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L. F. BLATT ET AL

3,371,925

TOGGLE CLAMP WITH UNUSUAL RISING ACTION

Filed Aug. 4, 1965

FIG. 3.

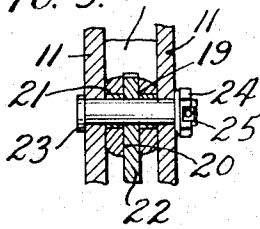


FIG. 1.

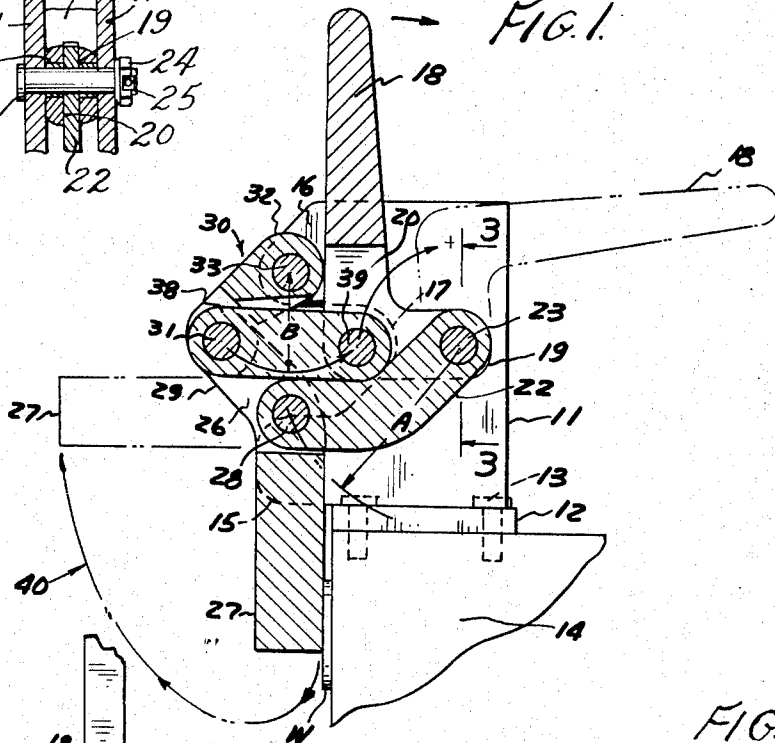


FIG. 4.

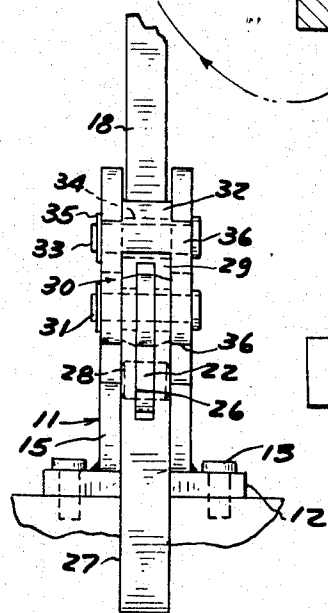
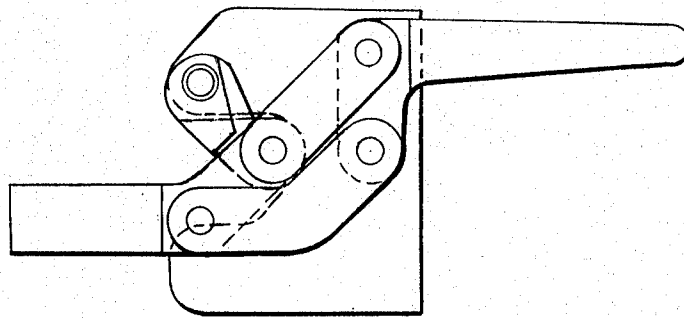


FIG. 2.



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3,371,925

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4 Claims. (Cl. 269-91)

ABSTRACT OF THE DISCLOSURE

A toggle clamp with handle on a first pivot and work securing arm, with spaced portions thereof, each pivotally mounted through separately located pivotal links connected to pivot through different arcs, to constrain pivotal movements of said arm to a resultant path in a relatively confined area, and with a third link interconnecting said arm and handle for effecting opening and closing movements of said arm on opening and closing movements of said handle.

The present invention represents a novel form of toggle clamp which includes an operating handle and a work engaging arm controlled by a linkage therebetween and wherein due to a specialized form of linkage forming a part of the present invention, a novel form of constrained and modified opening movement is provided for said arm on opening movement of said handle.

It is another object by such linkage that the work securing arm will swing in a relatively confined area.

It is the object of the present invention to provide an improved toggle clamp including a pivotally mounted work securing arm which, due to a novel form of pivotal mounting and linkage with respect to the sideplates of the clamp, provides for a modified composite translatory movement of the work securing arm when moved from work securing to opening position.

It is another object by such linkage that the work securing arm will swing in a relatively confined area.

These and other objects will be seen from the following specification and claims in conjunction with the appended drawing in which:

FIG. 1 is a fragmentary partly broken away and sectioned side elevational view of the present toggle clamp.

FIG. 2 is a left end elevational view thereof.

FIG. 3 is a fragmentary section taken in the direction of arrows 3-3 of FIG. 1.

FIG. 4 is similar to FIG. 1, showing the relation of the parts with the clamp in open position.

It will be understood that the above drawing illustrates merely a preferred embodiment of the invention, and that other embodiments are contemplated within the scope of the claim hereafter set forth.

In the drawing the present toggle clamp includes baseplate 12 which through fasteners 13 is adapted for securing upon the support 14 fragmentarily shown.

A pair of spaced upright sideplates 11 are secured upon baseplate 12, each including a laterally directed side portion 15, and thereabove a second laterally directed side portion 16, defining a notched portion 17 therebetween.

