Aug. 29, 1961 J. R. NEWCOMER, JR., ET AL 2,998,272

TOGGLE LATCH

Filed June 25, 1958 2 Sheets-Sheet 1

Fig. 1

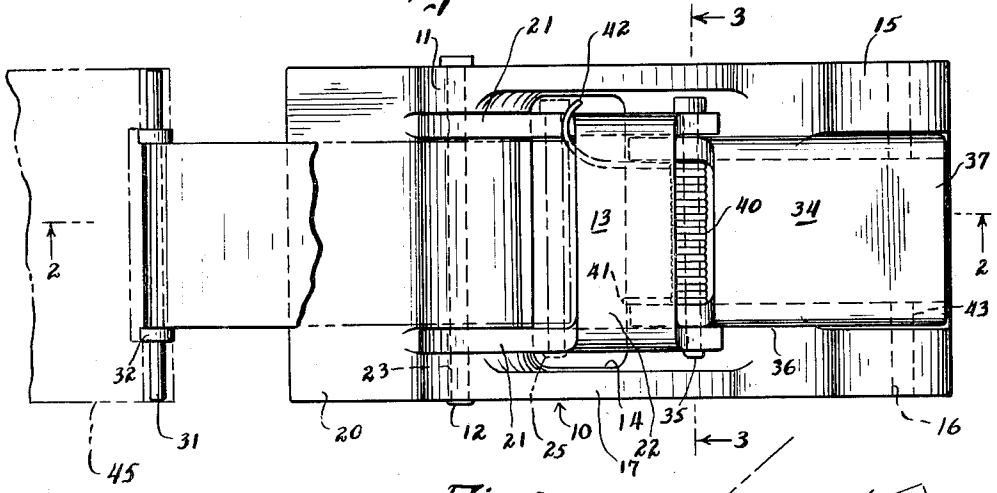


Fig. 2

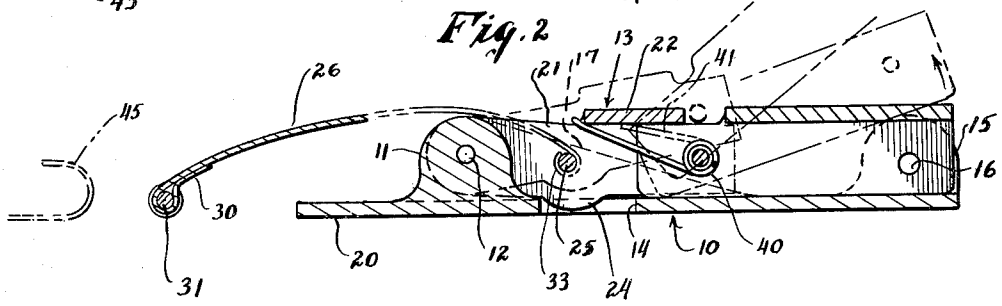


Fig. 3

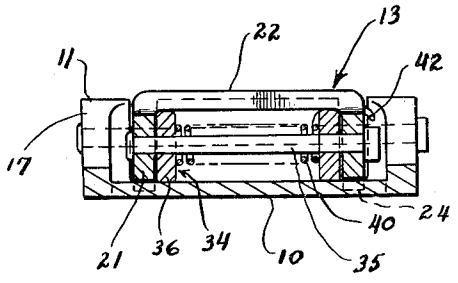
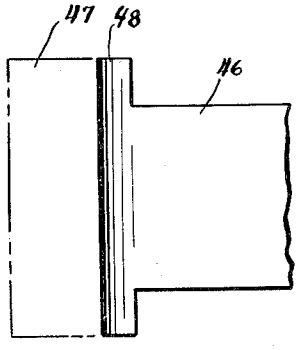


