

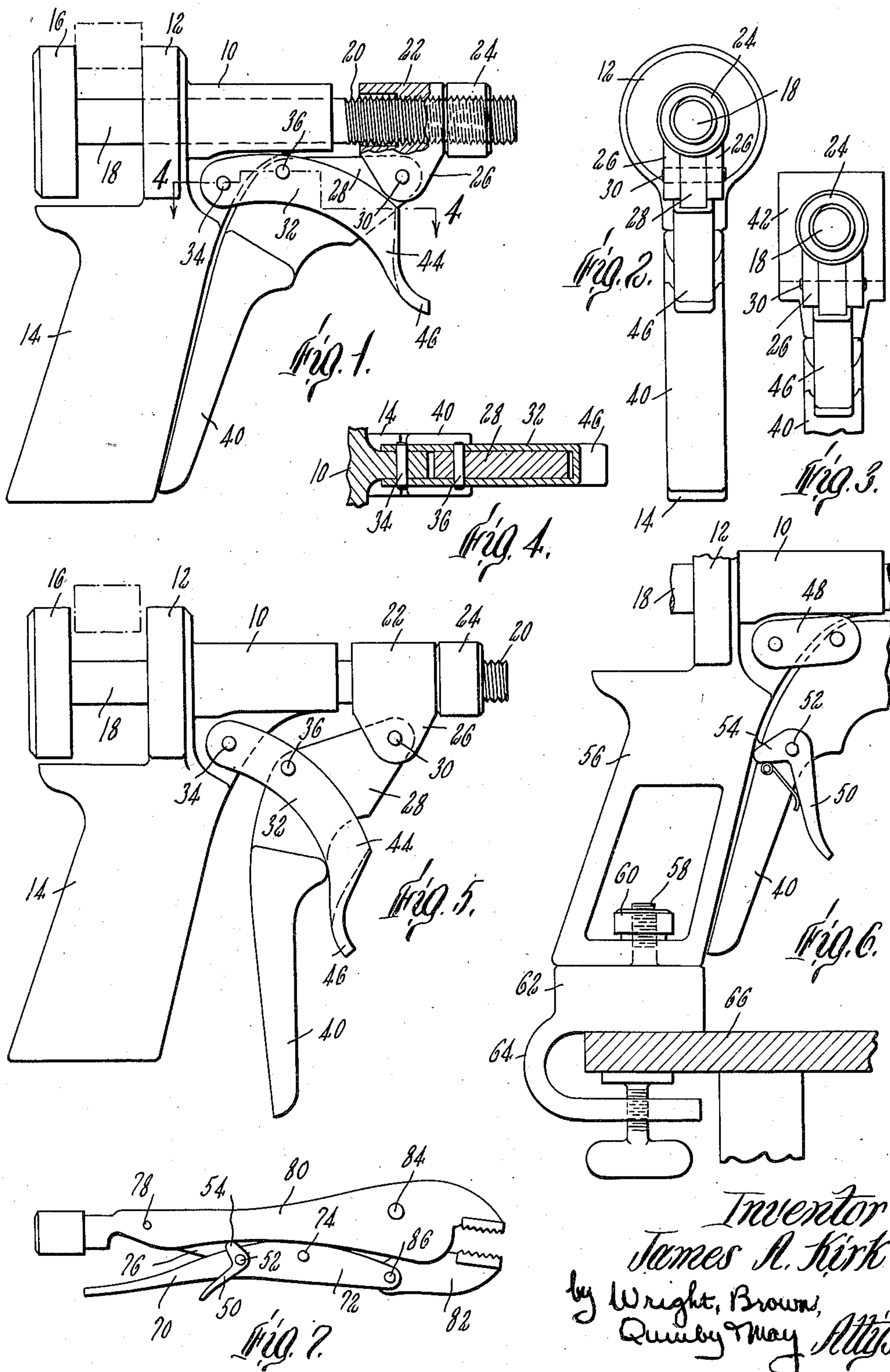
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TRIGGER RELEASE TOGGLE CLAMP

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## TRIGGER RELEASE TOGGLE CLAMP

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This invention relates to a toggle clamp of the type adapted to be held in the hand and to grip small work pieces. It is an object of the invention to provide a clamp of this variety having a trigger release by the actuation of which the toggle lock can be readily broken to release an article gripped by the clamp.