The handle 18, known as a 90° angle type of handle, and which could be replaced by a 45° angle type of handle, is in the form of a lever of general L shape and at its forward end portion 19, FIGS. 1 and 3, is guidably interposed between the sideplates 11 and is pivotally mounted upon the said sideplates by virtue of a first pivot mounting 23.

Said first pivot mounting includes the headed bolt 23 which extends through sideplates 11 and through the bushings 21 nested within corresponding recesses in the end portion 19 of handle 18 and is secured in position by the nut 24 and cotter pin 25, FIG. 3.

The end portion 19 of said handle is slotted as at 20 and is adapted to receive one end of the first pivotal link 22, which is also pivotally mounted upon the first pivot mounting 23 as best illustrated in FIG. 3.

5 The first pivotal link 22, as shown in FIG. 1, extends angularly downward and forward centrally of the sideplates 11 and at its forward end extends into the upright slot 26 in the work engaging or work securing arm 27 and is pivotally connected thereto by pivot pin 28.

10 In this connection, as shown in FIG. 1, the arm 27 is in clamping position operatively engaging the work W with respect to the upright wall of the support 14.

The upper end portion of arm 27 as at 29 is interposed between the free ends 30 of a second link, hereafter referred to as second link, and pivotally connected by the pivot pin 31 which extends through the spaced portions 30 of said second link and through the upper portion 29 of arm 27 there being a suitable locking ring as at 35 employed.

20 The second link 30 at its upper end has a spacer portion 32 of reduced width which is interposed between the extensions 16 of the sideplates 11 guidably extending therebetween and pivotally connected thereto by the pivot pin 33 which extends through the said sideplates 11 through the bushing 34 anchored within the spacer portion 32 of the second link and anchored in position by the locking ring 35, FIG. 2.

The construction of the second link 30 incorporates the free end portion 32 which serves as a spacer and which is guidably interposed between the sideplates 11 and pivotally mounted thereon as at 33. Portions of the second link 30 forwardly of the member 32 extend laterally from opposite sides terminating in the depending arms 36, which are coplanar with the side plates 11 and are adapted for cooperative registry therewith.

A third link 38 at one end extends into a slotted portion of the handle intermediate the ends of the handle as shown in FIG. 1 and is pivotally connected thereto by the pivot 39, FIG. 1. The opposite end of the third link 38 extends into the slot 26 formed in the upper portion of the arm 27 and is connected with the pivot pin 31. Thus, the third link which is in the nature of a control link depending upon pivotal movements of handle 18 connected thereto controls the movements of the other two links 30 and 22 which in turn regulate pivotal movements of the work securing arm 27 so that, as shown in FIG. 1, upon release of the arm 27 is moves through a modified path designated at 40. This is defined by the fact that the first pivot 23 acting through the link 22 defines a first path of movement for the central pivot portion 28 of the arm 27. At the same time, the link 30 at one end pivotally mounted upon the sideplates defines a second path of movement of the second pivot 31 with respect to pivot 33 for the said arm 27. Thus, upon opening and closing pivotal movements of the handle 18 transmitting movements to the control link 38 it is seen that the arm 27 when moving from open position to work securing position shown in FIG. 1 moves through a modified path indicated at 40. The first control path of the link 22 regulating translation of the arm 27 is indicated at A and the second control path for the ends of link 30 with respect to the sideplates and with respect to the said arm is indicated at B with the result that a modified and composite and unusual motion is achieved as designated at 40 upon opening and closing of handle 18 for securing the workpiece W schematically shown with respect to the support 14.

This provides a new type of toggle clamp with a peculiar rising action wherein the arm swings out from the workpiece but in a relatively confined area as shown in FIG. 1.

The relative positions of the parts when the clamp is closed to work securing position, is shown in FIG. 1. In

this position, the pivot 39 connecting control link 38 to handle 18 has moved past dead center of a line between pivots 23 and 31 to lock said arm in work securing position.

In this position, first link 22 and control third link 38 are coplanar and in cooperative engaging registry. 5

Having described our invention reference should now be had to the following claims.

We claim:

1. In a toggle clamp including a base plate adapted for securing on a support; 10
 a pair of spaced upright sideplates secured to the baseplate;
 a handle guidably interposed between the sideplates;
 a first pivot mounting the end of said handle upon the sideplates; 15
 a first pivotal link between the sideplates at one end joined to said first pivot;
 a work securing arm intermediate its ends pivotally connected to said first link at its other end; 20
 and guidably interposed between said sideplates;
 a second link at one end guidably interposed between and pivotally mounted upon said sideplates and extending outwardly thereof;
 a second pivot connecting the second link at its outer 25
 end to the free end of said arm;
 and a third link between said sideplates at one end pivotally joined to an intermediate part of said handle and at its other end pivotally connected to said second pivot and the said free end of said arm;
 said first pivot defining with said first link a first arcuate path of translation of said arm on pivotal movement of said handle;

and said second link defining a second path of arcuate movement for said arm;

said third link on pivotal movement of said handle causing opening and closing movements of said arm in a constrained composite path of movement.

2. In the toggle clamp of claim 1, on extreme movement in one direction of said handle, its pivotal connection with the third link moving past dead center of a line between the first and second pivots to lock said arm in work securing position.

3. In the toggle clamp of claim 1, said first and third links being coplanar and in cooperative engaging registry when the clamp is in work securing position.

4. In the toggle clamp of claim 1, said second link forwardly of its pivotal connection with said sideplates extending laterally from opposite sides and terminating in a pair of depending free ends respectively coplanar with said sideplates;

said second pivot extending through said free ends, through the free end of the arm and through the end of said third link.

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