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H. F. HUSTED

2,366,263

C CLAMP

Filed April 6, 1942

FIG. 1

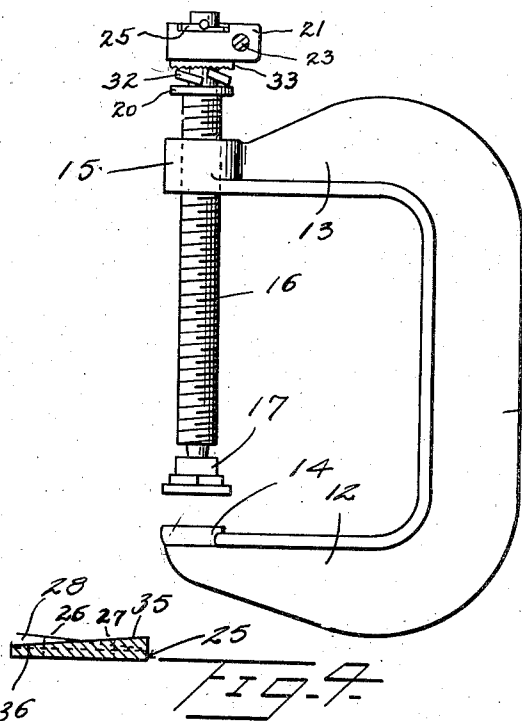


FIG. 2

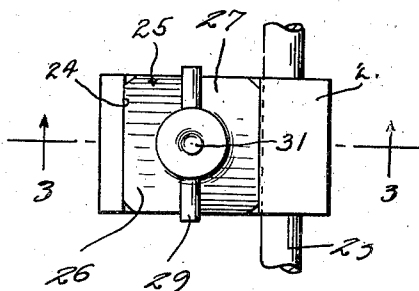


FIG. 3

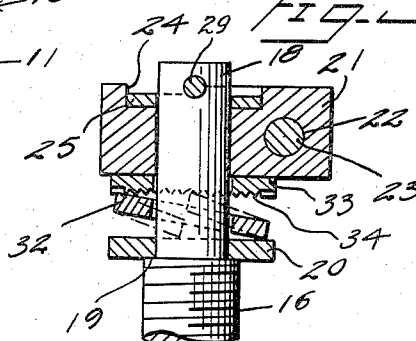


FIG. 4

FIG. 5

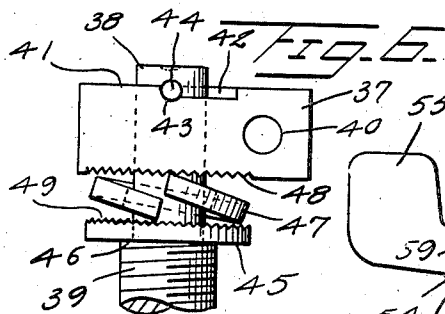


FIG. 6

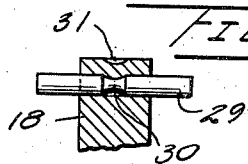


FIG. 7

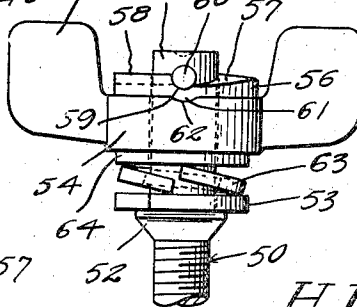
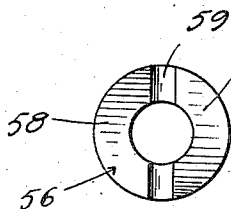


FIG. 8

Inventor

H. F. Husted

By

Kimmel & Crowell

Attorneys

UNITED STATES PATENT OFFICE

2,366,263

C CLAMP

Harry F. Husted, Shavertown, Pa.

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1 Claim. (Cl. 144—304)

This invention relates to clamps of the C type.

An object of this invention is to provide a C clamp which is so constructed that in the use thereof by a workman it will not be possible for the workman to tighten the clamp to a point where the clamp will break.

Another object of this invention is to provide in combination with a C clamp, a safety means which will permit the workman to tighten the clamp to a degree slightly less than the breaking strain of the clamp, but if additional pressure is attempted the safety head will be effective to prevent application of such additional pressure without releasing the maximum pressure permitted by the safety means.

In the use of conventional C clamps by a workman it frequently happens that a tool, such as a wrench or the like, is applied to the wings or head of the adjustable jaw, with the result that the clamp is placed under excessive pressure strains which result in twisting of the clamp, distortion or spreading of the clamp jaws, or cracking and breaking or spreading of the clamp. This results from the use of a light or small clamp for a job not intended for the particular clamp, and in addition to ruining a clamp the workman loses valuable time in obtaining a clamp suitable for the job. It is, therefore, an object of this invention to provide a C clamp which is so constructed that the workman cannot break the clamp or otherwise ruin the same by applying a tool thereto in order to clamp the articles under the desired pressure.

A further object of this invention is to provide a safety device in a clamp which is simple in construction so that it may be made at low cost and will withstand the necessary pressure strains without damage thereto or to the clamp.

