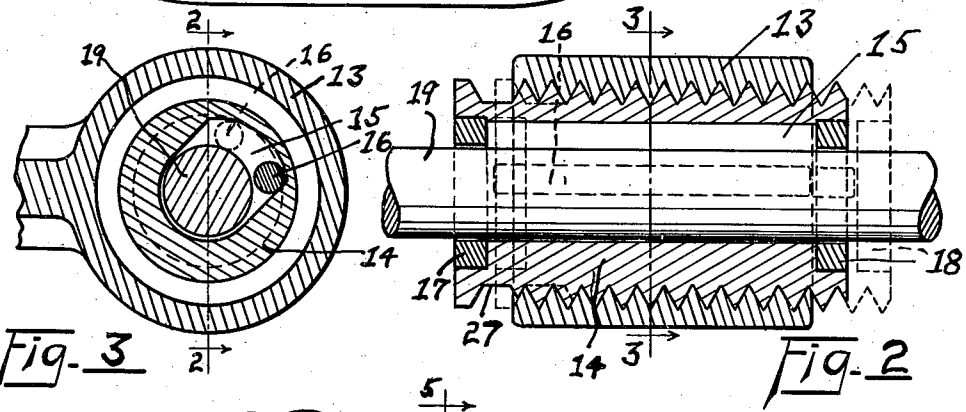


Fig. 3

Fig. 2

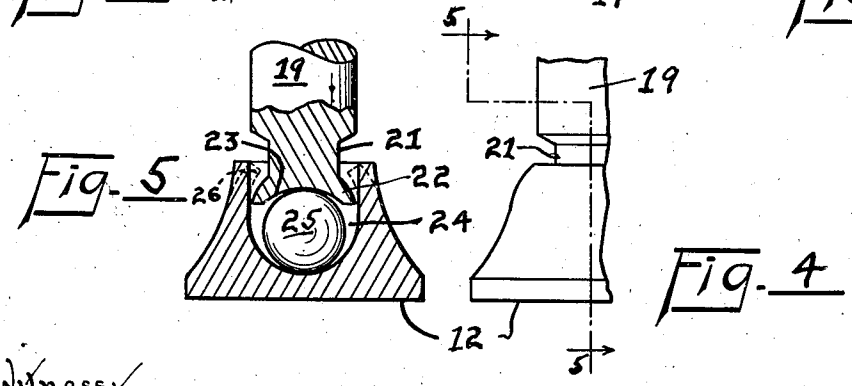


Fig. 5

Fig. 4

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2,396,823

PRESSURE UNIT

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Substituted for abandoned application Serial No. 444,356, May 25, 1942. This application August 30, 1945, Serial No. 613,576

1 Claim. (Cl. 74—424.8)

The present invention relates to pressure units and more particularly to quickly adjustable pressure clamps or vises. The device of the instant invention is in the nature of a modification of and improvement over the device illustrated and described in Patent No. 2,313,361, dated March 9, 1943, under which applicants are the exclusive licensees.

The primary objects of the present invention are to provide a pressure unit of the general character above indicated having fewer parts than are employed in the device of the co-pending application for patent above identified; to provide such a device whose pressure rod adjusting sleeve is integrally formed; to provide such a device whose pressure rod adjusting sleeve is provided with an interrupted external thread in screw threaded engagement with the internal thread of an outer sleeve whereby the movement of the adjusting sleeve is limited in one direction; to provide such a device having an improved type of pressure foot; and, to provide such a device which is convenient and efficient in use and which is reasonably economical in manufacture.

An illustrative embodiment of the invention is shown in the accompanying drawing, wherein:

Figure 1 is an elevational view of the pressure unit, here shown as in the form of a C-clamp;

Figure 2 is an enlarged sectional view thereof on line 2—2 of Figure 1 and showing the pressure rod adjusting sleeve within its outer sleeve together with the longitudinally slidable pressure rod within its adjusting sleeve;

Figure 3 is a sectional view on line 3—3 of Figure 2;

Figure 4 is an enlarged fragmentary view of the pressure foot of the device; and

Figure 5 is a sectional view thereof on line 5—5 of Figure 4.

Referring then to the drawing wherein like parts of the device shown are designated by the same numerals in the several views, the pressure unit illustrated is in the form of a C-clamp, generally designated 10, having a jaw 11 and a rotatably adjustable pressure foot 12 between which a plurality of work pieces may be quickly clamped under adjustable pressures.

The arm 13 of the C-clamp is provided with a right hand screw threaded bore within which an externally screw threaded pressure rod adjusting sleeve 14 is screw threadedly disposed.

