March 2, 1948. J. J. SENDOYKAS 2,436,941

TOGGLE CLAMP

Filed March 28, 1945

FIG. 1.

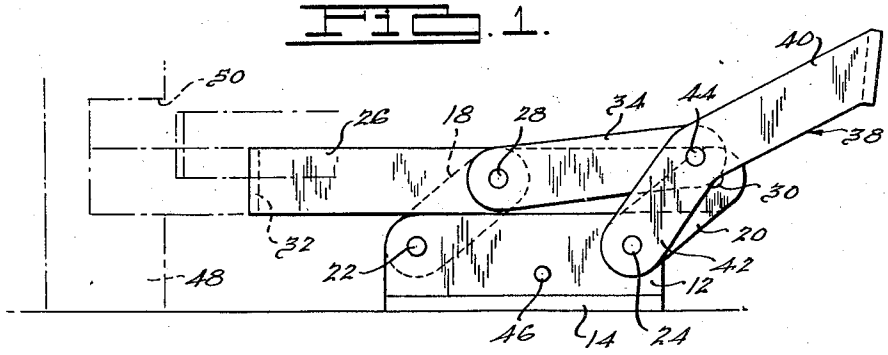


FIG. 2.

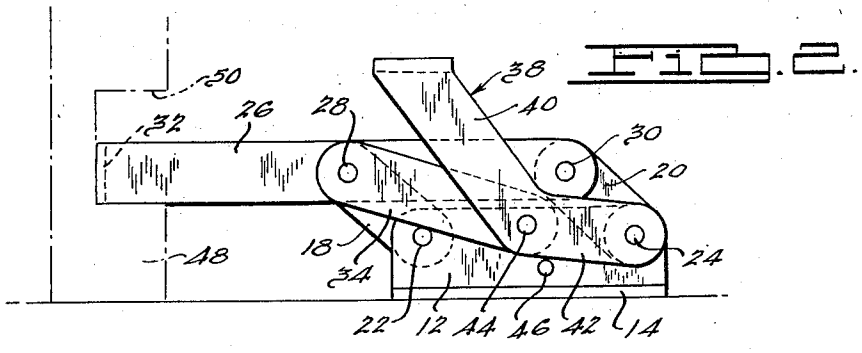
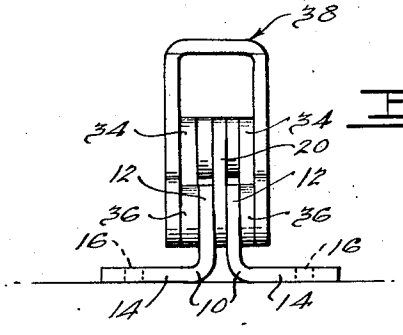


FIG. 3.



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TOGGLE CLAMP

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3 Claims. (Cl. 144—290)

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This invention relates to a toggle clamp and more particularly to a clamp for holding work while some operation is to be performed thereon or for temporarily holding two parts together while work is being done.

It is an object of the present invention to provide a clamping device which may be quickly and easily positioned to a locked or unlocked position and to provide a toggle joint between a pressure bar and a handle for greatly increasing the pressure applied to the work by the application of a minimum pressure by the operator.

Another object of the invention is to provide a clamp having a locking bar which travels bodily in an arc so that the resultant movement is outwardly and downwardly when the locking bar is brought to a locked position.

Other objects and advantages of the invention will be more fully understood from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a side elevational view of my improved device shown in its open position.

Fig. 2 is a view corresponding to Fig. 1 but showing the device in a closed and locked position.

Fig. 3 is an end view of Fig. 2.

Referring to the drawings, I have shown a base portion formed from oppositely disposed stampings 10 having a vertically extending portion 12 and a horizontally extending portion 14. The horizontal portion 14 is provided with openings 16 for receiving bolts or screws for attaching the base to a support.

At the opposite ends of the vertical portions, and arranged there between, are links 18 and 20 which are pivotally supported to the base by rivets 22 and 24. The links 18 and 20 are substantially of equal length and their outer ends are pivotally secured to a pressure bar 26 by rivets 28 and 30. The link 20 is pivotally supported at one end of the bar 26 and the link 18 is pivotally supported approximately midway between the length of the bar 26, although the distance or length of the locking arm could be a shorter or greater distance from the pivotal point. The distance between the pivot points 28 and 30 is substantially equal to the distance between the pivot points 22 and 24 so that there is an arrangement of a parallelogram, permitting bodily movement of the pressure bar 26 about an arc and maintaining the bar 26 in a horizontal position.