Fig. 4



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Fig. 5

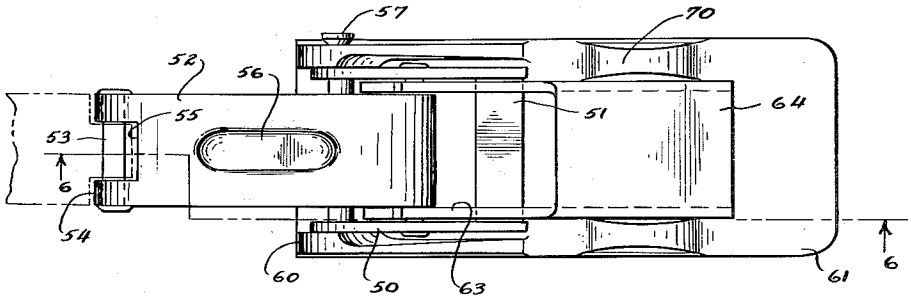


Fig. 6

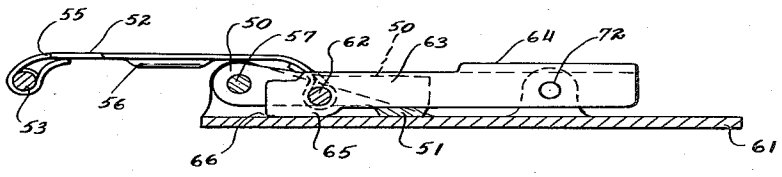
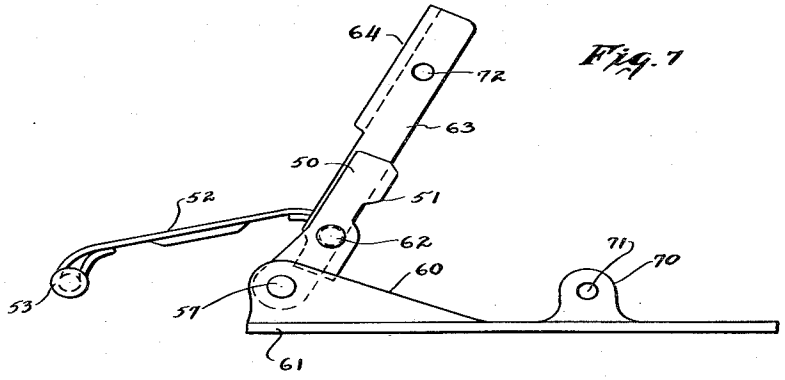


Fig. 7



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TOGGLE LATCH

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1 Claim. (Cl. 292—66)

This invention relates to latches which have a toggle action and relates more particularly to a toggle latch with a novel draw loop or bail element carried on a primary lever which is pivoted on a base and wherein improved means are provided for positively securing the latching elements in a locked position and for accomplishing quick release from said locked position.

An important object of the present invention is to provide an improved tension latch for electronic boxes and housings generally which are provided with movable access doors or hinged covers and wherein a quick and secure latching action is a requisite.

Another object of the invention is to provide a toggle latch with improved means for releasing the primary lever from its below center locked position. The improved latch of the present invention is provided with a draw loop or latching member of arched construction and having an attaching element such as a cross pin or hook member at its outer or free end. As the loop is drawn inwardly to latching position the arcuate loop tends to deflect and straighten itself somewhat but it will not straighten itself completely and thus dissipate the toggle action when used within the normal working range of the latch fastener.

A further object of the invention is to provide a novel tension latch having an upwardly arched spring draw loop which is under deflection when the latch is locked and which preserves the toggle action against vibration and prevents rattling of the parts without the use of spring elements.

In the drawings:

FIG. 1 is a plan view of a toggle latch embodying the present invention.

FIG. 2 is a longitudinal section taken on line 2—2 of FIG. 1.

FIG. 3 is a transverse section taken on line 3—3 of FIG. 1.

FIG. 4 is a plan view of a modified draw loop where the latch pin is formed by rolling a widened section on itself, the view showing in broken lines the portion of the blank which is rolled to form the latch pin.

FIG. 5 is a plan view showing a modified construction.

FIG. 6 is a longitudinal section taken on line 6—6 of FIG. 5.

FIG. 7 is a side elevation showing the parts in fully open position.

The tension latch of the present invention includes a base 10 which may be cast or wrought and which is provided adjacent its outer end with a pair of raised ears 11 which receive the terminals of a pivot pin 12 on which a primary lever 13 is mounted. To the rear of pivot pin 12 a transverse opening 14 is formed in the base for a purpose to be disclosed. At its opposite or inner end a second pair of raised ears 15 are provided and which have aligned openings 16 therein. Because the formation of opening 14 somewhat weakens the forward end of the base the ears 11 are provided with rearwardly sloping reinforcing webs 17 which terminate on the base wall to the rear of opening 14.

The base is shown as having an extension 20 lying forwardly of pivot pin 12 and no substantial portion lies to the rear of ears 15. The exact shape of the base will depend on how it is secured to the structure such as by rivets or by welding.

The primary lever 13 is of channel shape with opposed walls 21 which extend beyond a cross-piece 22 conecting said walls 21. At its forward end the primary lever has aligned openings 23 to receive a pivot pin 12 and to the rear of these openings the side walls have downwardly offset portions 24 adjacent to which are formed aligned openings which receive a pin 25 similar to pin 12 on which a draw member 26 is carried. This pin may be an ordinary headed pin or one of the various elastic type headless pins. This draw member may be formed from sheet spring steel and is convexly curved or arched on its upper face. At its outer end the metal is turned back at 30 and may be spot welded to develop a higher spring rate. If the latch is used in light duty applications the welding may be omitted. The transverse opening so formed supports a latch pin 31. This pin has shoulders 32 to maintain it captive in the draw member. The draw member is of a width to freely move into the area between sides 21 and at its rear end the draw member is turned back at 33 to provide an attachment to pin 25.

