

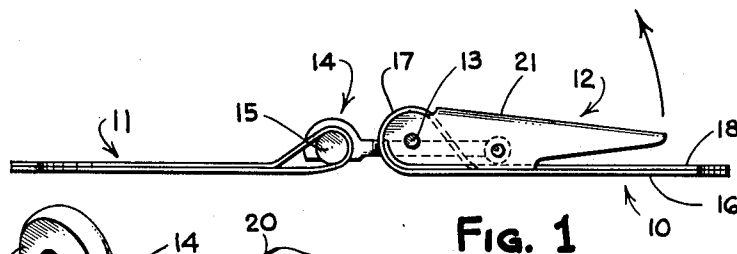
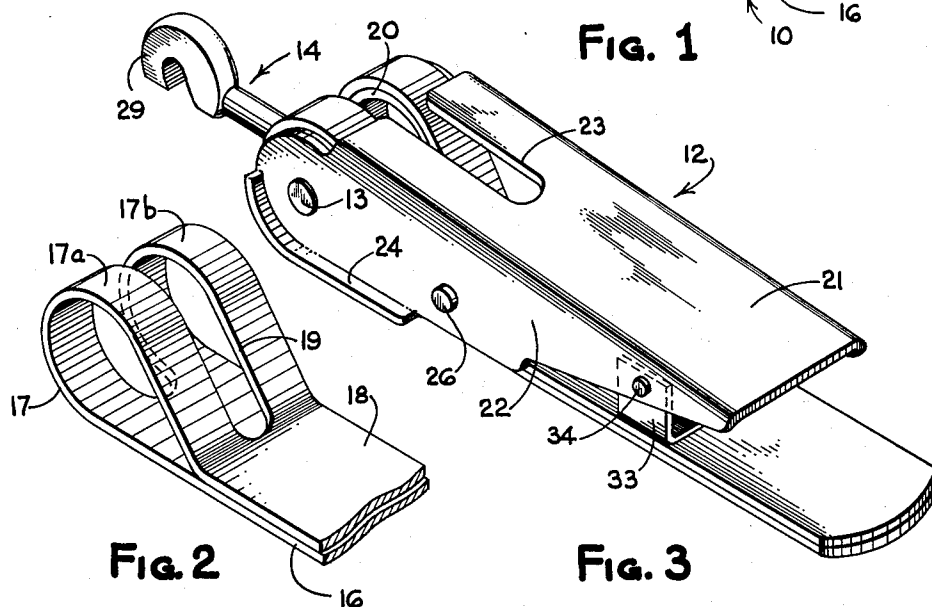
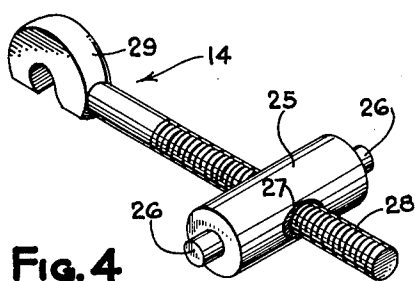
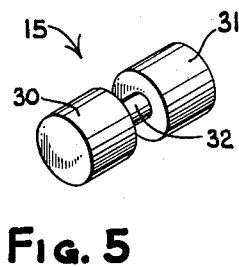
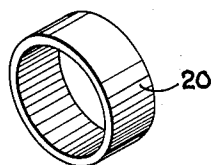
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OVERCENTER LATCH

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2,920,370

OVERCENTER LATCH

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7 Claims. (Cl. 24—271)

This invention generally relates to overcenter latching apparatus, and more particularly relates to an overcenter latch with particular utility in co-operation with clamping or coupling devices employed with hoses, tubing, and the like. It is understood, however, that the overcenter latch of the present invention is adaptable to many diverse applications where a positive latching or locking means is required, which must be susceptible of quick disconnecting operation.

Although overcenter latches of various types are well known in the art, a need has arisen for an overcenter latch which may be simply and economically constructed, and yet which is positive and secure in its operation. Furthermore, in conjunction with applications in which the components must be disassembled for maintenance or servicing, it is also desirable that a latch be provided which is susceptible of quickly being disconnected while at the same time maintaining the parts of the latch in convenient working position for re-latching engagement.

It is, therefore, an object of the present invention to provide an overcenter latch which may be economically manufactured with a minimum number of parts, and yet which is provided with a rugged construction enabling positive and secure latching or locking of the joined elements.