The bar 26 is formed with two parallel plate portions connected together at the outer ends by a portion 32. The links 18 and 20 are positioned between the two portions of the bar 26. Mounted

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at the outer surfaces of the bar 26 are links 34 which have one end thereof pivoted on the rivet 28. These links extend rearwardly toward link 20. Spacing washers 36, at the outer surfaces of the base upright section 12 and 13 or stamping 10, are mounted on the rivet 24 and a U-shaped handle 38, having its arms at the outer surfaces of the washers 36, is pivoted on the rivet 24. The arms of the handle 38 are angularly shaped as viewed in side elevation and at the juncture of the two portions 40 and 42 forming the angle I have pivotally mounted the opposite end of the links 34, as at 44.

When the clamp is in the position shown in Fig. 2 the portion 42 of the arm forms a continuation of the link 34 with the pivotal point 44 swinging about an arc from the pivotal point 24 drawing the pivotal points 28 and 30 upwardly and rearwardly about arcs from the pivots 22 and 24 respectively.

When the clamp is in the position shown in Fig. 1 and the handle moved to the left, the pressure bar 26 is moved upwardly and outwardly toward the work. When the bar reaches top dead center, further movement of the handle toward the left causes the bar to continue its outward movement toward the work and then downwardly into contact with the work. At this point the pivotal point 44 has not reached a center line between pivots 28 and 24 but further movement of the handle toward the centerline greatly increases the downward pressure applied to the bar 26 locking the work in position. Because the pivot 44 has now reached the centerline between pivots 28 and 24 there is no further outward movement of the bar which might cause movement of the work. As shown in Fig. 2 the pivot 44, in its final locked position is caused to pass the centerline between pivots 28 and 24 being limited by a stop 46. This provides an over center lock because any upward pressure on the bar 26 would force the handle against the stop.

I have illustrated the work 48 having a recess 50. It would be impossible by the use of the usual swinging arm clamp to lock the work by the bar entering the recess but since the bar moves slightly upwardly and then rearwardly, it may be caused to enter openings in the work and is particularly desirable for clamping tubing or parts having overhanging projections.

It is to be understood that the clamp may be used for locking the work by a horizontal pressure as well as a vertical pressure because of the forward movement of the bar as well as downward movement.

I have used the terms, "horizontal," "vertical," "upward," "downward," "inwardly" and "outwardly" for the purpose of clearly describing the operation of the device when used in a position as illustrated, but the clamp may be mounted on a support in any position.

It will be understood that various changes including the size, shape and arrangement of parts may be made without departing from the spirit of my invention and it is not my intention to limit its scope other than by the terms of the appended claims.

I claim:

1. A toggle clamp comprising a base, a pressure bar arranged adjacent to said base and having a projecting work engaging portion disposed laterally of said base, a link having one end pivotally connected to one end of said bar and its opposite end pivotally connected to said base, a second link having one end pivotally connected to said bar at a point spaced from the pivotal connection of said first link to said bar and its opposite end pivotally connected to said base at a point spaced from the pivotal connection of said first link to said base at a distance substantially equal to the space between the pivotal connections on said bar, a handle pivotally connected to said base at the pivotal connection between said first link and said base, and a third link having one end pivotally connected to said bar at the pivotal connection between said second link and said bar and its opposite end pivotally connected to said handle at a point spaced from the pivotal connection of said handle to said base.

2. A clamp comprising a base having spaced front and rear pivots; a pressure bar arranged adjacent to said base and provided with a projecting work engaging portion disposed laterally of said base, said bar having spaced front and rear pivots; swingable links connecting corresponding pivots of said base and said pressure bar; a handle; a link pivoted at one end to the handle intermediate the ends of the latter, said link and an end portion of said handle forming a toggle, and said toggle pivoted at its ends to the front pivot of said pressure bar and the rear pivot of said base.

3. A clamp comprising a base; a pressure bar arranged adjacent to said base and having a projecting work engaging portion disposed laterally of said base; a pair of substantially parallel links extending between said bar and said base; pivots connecting said links to the bar and to the base, said pivots arranged generally in the form of a parallelogram; a handle; a link pivoted at one end to the handle intermediate the ends of the latter, said link and an end portion of said handle forming a toggle, and said toggle pivoted at its ends to a diametrically opposed pair of said pivots.

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