

Jan. 28, 1969

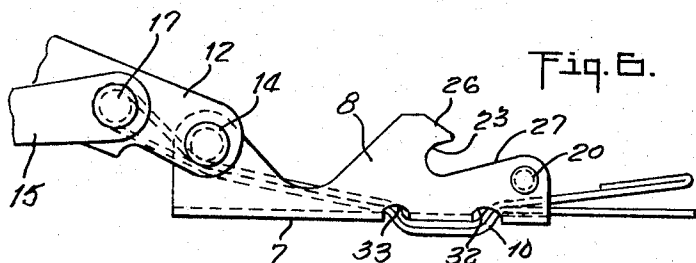
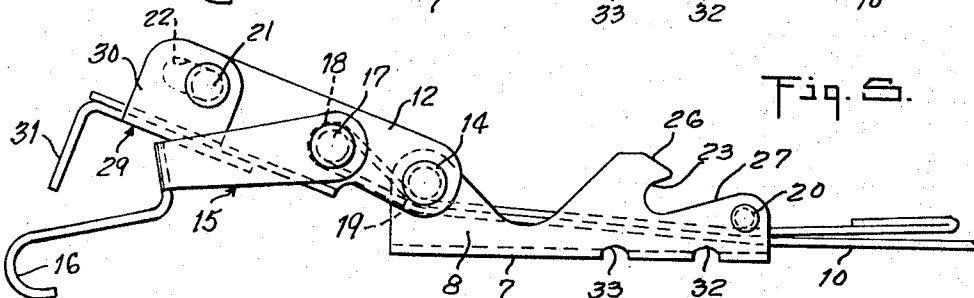
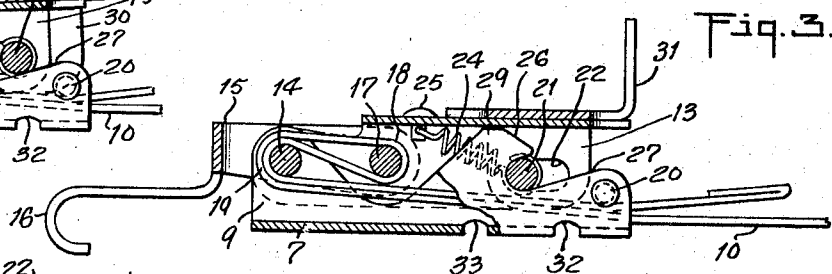
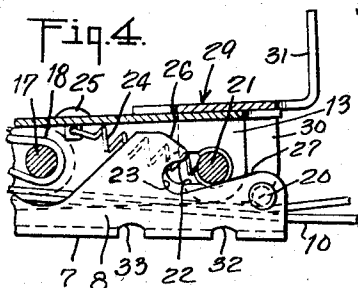
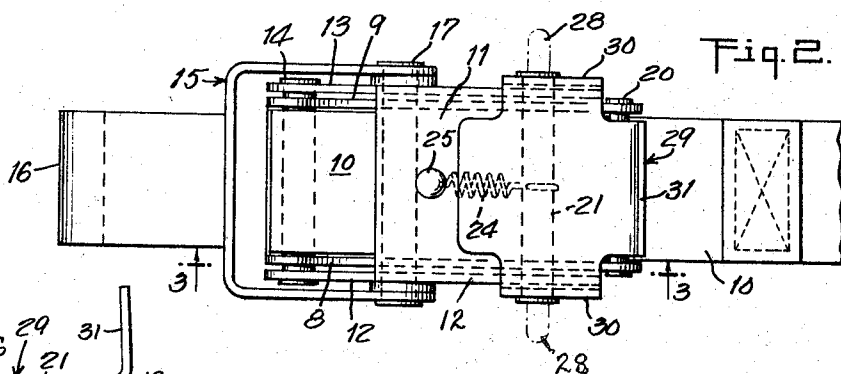
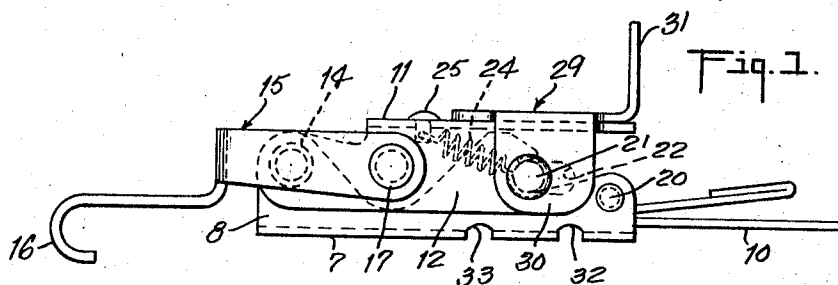
N. HIGUCHI