A further object of this invention is to provide a safety device of this kind which will release the clamping screw from application of a predetermined maximum pressure but which will permit ready reverse turning of the clamping screw toward released position.

To the foregoing objects and to others which may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts as will be more specifically referred to and illustrated in the accompanying drawing wherein are shown embodiments of the invention, but it is to be understood that changes, variations, and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawing:

Figure 1 is a detail side elevation, partly in section, of a C clamp constructed according to an embodiment of this invention.

Figure 2 is a fragmentary top plan of the safety device mounted on the upper end of the movable jaw shaft.

Figure 3 is a sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a sectional view of the keeper embodied in this invention.

Figure 5 is a fragmentary vertical section of the locking bolt embodied with the movable jaw shaft.

Figure 6 is a fragmentary side elevation of an improved form of safety device.

Figure 7 is a fragmentary side elevation of a further modification of this invention.

Figure 8 is a plan view of the keeper plate embodied in the form of the invention shown in Figure 7.

Referring to the drawing the numeral 10 designates generally a C-shaped frame structure including a vertically disposed frame member 11, a lower right angular frame member 12 and an upper right angular frame member 13 disposed in parallel relation with the lower frame member 12. The lower frame member 12 has formed integral with the forward end thereof, a stationary or fixed jaw member 14. The upper frame member 13 has formed integral therewith a threaded boss 15 through which a threaded shaft 16 engages. The shaft 16 at its lower end, has swivelly or rotatably mounted thereon, a movable jaw 17 which confronts a stationary jaw 14.

In order to provide means whereby the tension applied to the frame 10 by clamping of an article between the two jaws 14 and 17 may be prevented beyond a predetermined point, which point is slightly less than the breaking strain of the frame 10, I have provided a safety means, to be hereinafter described, which is mounted on the upper end of the threaded shaft 16. The shaft 16, at its upper end, is formed with a smooth reduced stud 18 which forms a shoulder 19 at the upper end of the threaded portion of the shaft 16. A lower washer or annular member 20 is mounted on the stud or shaft extension 18 and rests against the shoulder 19, being tightly pressed on the stud or shaft extension 18 so that the washer 20 will thereby be held against rotation relative to the extension 18. A substantially rectangularly shaped block 21 is loosely mounted on the stud 18 and is formed with a transversely extending opening 22 through which an operating bar 23 slidably engages so that the

block or head 21 may be rotated as a unit with the shaft 16 as will be hereinafter described. The block 21 is normally held against rotation relative to said shaft as will be hereinafter described. The block 21 has formed in the upper side thereof, a transversely extending recess 24 within which a substantially square keeper plate 25 is positioned. The plate 25 is formed on the upper side thereof with an upwardly opening groove 28 extending transversely across the plate and separating the upper side into two faces 26 and 27. The faces 26 and 27 are cam faces which taper in the axial direction of said groove but their inclination is in the opposite sense. A locking pin 29 is mounted transversely through the upper end portion of the stud 18 projecting laterally thereof and engaging within the groove 28. The pin 29 is formed intermediate the ends thereof with an annular groove 30 and preferably the upper end of the stud 18 is provided with a dent 31 pressing a portion of the metal of the stud 18 into the groove 30 in order to thereby hold the pin 29 against endwise movement.

In order to provide a means whereby the keeper 25 may be held in engagement with the pin or locking bolt 29 I have provided a split resilient washer or ring 32 which engages against the washer 20. A washer 33 is interposed between the upper side of the spring ring 32 and the lower side of the block 20, and is formed in its lower face with serrations 34 so as to thereby hold the washer 33 against rotation relative to the spring 32. The provision of the oppositely inclined faces 26 and 27 provides oppositely disposed locking and releasing shoulders 35 and 36 respectively so that when the operator 23 is rotated and the shaft 16 rotated therewith, the low shoulder 36, upon application of an undue strain on the frame 10, will permit the locking pin 29 to be released from the keeper groove 28 when the shaft 16 is rotated in a clockwise or tightening direction. The provision of the high shoulders 35 opposite to the low shoulders 36, provides a means whereby the shaft 16 may subsequently be rotated in a counterclockwise or released direction to thereby release the material engaging between the two jaws 14 and 17.

Referring now to Figure 6, there is disclosed a slightly modified form of this invention wherein a block 37 is rotatably mounted on the reduced stud 38 of the threaded movable jaw carrying shaft 39. The block 37 is formed with a transversely extending opening 40 through which a handle or operator may slidably engage. The block 37 is formed on the upper side thereof with oppositely inclined keeper surfaces 41 and 42 which are separated by a transversely extending keeper groove 43. A locking pin 44, similar to the pin 29, is mounted in the stud 38 and normally engages within the keeper groove 43. The inclined faces 41 and 42 are similar in every detail to the inclined faces 26 and 27. In the present instance, however, the block 37 is hardened to the desired degree whereas in the previous modification the keeper plate 25 is hardened or suitably tempered so that the locking pin 29 will not injure the upper surface of the keeper plate 25. A washer 45 is mounted on the stud 38 and engages against the shoulder 46 formed between the lower end of the stud 38 and the upper end of the threaded shaft 39. The block 37 is spring pressed for engagement of the locking member 44 in the keeper groove 43 by means of an annular spring washer 47 which is interposed between the stationary washer 45 and the lower