Another object of the invention is to provide a clamp so shaped as to facilitate the manipulation thereof, the shape including a hand grip which may be in the form of a conventional pistol grip adapted to fit in the hand of the operator.

For a more complete understanding of the invention, reference may be had to the following description thereof, and to the drawing, of which:

Figure 1 is a side elevation of an embodiment of the invention, a portion being broken away to show in section;

Figure 2 is a front end elevation of the same;

Figure 3 is a front end elevation of a modified form of the invention;

Figure 4 is a section on the line 4-4 of Figure 1;

Figure 5 is a side elevation of the clamp shown in Figure 1, the clamping jaws being open;

Figure 6 is a fragmentary side elevation of another modified form of the invention;

Figure 7 is an elevation of a pair of toggle pliers having a toggle release device thereon.

As shown in Figures 1 and 5, the invention may be embodied in a device which includes a member 10 having a bore therethrough. Integral with this member is a work engaging jaw 12 and a hand grip 14 which may be in the form of a conventional pistol grip. Cooperating with the clamp jaw 12 is an opposing jaw 16 which is on an end of a rod 18. This rod fits slidably in the bore of the clamp member 10 and projects from the further end thereof. The projecting portion 20 is screw threaded. Mounted on the screw threaded portion 20 is an internally threaded sleeve 22 and a lock nut 24. Projecting down from the sleeve 22 are a pair of ears 26 which are pivotally connected to a toggle link 28 as at 30. A second toggle link 32 is pivoted at 34 to the clamp member 10, the link 32 being composed preferably of two parallel strips which are on either side of the member 10. The toggle links 28 and 32 are pivotally connected to each other at 36 to form a toggle joint.

The toggle link 28 is made with an elongated extension 40 which projects beyond the toggle joint 36 and is shaped to fit against the handle

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grip 14 so as to act as an operating lever to close the toggle. As is evident from Figures 1 and 5, the fingers of the hand in which the hand grip 14 is grasped can conveniently extend about the operating lever 40 which can then be actuated to rock the toggle link 28 so as to close the toggle, that is, to cause the toggle pivot 36 to move up across the line of centers of the pivots 30 and 34. Such movement of the toggle results in forcing the sleeve 22 toward the right. This in turn forces the rod 18 and the clamp jaw 16 to the right, thus causing the jaw 16 to move toward the jaw 12. In this way a work piece can be quickly and easily clamped between the jaws 16 and 12 with a firm grip. In order to adjust the space between the jaws 16 and 12 to accommodate work pieces of different sizes, the jaw 16 and the rod 18 may be rotated. The threaded engagement between the end portion 20 of the rod 18 and the sleeve 22 results in axial adjustment of the rod to the right or to the left. The lock nut 24 is then set up against the outer end of the sleeve 22 so as to lock the rod 18 against rotation and also to take the forward thrust of the sleeve when the toggle is closed. As indicated in Figure 2, the jaws 16 and 12 are preferably circular so that adjustments between the jaws can be made to a very fine degree by adjustive rotation of the jaw 16 through small angles. If preferred, the work engaging jaws may be of square shape as indicated at 42 in Figure 3 or may be of any other preferred shape. Where a square shape is employed, adjustments of the spacing between the jaws must be by quarter turns of the jaw 42 if the rod which carries the jaw is in screw threaded engagement with the sleeve 22 as shown in Figure 1. Such threaded engagement with the sleeve is, however, not essential. If the sleeve is not threaded, it has a limited range of movement with respect to the rod 18, its movement toward the adjacent end of the rod being limited by the nut 24, in which case the adjusting can be done by means of the nut 24 without rotation of the rod 18.

