Sept. 16, 1952 E. L. RATCLIFF 2,610,662

TOGGLE ACTUATED QUICK ACTION C-CLAMP

Filed Feb. 24, 1947

FIG 1

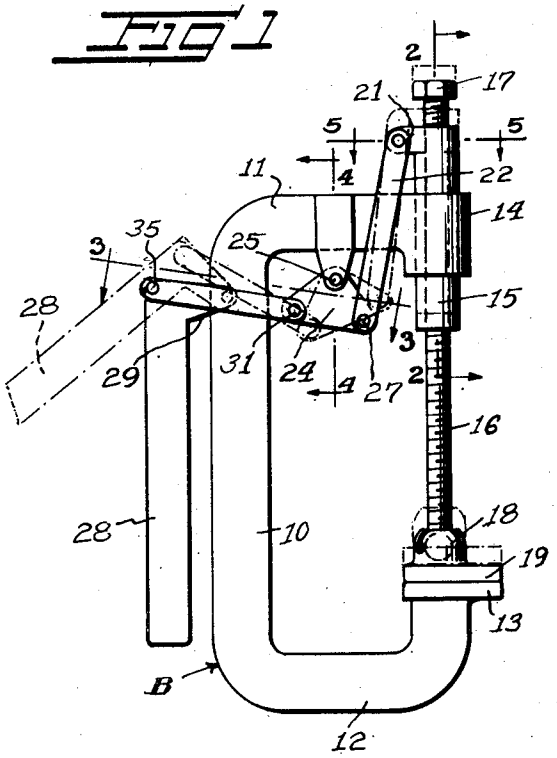


FIG 2

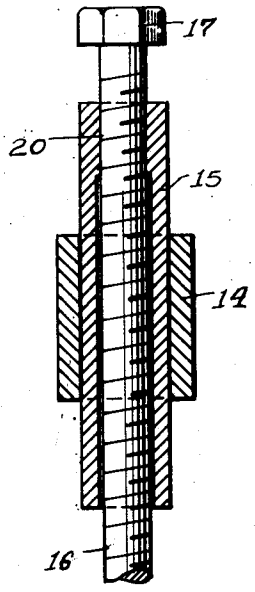


FIG 4

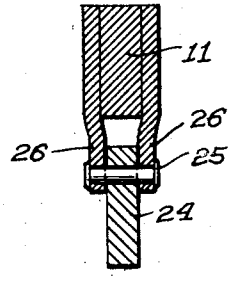


FIG 3

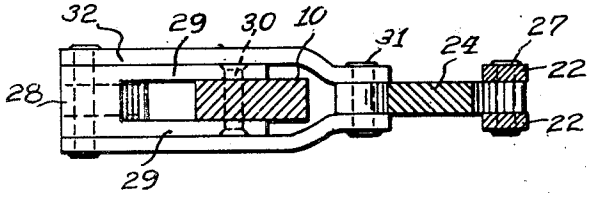
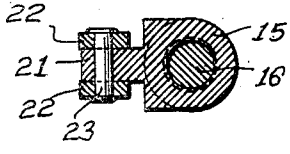


FIG 5



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TOGGLE ACTUATED QUICK ACTION C-CLAMP

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Application February 24, 1947, Serial No. 730,597

1 Claim. (Cl. 144—305)

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This invention relates generally to the class of tools and pertains particularly to improvements in clamps.

An object of the present invention is to provide an improved clamp structure having a fixed and a movable jaw, wherein the movable jaw is supported for two clamping adjustments or movements, one of said movements being under the operation of a lever and linkage connection whereby upon manipulation of the lever in one direction the jaws are locked in gripping relation with a body interposed between them.

A further object of the invention is to provide a clamp of the "C" type wherein there is a fixed jaw and a movable jaw attached to a threaded stem, the stem being threadably engaged in a sleeve which has free sliding movement in an arm of the clamp body, with means in the form of a lever pivotally attached to the body and operatively coupled through a linkage system with the sleeve, whereby the sleeve, threaded stem and movable jaw may be shifted as a unit toward the fixed jaw.

Still another object of the invention is to provide a structure of the character above set forth wherein the linkage mechanism is so constructed and arranged that upon movement of the operating lever to a predetermined position, elements of the linkage connection between the lever and the sliding sleeve will be brought into an aligned locked relation to secure the sleeve, the threaded stem and movable jaw against retrograde movement.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming a part of the specification, with the understanding, however, that the invention is not confined to a strict conformity with the showing of the drawing but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claim.

In the drawing:

Figure 1 is a view in side elevation of a clamp constructed in accordance with the present invention and showing the same closed, the movable parts being shown in broken lines, in the opened position of the clamp.

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1.

Figure 3 is a sectional view taken substantially on the line 3—3 of Figure 1.

Figure 4 is a sectional view on the line 4—4 of Figure 1.

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Figure 5 is a sectional view on the line 5—5 of Figure 1.

Referring now more particularly to the drawing the reference character B generally designates the body of the clamp which, as shown, is of the type known as a C-clamp.

The body comprises the relatively long back portion 10 which is joined at its two ends to the arms 11 and 12 which are substantially perpendicular to the back 10 and are in spaced parallel relation.

The arm 12 carries a fixed jaw or mandrel 13 and in opposed relation with this jaw and directed toward it is a cylindrical enlargement 14 integral with the free end of the arm 11 and having a bore extending axially therethrough.