Another object of the present invention is to provide an overcenter latch which may be quickly manually disconnected, and yet which is designed for re-latching with a minimum amount of effort.

A still further object of the present invention is to provide an overcenter latch which does not require the removal of any components to release the latch, and which may be readily adjusted to meet the clamping force requirements of the particular application.

These and other objects of the present invention are generally attained by providing a strap member turned back on itself so as to define a loop portion. Bearing means are journaled in the loop portion and adapted for rotative movement therein. Handle means are coupled to the bearing means for movement therewith, and first trunnion means are rotatably mounted within the handle means.

A latch member is provided and has one end coupled to the first trunnion means. A second trunnion means is provided and is adapted to receivingly engage the other end of the latch member. The first trunnion means is so positioned in the handle means with respect to the bearing means so as to effect movement of the hooking or other end of the latch member past dead center, as defined by the bearing means and the first trunnion means, during engagement or release of the hook end with the second trunnion means.

A better understanding of the present invention will be had by reference to the drawings, showing an illustrative embodiment only, and in which:

Figure 1 is a side elevational view of the overcenter latch of the present invention, illustrating the latch in locking engagement;

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Figure 2 is an enlarged view of the loop portion of the strap retaining the latching assembly;

Figure 3 is a perspective view of the operating portion of the overcenter latch of Figure 1;

Figure 4 is a perspective view of the latch and trunnion means retaining same, as partially shown in Figures 1 and 3;

Figure 5 is a perspective view of the trunnion means adapted to receive the latch; and

Figure 6 is a perspective view of one of the bearing members indicated in Figure 3.

Referring now to the drawings, there is shown in Figure 1 a band or strap member 10 adapted to be coupled or connected to another band or strap member 11. Towards this end, there is shown associated with the strap member 10 a handle means 12, adapted to pivot about a point 13, and having coupled thereto a latch member 14 secured to trunnion means 15, the latter being shown more clearly in the view of Figure 5.

The strap member 10 consists of a lower strap element 16 which is turned back on itself so as to form a loop portion 17 and define an upper strap element 18. The loop portion 17 is bifurcated so as to define a slot 19 throughout the length thereof interposed between loop strips 17a and 17b.

The loop strips 17a and 17b form bearing surfaces to receive the bearing means of the present invention. The bearing means, as shown more clearly in the views of Figure 3 and Figure 6, comprises a pair of opposing cup shaped members 20, which are, respectively, inserted within the loop strips 17a and 17b with their closed ends being substantially flush with the outer edges of the loop strips 17a and 17b.

The handle means 12 is provided with an upper surface in the form of a flat member 21 from which downwardly depend in a U-shaped configuration opposing side members 22 coupled to the oppositely disposed bearing members 20 through rivets 13 establishing the center of rotation for the handle means 12 with respect to the strap 10, as previously indicated in the description of Figure 1. The handle means 12 is further provided in its upper surface 21 with an elongated aperture or slot 23 aligned with the slot 19 extending throughout the loop portion 17.

Preferably, the downwardly depending side members 22 of the handle means 12 further include laterally extending flanges or lips 24. The lips 24 strengthen the handle means 12 and further provide a bearing surface limiting downward movement of the handle 12 with respect to any clamping member (not shown) which may be mounted underneath the straps 10 and 11.

Laterally disposed within the side members 22 of the handle 12 is another trunnion means 25, more clearly shown in the view of Figure 4, provided with axially extending pins 26 journaled within the respective opposing side members 22. The trunnion means 25 is provided with a diametrically extending threaded bore 27 adapted to receive a threaded end 28 of the latch member or hook bolt 14. The other end of the latch member 14 is provided with a hook 29 to be received on the trunnion means 15, as shown in conjunction with Figures 1 and 5. The manner in which the latch member or hook bolt 14 is fastened to the trunnion means 15 is similar to the construction as set forth in applicant's co-pending application Serial Number 447,778, entitled "Clamp Assembly." This construction forms no part of the present invention. Towards this end, however, as shown in Figure 5, the trunnion means 15 is comprised of end portions 30 and 31 having axially extending therebetween a reduced diameter portion 32. Thus, the hook end 29 of the latch 14 is adapted to be received between

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the end portions 30 and 31 about the reduced diameter portion 32.