This sleeve 14 is provided with a longitudinally disposed slot 15 eccentrically broached or cross sectionally deeper along one length than along its opposite length, all as best shown in Figure 3 and a locking roller 16 disposed within the slot 15 is retained therein by washers 17, 18 inserted within the bore of the sleeve 14 adjacent its opposite ends. The slot 15 which communicates with the bore of the inner sleeve and which is greater in depth at one end than the diameter of the locking roller 16 is of less depth at its other end than the diameter of the locking roller and it gradually tapers in depth from the larger end to the smaller end and it provides an eccentrically arranged concave gripping or clutching surface which cooperates with a pressure rod 19 to engage the locking roller and cause the same to lock the pressure rod to the inner sleeve when the rod is rotated in one direction and to free the rod when the latter is rotated in the opposite direction. The pressure rod 19 has a sliding fit in the bore of the inner sleeve and when free to move is capable of longitudinal sliding movement in the inner sleeve and also to rotary movement independently of the inner sleeve when the roller 16 is out of locking engagement with the inner sleeve and the pressure rod.

The pressure rod 19 has a cross head 20 and is longitudinally slidably embraced within the sleeve 14 and retaining washers 17, 18 and it has a reduced portion 21 flared outwardly at its extremity 22. The flared extremity of the pressure rod 19 is provided with a concave surface 23 and the pressure foot 12 having a concave well 24 within which the ball 25 is seated, is secured to the foot end of the pressure rod 19 by fingers 26 struck inwardly therefrom which spacedly embrace the reduced portion 21 of the pressure rod.

The inner end of the pressure rod adjusting sleeve 14 is provided with an interrupted external screw thread or shoulder 27 as shown, providing means for unlocking the pressure rod 19 from its adjusting sleeve 14, all as now to be presently described.

Operation

In operation, a right hand or clockwise rotation of the cross head 20, because of the contour of the broached eccentric slot 15, causes the pressure rod 19 to rotate against the locking roller 16, which in turn is caused to rotate from its position shown in full lines in Figure 3 to its position shown in dotted lines in the same view, effecting a seizure between the pressure rod 19 and its adjusting sleeve 14. Continued clockwise rotation of the cross head 20 effects a rotation of the adjusting sleeve 14 within the screw threaded bore of the arm 13 of the C-clamp 10 to secure a plurality of work pieces between the jaw 11 and rotatably adjustable pressure foot 12.

A reversed or counterclockwise rotation of the cross head 20, effects a release of the binding pressure of the locking roller 16, seized between the pressure rod 19 and its adjusting sleeve 14, when the interrupted portion of the external screw thread or shoulder 27 of the sleeve 14 fails to longer co-act with the internal screw thread of the bore within the arm 13 of the clamp 10 or when the adjusting sleeve 14 is rotated from its position shown in full lines in Figure 2 to its position shown in dotted lines in the same view, permitting a manual sliding movement of the pressure rod 19 and its presure foot 12 away from the jaw 11, thereby releasing the work pieces previously held therebetween and preparatory to the next clamping operation.

The ball 25 seated within the well 24 of the pressure foot 12 and in engagement with the concave surface 22 of the extremity of the pressure rod 19 reduces to a minimum the transfer of torsional strain upon the pressure rod 19 in instances where clamping pressures are applied, permitting the effective holding and retention of non-parallel surfaces of work pieces between the jaw 11 and pressure foot 12 since the pressure foot adapts itself to the work pieces clamped therebetween.

It will thus be seen that the pressure unit herein illustrated and described is in the nature of a modification of and improvement over the device shown and described in the above identified Patent No. 2,313,361, in that the device of the present invention is composed of fewer parts, the pressure rod adjusting sleeve is integrally formed and is provided with an interrupted external thread or shoulder for limiting its movement within the outer sleeve for releasing the seized pressure rod and permitting its longitudinal sliding movement and that an improved type of pressure foot is here provided.

While but one specific embodiment of the invention has been herein shown and described, it will be understood that certain details of the construction shown may be altered or omitted without departing from the spirit of the invention as the same is defined by the following claim.

We claim:

A clutch mechanism comprising an outer sleeve, an inner sleeve having screw-threaded engagement with the outer sleeve and movable longitudinally within the latter, the inner sleeve having a longitudinal slot therein which is confined within the cross-sectional area of the inner sleeve and which is cross-sectionally deeper along one length thereof than along its opposite length, the threads of the inner sleeve being mutilated at one end of the inner sleeve, a locking roller disposed in said slot, and a rod slidable in the inner sleeve and operable upon movement in one direction to cause a locking connection between the rod and the inner sleeve, the mutilated part of the threads of the inner sleeve permitting a release of the locking connection when the rod is moved in the opposite direction.

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