Extending through and slidable in the bore in the cylindrical enlargement 14 is a relatively long sleeve 15 and extending through the sleeve 15 is an elongate screw 16 which has its outer end formed with a head 17 of polygonal form and its inner end is provided with a ball engaged in a socket 18 carried by a movable jaw 19. As shown this jaw 19 is adapted to cooperate with the fixed jaw 13 for the purpose of holding or gripping a piece of work and the two jaws may be brought into contacting relation in the manner shown.

The screw 16 is threadably engaged in the bore of the sleeve 15 as indicated at 20. Accordingly it will be seen that by rotating the screw 16, it can be shifted longitudinally through the sleeve 15 so that desired adjustments may be made between the movable jaw 19 and the fixed jaw 13.

The outer end of the sleeve 15 has formed integral therewith the pivot lug 21 which is directed toward the rear or the back of the clamp. This lug positions between two adjacent ends of two relatively long links 22 and is pivotally coupled to the links by the pivot pin 23.

The links 22 extend in the direction of the fixed jaw supporting arm 12 of the body with the arm 11 disposed between them and the opposite ends of these links are disposed upon opposite sides of one corner or angle of a triangular rock plate 24 which, as shown in Figure 1, is disposed between the two arms 11 and 12 of the clamp body.

The point or angle of the triangular plate 24 which would be the apex of the triangle, is disposed between and pivotally coupled by the pivot pin 25 with two spaced ears 26 which are joined to the arm 11 by welding or in any other suitable manner.

The connection between the inner ends of the links 22 and one base corner of the triangular rock plate 24 is by means of the pivot pin 27.

The numeral 28 designates a lever which is

disposed at the outer or rear side of the back portion 10 of the clamp. This lever at one end has the right angularly directed spaced lugs 29 which receive between them the back 10 of the body of the clamp.

The lugs 29 are pivotally secured to the part 10 of the clamp by the pivot pin 30 and this pivot for the lever is located so that a line drawn transversely of the back 10 through the pivot 30 and perpendicular to the back of the clamp will pass between the pivot 25 of the triangular rock plate and the bottom or base edge thereof.

The other base corner or angle of the rock plate 24 opposite from the corner where the pivot pin 27 is located, is connected by a pivot pin 31 with adjacent ends of two lever links 32. These lever links 32 pass on opposite sides of the lugs 29 of the lever 28 and are pivotally joined to the lever at the outer ends of the lugs 29, by the pivot pin 35. With this connection, when the lever 28 is shifted to a position where it is substantially parallel with the back portion 10 of the body of the clamp, the lever links 32 will be pulled outwardly or rearwardly so as to effect oscillation of the rock plate 24 and will also be pulled to a position where they extend across the pivot 30 for the lugs 29 of the lever, bringing this pivot together with the pivots 31 and 35 substantially into line.

In the use of the present clamp the jaws 13 and 19 are separated by swinging the lever 28 rearwardly to the broken line position in which it is shown in Figure 1. This will swing the rear ends of the lever links 32 upwardly and forwardly and effect the rocking of the plate 24 so as to move the pivot 27 toward the arm 11. This causes the sleeve 15 to be shifted outwardly away from the fixed jaw 13, carrying with it the threaded stem 16 and the movable jaw 19. If the jaws are not then sufficiently separated to receive the desired piece of work, such separation may be brought about by rotating the threaded stem 16 in the proper direction to shift it through and relative to the sleeve 15. In this way a rough adjustment may be made to facilitate placing the work between the jaws and the jaws can then be moved together to be brought into tight gripping relation with the piece of work by swinging the lever 28 back toward the back end of the body into the position in which it is shown in full lines in Figure 1. This reversely rocks the plate 24, pulling down upon the links 22 and sliding the sleeve 15 through the collar 14. When the lever links 32 are swung to a position where the pivot 35 and the pivot 31 are in a common line with each other and with the fixed pivot 30 the parts will be locked and the clamp will be secure. To prevent accidental opening of the clamp the parts may be arranged so that the center of the pivot 35 swings slightly beyond the center of the fixed pivot 30 as a result of which the strain or pull constantly

exerted on the lever links 32 will have a tendency to pull the lever 28 toward the body portion 10 of the clamp or toward closed position for the lever.

From the foregoing it will be readily seen that there is provided in the present tool a means whereby a quick rough adjustment may be made and the jaws then easily and quickly brought into clamping relation and locked in such position so as to effect a positive and strong gripping action of the jaws upon any piece of work located between them.

I claim:

In a quick-action clamp, a C-shaped body having an inturned portion at the free end of one of its arms, a cylindrical enlargement at the end of the other of the arms thereof disposed in alignment with the said inturned portion and having an axial bore extending through the same, a sleeve slidable in the said bore, a flat jaw element fixedly mounted on said inturned portion, a screw extending through the said bore and in threaded engagement with said sleeve, a head on the outer end of said screw, a flat movable jaw element cooperative with said fixed jaw, a ball and socket coupling between said movable jaw and the inner end of said screw, a toggle pivotally interconnecting said body and said sleeve including a lug projecting radially from the outer end of said sleeve, a pair of links pivoted at their outer ends to said lug and having their inner end portions extending cross wise of and at opposite sides of the said one arm, a triangular member pivotally supported at its apex from and at the inner side of the said one arm and pivotally connected at one of its corners to and between the inner ends of said links, a second pair of links pivoted at their inner ends to and at opposite sides of the remaining corner of said triangular member, said second links extending at opposite sides of the intermediate portion of said body and beyond the same, a hand lever pivoted at one end to and between the outer ends of said second links, and a pair of laterally disposed lugs offset from the pivoted end of said lever and straddled over the intermediate portion of said body.

EDWIN L. RATCLIFF.

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