As an auxiliary feature of the present invention, in the event it is desired to lock the latching device when it is in engagement, an angle member 33 may be secured to the upper strap element 18, as shown in Figure 3, and provided with a pin or other device 34 coupling it to the side member 22 of the handle 12. With such a construction, the pin 34 would necessarily have to be removed before lifting of the handle 12 in the direction of the arrow, as shown in Figure 1, for release of the latching mechanism.

It is believed that the operation of the overcenter latch of the present invention is evident from the preceding description. It is merely necessary for the operator to lift the handle 12 by inserting a finger or portion of his hand underneath the upper surface 21 so as to effect movement of the handle 12 angularly about the center of rotation of rivets 13. Since the pins 26 are located closer to the plane of the strap 10 than the pivot point 13, it is apparent that the latching member 14 will pass through dead center as the handle 12 is rotated in the counter clockwise direction, whereby the hook end 29 may be readily removed from the trunnion means 15. Of course, during latching a reverse action will take place wherein the latching member 14 will pass through dead center thereby forcing the strap members 10 and 11 towards each other in a clamping relationship. The aligned slots 23 and 19 permit angular movement of the latching member or hook bolt 14 during the releasing operation.

Certain details of the construction have not been illustrated as the features are well known in the art. For example, the upper strap element 13 and lower strap element 16 would normally be fastened together by rivets or welding.

It is evident that many modifications and changes may be made in the illustrative embodiment shown without departing from the spirit and scope of the invention as set forth in the following claims.

What is claimed is:

1. A fast action toggle clamp for releasably clamping together a pair of flat looped straps, cross pin means seated in one of said looped straps with its midportion exposed, toggle latch means including a hook bolt engageable over the exposed portion of said pin means, channel-shaped lever means having one end pivotally supported in the other looped strap, and means pivotally connecting the shank of said hook bolt to the midportion of said lever means along an axis extending transversely of said lever means, the longitudinal axis of said hook bolt being adapted to lie inwardly of the axis of the pivotal support of said lever means in the closed position thereof and the web of said channel-shaped lever being notched from one end to receive the shank of said hook bolt during opening and closing movements of said toggle clamp.

2. A fast action toggle clamp as defined in claim 1 characterized in that the side flanges of said channel-shaped lever means lie closely beside the opposite lateral edges of one of said looped straps.

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3. A fast action toggle clamp as defined in claim 1 characterized in that said hook bolt has a threaded shank end adjustably connected to said means connecting said hook bolt to the midportion of said lever means.

4. A fast action toggle clamp as defined in claim 1 characterized in that said hook bolt comprises a threaded shank having a flattened head end at one end of said shank which head is provided with a notch opening through one lateral side thereof at an angle inclined to the axis of said shank.

5. A toggle latch mechanism comprising a channel-shaped operating lever having a pair of aligned pivot pin openings through the flanges thereof near one end, the web portion of said lever being notched lengthwise from the end thereof having said pivot pin openings, a second pair of aligned openings through said flanges intermediate the ends of said lever, a hook bolt having a shank adjustably supported in and extending at right angles to the length of pin means, said pin means having its opposite ends journaled in said second pair of aligned openings, said hook bolt having a free end notched inwardly from one lateral edge and adapted to engage over an independently supported cooperating detent when said lever is pivoted to its open position and in a direction to move said hook bolt toward said detent, and the notch in the web of said operating lever permitting limiting swinging movement therethrough of said hook bolt shank.

6. A toggle latch mechanism comprising a pair of straps each having their opposite ends folded toward one another to form a pair of loops of substantially different diameters, each of said loops having long slots there-through extending generally centrally and longitudinally of said straps, a channel-shaped lever having means at one end thereof journaling said lever in the large diameter one of said loops, a hook bolt having a notch at one end and a cross head at its opposite end pivotally supported at its ends to the midportion of said lever, and detent pin means socketed in the smaller diameter looped end of the other strap with its midportion exposed and adapted to seat in the notch of said hook bolt, the axis of said detent pin means and the axis of said cross head lying in a plane disposed to one side of the axis of said large diameter loop in the closed position of said lever.

7. A toggle latch mechanism as defined in claim 6 characterized in that said cross head has a transverse threaded bore threadedly and adjustably seating the threaded shank portion of said hook bolt.

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