3,423,799

WEB TENSIONING BUCKLE WITH SAFETY LOCK

Filed April 12, 1967

Sheet 1 of 2



INVENTOR
NORI HIGUCHI

BY *Philip S. McLean*
ATTORNEY

Jan. 28, 1969

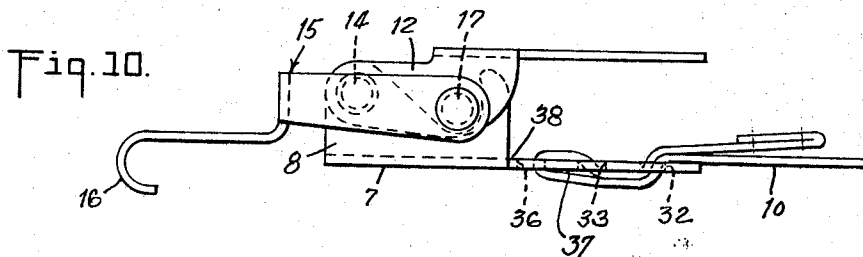
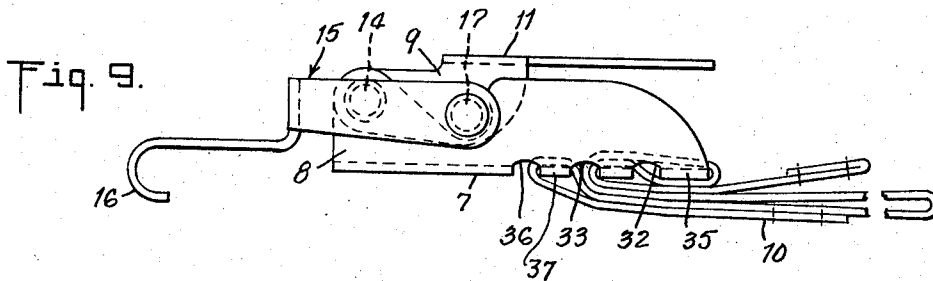
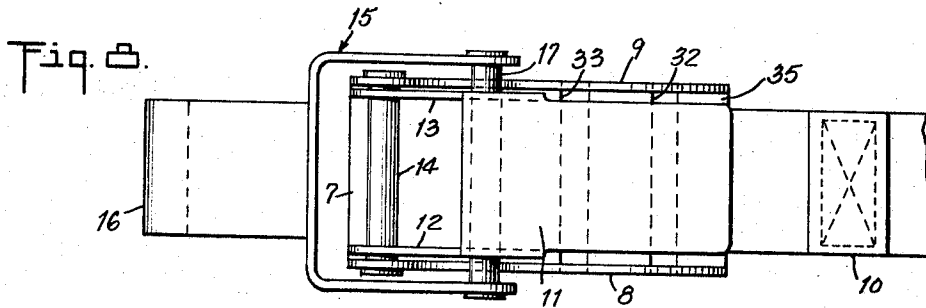
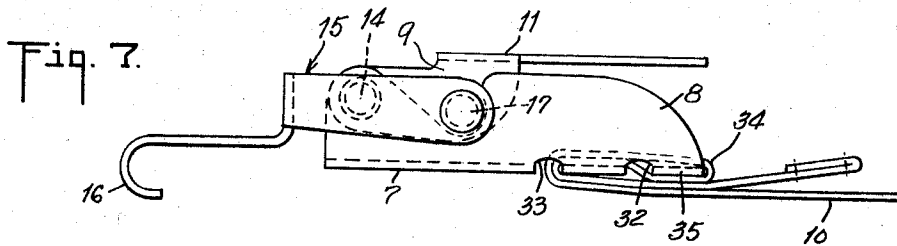
N. HIGUCHI

3,423,799

WEB TENSIONING BUCKLE WITH SAFETY LOCK

Filed April 12, 1967

Sheet 2 of 2



INVENTOR
NORI HIGUCHI

BY

Philip S. Dean
ATTORNEY

1

3,423,799

WEB TENSIONING BUCKLE WITH SAFETY LOCK

Nori Higuchi, Northport, N.Y., assignor to Davis Aircraft Products, Inc., Northport, N.Y., a corporation of New York

Filed Apr. 12, 1967, Ser. No. 630,243

U.S. Cl. 24-68

Int. Cl. A44b 21/00

3 Claims

ABSTRACT OF THE DISCLOSURE

Buckle with web tensioning and slack takeup toggle lever which may carry a locking pin slideable into and out of locking engagement with hooks on the sides of the frame of the buckle.