One of the further objects of the invention is to provide means for facilitating the opening of the clamp by breaking the toggle when it is desired to release the work piece gripped therein. For this purpose the toggle link 32 is extended beyond the joint 36, the extension 44 being shaped to act as a releasing lever. For this purpose the parallel strips constituting the link 32 are joined at a point beyond the link 28, the extremity being shaped as at 46 into the form of a trigger on which can be hooked the forefinger of the opera-



tor's hand. For this purpose the extension 44 is bent or curved downward so that the trigger will extend roughly parallel to the operating lever 40. Thus, when the lever 40 is pulled toward the left, the toggle is moved to its closed position and when the trigger 46 is pulled toward the left the toggle is broken as in Figure 5. This provides for a rapid operation of the toggle clamp when it is being used, for example, to hold a succession of similar articles upon which a given operation is to be performed. For articles of a uniform size, no adjustment of the spacing between the jaws 16 and 12 need be made after the spacing has been adjusted to the first such article.

Instead of extending the link 32 to form a trigger 46 as shown in Figures 1 and 5, a short link 48 may be employed as shown in Figure 6, the toggle breaking device in this case consisting of a trigger 50 which is the long arm of a bell crank pivoted as at 52 to the operating lever 40. The short arm 54 of the bell crank engages against the forward surface of the handle grip 56 so that when the trigger 50 is pulled, the arm 54 pushes against the hand grip 56 and forces the lever 40 away therefrom, thus breaking the toggle.

Figure 6 also illustrates a clamping device by which the trigger clamp can be mounted on a table or shelf so that it need not be supported by the hand of the operator. In such case, the hand grip 56 is provided with a suitable opening into which can project from below a bolt 58 to receive thereon a nut 60. The bolt 58 projects vertically from a block 62 which is the upper jaw of a suitable screw clamp 64 by which the device is clamped to the edge of a table 66 or the like. By removing the nut 60, the toggle clamp can readily be detached from the supporting clamp so as to be used as a hand clamp.

The toggle breaking device illustrated in Figure 6 is shown in Figure 7 as applied to a pair of toggle pliers, the pliers themselves being old in the art. As shown, the trigger 50 is pivoted as at 52 to an extension 70 of a toggle link 72 which is pivotally connected as at 74 to another toggle link 76, the latter being pivoted as at 78 to one of the clamp members 80. The short arm 54 of the bell crank of which the trigger 50 is a part bears against an edge surface of the clamp member 80 so that when the trigger 50 is pulled, it forces the lever 70 away from the clamp member 80 so as to break the toggle joint. The other clamp member 82 is pivoted to the clamp member 80 as at 84 and is pivotally connected to the link 72 as at 86, the structure and operation of this form of toggle clamp being well known.

I claim:

1. A toggle clamp comprising a member having a bore therethrough, a rod extending slidably and rotatably through said bore, clamp jaws on said member and rod respectively, a sleeve screw-threaded on a projecting portion of said rod remote from said jaws, a toggle joint connecting said member and sleeve, said joint consisting of toggle links pivoted respectively to said member and said sleeve and pivoted to each other, and an extension on one of said links beyond the common pivot serving as an operating lever.

2. A toggle clamp comprising a member having a tubular portion with a circular work-engaging jaw at one end thereof and a hand grip projecting laterally therefrom, a rod slidably and rotatably fitted in said tubular portion, said rod having on one end thereof a circular work-engaging jaw opposed to the jaw on said member, a sleeve on and in screw-threaded engagement with said rod beyond said tubular portion of said member, a knurled lock-nut on said rod beyond said sleeve, and toggle means connected to said member and sleeve and operable to push said sleeve so as to draw said jaws closer together.

3. A toggle clamp comprising a member having a clamping jaw and a handle portion having a size and shape like a pistol grip, an elongated axially movable member arranged with respect to the handle as a pistol barrel to its grip, said elongated member having a clamping jaw movable therewith toward and from the first said jaw, toggle means for operating said jaws, said toggle means comprising two levers each pivoted at one end to said members respectively and pivoted to each other to form a toggle joint, the other end portion of one said lever being movable into juxtaposition with said handle to straighten the toggle, the other end portion of the other said lever resembling a pistol trigger in its shape and position relative to said handle.

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