When the latch is installed in the position of FIG. 2 and the parts are in fastened position, pivot pin 12 supporting the primary lever 13 occupies a position above a line passing through latch pin 31 and draw member supporting pin 25 and this toggle arrangement retains the parts in locked position due to the spring action of draw member 26. In order to provide this below center position of pin 25 the extensions 24 are formed in order to avoid weakening of the side walls 21 adjacent the openings for pin 25. In order to accommodate these extensions which lie below the upper face of the base, opening 14 is formed to receive the extensions.

To facilitate raising of this primary lever from its below center position a channel shaped lift lever 34 is pivoted on a pivot pin 35 carried at the rear end of the primary lever. This lift or secondary lever is also of channel shape and has opposed side walls 36 and a connecting wall 37. The side walls are spaced apart a distance only sufficient to permit the lift lever to be positioned between the opposed walls of the primary lever.

When the latch is in locked position the two levers are in the nested, horizontal position of FIG. 3 and when it is desired to release the latch the lift lever is grasped at its rear end and raised, thus causing the forward lower end 39 thereof to act as a cam which works against the upper face of the base and raises the rear end of the primary lever above the center line.

A coiled spring 40 having terminals 41 and 42 is carried on pivot pin 35 and urges the lift lever in a clockwise or downward direction. The side walls 36 of the lift lever have openings 43 aligned with openings 16 in ears 15 through which a wire (not shown) may pass for the purpose of securing the latch in a locked position.

If the latch is mounted on an access door the ends of the latch pin 31 will engage a hook-shaped, bifurcated keeper shown diagrammatically at 45.

A modification of the construction of the draw member is shown in FIG. 4 wherein a blank forming the draw member 46 is formed with a terminal section 47 of increased width which is rolled back upon itself to form the latch pin 48.

In the modified form of latch shown in FIGS. 5, 6 and 7 the side walls 50 of the primary lever are connected by a cross piece 51 at their lower rather than their upper ends. The arched draw loop 52 has a latch pin 53 mounted between attaching ears 54 at its outer end, said outer end having a central opening 55 between the attaching ears. The bending action of the draw loop may be reduced by an elongated rib 56. The primary lever is mounted on a pivot pin 57 between ears 60 on

base **61** and to the rear of pin **56** a second pin **62**, which is disposed below center when the latch is fastened, passes between side walls **50**.

A lift lever having opposed side walls **63** connected by an upper wall **64** is also pivoted on pin **62**. This lift lever has extensions **65** at its forward end whose lower edges engage the upper face of the base. The forward corners **66** of these extensions form cams which raise the primary lever over center when the rear end of the lift lever is raised.

To the rear of ears **60** there is a second pair of spaced ears **70** having openings **71** aligned with openings **72** in the lift lever through which a wire (not shown) can pass to maintain the lift lever in secured position when the latch is fastened.

Several different forms of attaching means at the outer end of the draw loop have been shown and they are suggestive only since the means may comprise any member which attaches to another and retains the attachment when the parts are under tension. For example, both attaching members can be the elongated devices, **C**-shaped in construction, of the type shown at **45** in FIG. 2.

While there have been described herein what are at present considered preferred embodiments of the invention, it will be obvious to those skilled in the art that many modifications and changes may be made therein without departing from the essence of the invention. It is therefore to be understood that the exemplary embodiments are illustrative and not restrictive of the invention, the scope of which is defined in the appended claim, and that all modifications that come within the meaning

and range of equivalency of the claim are intended to be included therein.

What we claim is:

A toggle latch to secure first and second members together and including a base for securing to the first member and provided with upstanding apertured ears at its forward end, a latch lever provided with first, second and third pivot pins, the first pin at the forward end thereof passing through said ears to provide a pivotal mounting on the base, a lift lever mounted on the third pin and provided with cam portions extending forwardly of its pivot which engages the base and lift the latch lever when the lift lever is raised at its rear end, and a spring draw member mounted at its rear end on the second pin and being provided with means at its forward end for attachment to the second member, said draw member having an upwardly arched central section which is under deflection when the latch is secured, said attachment means and the second pin being below the first pin when the latch is secured to provide a toggle locking action, and means for securing the lift lever against upward movement.

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