The invention relates to web tensioning buckles for cargo tiedown and other such purposes on the order of the Davis Patents #2,429,926, Oct. 28, 1947, #2,997,761, Aug. 20, 1961 and #3,252,188, May 24, 1966.

General objects of the invention have been to provide a buckle of this nature, of simple substantial construction; easy to operate for adjustment and tensioning of the web, automatically locking in the holding position and having means for facilitating both the locking and the unlocking action of the same.

The accompanying drawings are illustrative of present practical embodiments of the invention.

FIG. 1 is a side elevation of one of the buckles in closed and locked position.

FIG. 2 is a top plan view of the same.

FIG. 3 is a longitudinal sectional view, as on substantially the plane of line 3-3 of FIG. 2.

FIG. 4 is a broken sectional detail showing in particular the ramps or cam slopes for directing and facilitating the locking and unlocking actions of the buckle.

FIG. 5 is a side elevation illustrating the fully open release position of the parts.

FIG. 6 is a broken side elevation showing how if desired the web may be adjusted and held in one selected position of adjustment.

FIG. 7 is a side elevation showing how the buckle may be constructed without the locking slide, relying on the overcenter movement of the toggle lever to automatically lock the buckle in the closed, holding position.

FIG. 8 is a top plan view of the same.

FIG. 9 is a side view showing the buckle frame as having three web receiving slots in the bottom of the same for double strand web.

FIG. 10 is a side elevation of a further simplified form of the buckle in which the frame has less than full length side walls.

The frame of the buckle is shown in FIGS. 1 to 6 as a sheet metal channel having a back wall 7, and angularly upstanding parallel side walls or flanges 8 and 9, spaced the width of the web 10, which the buckle is to handle.

The toggle lever for tensioning and holding the web is shown as a reversely faced sheet metal channel, having a top wall 11 and parallel side walls 12, 13, which extend down over the side walls of the frame and are pivotally secured thereto by a cross pin 14.

Pivotally secured to the side walls of the toggle lever is a yoke 15, having means for attachment to a cargo anchorage or for connection of webbing or other cargo securing means.

In the illustration, this yoke terminates at the center in a cargo or anchorage engagement hook 16, but it will be appreciated that this form of connection may be varied according to circumstances.

In the illustration, the anchorage yoke 15 is pivoted to

2

the toggle lever at a point removed from the toggle center 14, by pivot pin 17, extending between the sides of the toggle lever channel.

The web 10 is shown extended about the yoke pivot pin 17 in the form of a loop 18, with both sides of the web wrapped about the pivot pin 14 of the toggle at 19 and extended out the end of the channel frame beneath a holddown guide pin 20, FIG. 3.

In the open extended position of the buckle shown in FIG. 5, the web extends in a substantially straight run, in a single loop about the pivot 17, and can therefore be freely adjusted in either direction.

When the toggle lever is swung over to the closed position, shown in FIG. 3, both runs of the web will be wrapped about the pivot pin 14 and the web then be securely held against movement in either direction.

The parts are automatically locked in the web tensioning closed position by engagement of a transversely extending lock pin 21, slideably engaged in slots 22, in the side walls of the toggle lever and engaged at its ends in holding hooks 23, on the side walls of the channel frame.

This locking pin is tensioned into fully seated holding engagement in the hooks by a spring 24, FIGS. 2 and 3, extending from a mid-portion of the pin to an anchor stud 25, on the toggle lever.

In the closing movement of the buckle, the lock pin is eased into engagement with the holding hooks by downwardly inclined ramps or cams 26, on the tops of the hooks leading downward to the points of the hooks.

To opposite effect, upwardly inclined ramps or cam slopes 27, lead from the bottom of the hooks upwardly and outwardly away from the hooks so as to guide the pin upwardly and in so doing, clear the pin of the hooks and impart lifting and freeing movement to the toggle lever.

Easy locking of the buckle is thus assured and in the reverse operation, lifting movement is imparted to this lever to assist in overcoming a tight holding tension of the web.

FIG. 2 shows in broken lines how the ends of the locking pin may be extended beyond the sides of the buckle at 28, to provide fingerholds by which this pin may be withdrawn from engagement beneath the holding hooks.

In the several views FIGS. 1 to 6, the holding pin is illustrated as released by a slide 29, engaged over the top of the toggle lever, having dependent flanges 30, extending down over the sides of the lever and through which the locking pin is extended.