side of the block 37. The lower side of the block 37 may be formed with an annular series of serrations 48 and the upper side of the washer 45 may also be formed with an annular series of serrations 49 so that the block 37 will be provided with sufficient resistance tending to hold this block 37 against rotation relative to the shaft 39. However, when undue strain is applied to the block 37 and the shaft 39, the spring washer 47 will be slightly compressed by the locking member 44 moving out of the keeper groove 43 and slidably engaging the oppositely inclined faces 41 and 42.

Referring now to Figures 7 and 8 there is disclosed a further modification of this invention which embodies a threaded shaft 50 similar to the shaft 16 and which is formed with an unthreaded upper end portion 51. An annular flange or shoulder 52 is formed integral with the shaft 50 and the extension 51 and provides a shoulder against which a lower washer 53 is adapted to engage. An annular operator 54 is rotatably mounted on the extension 51, and is formed with a pair of diametrically opposed wings 55. An annular keeper plate 56 is mounted on the shaft extension 51, and is formed with oppositely inclined faces 57 and 58. The keeper member 56 is also formed with a keeper groove 59 within which a locking bolt 60, similar to the bolt or pin 29, is adapted to normally engage. The keeper member 56 is also formed with a downwardly extending part 61, which engages in a diametrically disposed groove 62 formed in the upper side of the head or body 54 so that the keeper member 56 will be held against rotation relative to the body or head 54. The keeper member 56 is formed of highly tempered material and hardened to the desired degree so that this keeper member will not be injured during the use of the clamp. The keeper member 56 is held resiliently in engagement with the bolt 60 by means of a split resilient ring or washer 63 which is interposed between the lower washer 53 and the upper washer 64 engaging against the lower side of the body or head 54.

In the use and operation of this safety clamp the desired article or articles are interposed between the two jaws 14 and 17. The movable jaw 17 may be tightened to the desired degree by rotating the shaft 16 through the medium of the operator 23. Normally, the bolt or locking member 29 will be positioned within the groove 28 of the keeper plate 25 but when undue pressure has been applied to the frame 10, by tightening of the movable jaw 17, the bolt 29 will ride out of the keeper groove 28 and place the spring member 32 under additional tension. In this manner, the shaft 16 will be stationary whereas the block 21 will be rotated with the operator 23 about the stud 18. In order to loosen the movable jaw 17 it is only necessary to reverse the rotation of the block 21 and at this time the pin or bolt 29 will engage the high portions 35 of the keeper member 25 thereby limiting the reverse rotation of the block 21 with respect to the stud 18. By mounting the locking bolt 29 in the stud 18, through the medium of the dent 31, in the event the bolt 29 becomes broken or damaged it may readily be replaced by forcing the bolt out of the opening in the stud 18, and inserting a new bolt therein.

With a safety clamp as hereinbefore described it will not be possible for a workman to place a breaking strain on the clamp frame and if the workman uses a wrench or other tool in or-

der to rotate the block 21, additional strain applied to the frame 10 by the tool will not break or bend the frame 10, due to the release of the block 21 from the shaft 16 after a substantially breaking strain has been applied to the frame 10.

This safety clamp is of simple construction so that it can be manufactured and produced at low cost and will effect a very material saving in tools used in a shop, as the safety device will eliminate any breaking of the clamp on the part of the workman.

What I claim is:

In a clamp, a frame, including a stationary jaw, a threaded shaft in said frame, a movable jaw carried by one end of said shaft, and an operator slidably mounted on said shaft for rotating the same, means whereby said operator may be released from said shaft for rotation thereabout when said movable jaw has been placed under predetermined pressure, said means comprising an annular plate slidably mounted on said shaft, cooperating means on said plate and on said operator for releasably but non-rotatably connecting said plate to the top of said operator, said plate having on the upper, or free, side thereof an upwardly opening groove extending

diametrically across the plate and separating said upper side into two faces, said faces sloping axially of said groove, their inclination being opposite in direction so as to provide opposed shoulders on alternate sides adjacent the ends of said groove, a pin above said plate extending diametrically through said shaft and projecting laterally therefrom, and spring means mounted on said shaft, one end thereof abutting against a shoulder on said shaft and the other end bearing against the bottom of said operator whereby to normally hold the projecting ends of said pin in the groove of said plate until a predetermined pressure between said movable and stationary jaws has been reached, further pressure applied to the operator in the clamping direction effecting the unseating of the ends of said pin from said groove and the rotation of said plate and operator relative to said shaft with the ends of said pin sliding up said sloping faces, while rotation of the operator in the clamp releasing direction causing said shoulders to abut against the ends of said pin, thereby to turn the shaft to release the movable jaw of the clamp.

HARRY F. HUSTED.