This releasing slide is shown as having an angularly projecting operating handle 31, which may be extended upwardly as shown, or if desired, be turned in a downward direction according to specific requirements.

Except for the cross pins, the buckle may be made up entirely of light sheet metal punched parts, strong and inexpensive in cost.

Where only an initial adjustment of the web is required and it may be advantageous to maintain this adjustment, the looped end portion of the web may be fed through parallel slots 32 and 33, in the bottom of the channel frame as shown in FIG. 6.

Once this first adjustment of the webbing is made, the buckle may be kept in this condition, with the web fixed at this adjustment and the toggle lever free to be operated to take up slack or put desired tension on the web.

The initial adjustment in the holding slots 32 and 33 may be readily changed when required on opening the buckle as in FIG. 6, to more or less straighten the loop of webbing.

While the hook form of terminal such as shown at 16, may be preferred for general purposes, it will be appreciated that other terminal connections may be utilized.

Thus for example, in place of the hook 16, a terminal

length of webbing may be attached to or looped above the yoke or shackle 15, which is pivoted to the toggle lever.

FIGS. 7, 8, 9 and 10 show how the locking slide may be omitted and the locking be automatically effected by passage of the toggle lever over the dead center position.

FIG. 7 shows how a single strand web may be looped at 34 about the end 35 of the frame, with the top run of the web extended up through slot 32 and both runs brought down through slot 33.

As a further variation, a third cross slot 36, FIG. 9, may be provided in the bottom of the buckle and a double strand web be threaded as there shown with the lower run secured in a loop about the bar forming portion 37 between slots 33 and 36 and the upper run looped about the outer bar forming portion 35, and doubled back down through the intermediate slot 33.

FIG. 10 illustrates a further simplification in which the side walls of the frame are for the most part omitted, leaving the frame flat and open at 38, at the slotted end where the webbing is connected.

This open construction facilitates the threading of the webbing and this particular view shows how a single strand may be looped about the bar forming portion 37 between the intermediate and inner slots 33 and 36 and be doubled up through the outer slot 32.

The invention provides a small, light weight buckle made up of the fewest possible number of parts; quickly and easily operable into locked or unlocked condition and a construction in which the web may be attached to the toggle alone, as in or to the frame alone, as in FIGS. 7, 8 and 9.

The cross pin 20 over the web, as in FIG. 5 is a safety feature preventing any lifting of the web, such as might tend to lift and release the toggle lever.

In the lowered, closed position, the toggle lever extends over the cross slots in the base of the frame, serving as a protector or guard for webbing extending through said cross slots.

What is claimed is:

1. A web tensioning buckle with safety lock comprising: a channel form base frame having a back wall and up-standing spaced parallel side walls, said side walls having hooks open toward the end of the frame and having downwardly inclined cam slopes on top leading downwardly to the ends of the hooks and up-

wardly inclined cam slopes leading from the open sides of the hooks toward the adjoining end of the frame,

a toggle lever of channel formation pivoted at one end to the opposite ends of said side walls of the frame and having longitudinally extending slots in the opposite free end of said lever,

a locking pin slidably guided in said slots in position for engagement in said hooks and for sliding engagement over said downwardly and upwardly inclined cam slopes,

spring means tensioning said locking pin into interlocked engagement in said hooks,

a yoke shape clevis pivoted on said toggle lever and provided with terminal means for anchoring the buckle,

a transverse pin pivotally securing said toggle lever to said side walls of the frame,

a transverse web tensioning pin carried by said toggle lever at a distance from said pivot pin for holding a loop of webbing wrapped about said pivot pin,

a transverse holddown pin extending between said side walls for confining both runs of a loop of webbing against the back wall of the frame beneath said hook formations, and

handle means exposed at the opposite ends of said locking pin for withdrawing the same from engagement in said hook formations.

2. The invention according to claim 1, in which said releasing means includes a slide operating over said toggle lever provided with an operating handle and having end flanges engaged with the ends of said locking pin.

3. The invention according to claim 1, with said clevis carried by said web tensioning pin.

References Cited

UNITED STATES PATENTS

2,429,926	10/1947	Davis	24-197
2,846,745	8/1958	Lathrop	24-75
2,852,827	9/1958	Arnold	24-68
2,867,406	1/1959	Davis	24-68 X
2,997,761	8/1961	Davis	24-68
3,120,946	2/1964	McCormack et al.	24-68 X

DONALD A. GRIFFIN, *Primary Examiner.*