ABSTRACT
An improved "captured wedge" buckle in one preferred embodiment exhibiting the features of a spring-urged wedge held within a housing with a helical coil return spring housed within, being mounted thereby by a prescribed efficient, simple assembly technique, the wedge adapted to slide flat along a base to engage its web against an opposing inner tapered frictional surface of the housing, the housing being formed to exhibit a compact profile.

8 Claims, 11 Drawing Figures
POCKETED SPRING BUCKLE IMPROVEMENTS

The invention herein described was made in the course of, or under, a contract or subcontract with the Department of the Army.

BACKGROUND, FEATURES

The art of designing and fabricating buckles is an old and crowded one; changes and improvements come slowly and by small degrees, as workers in this art well know. One desirable feature for many buckles, such as for use with knapsacks or trousers, is that the buckle be "normally engaged" (i.e., its web in "rest condition"). Especially with buckles of the "captured wedge" type (e.g. see FIGS.) this is a very useful feature whereby a web may be "automatically" engaged within a buckle pocket, so "normally locked," and requiring positive action to release it from the wedge. It is preferable that it be made necessary to positively displace such a locking wedge, at least somewhat, from out of the pocket in order to withdraw the web, unlocking it simply by applying a slight external force. Thus, according to a feature hereof, an improved captured wedge type buckle is conceived comprising a hollow housing defining a pocket with a sliding, locking wedge fitted therein to, combined with a return (retainer) spring, preferably housed within the wedge, and adapted to normally maintain it in engagement with the pocket. Such a buckle is to be normally engaged (as opposed to "normally disengaged") with the web section captured between the wedge and pocket walls. It is accordingly an object of this invention to provide such an improved captured wedge type buckle.

With such buckles, it has further been discovered that resilient bias means, such as a return spring, may be advantageously contained within the sliding wedge (preferably in a hollow "pocket" therein). It has been found that such a design avoids difficult problems in assembly, production and use. For instance, this "pocketed spring" construction facilitates simple, quick assembly techniques using a pre-assembled wedge "sub-assembly," with a coil return spring housed inside a cavity in the wedge. Moreover, so pocketing the return spring serves to provide a bias for the sliding wedge which can better resist corrosion during service, as well as resisting intrusion of jamming, fouling material, such as soil particles. It has even been found that such a construction may be "self-cleaning"; e.g., when a balanced, centered, coil spring is positioned in the wedge cavity in conjunction with lateral apertures therein, any such contaminant will typically be ejected during service. It is an object of the subject invention to provide such a "pocketed return spring" and related features.

Even more particularly, in the design and use of such buckles including a return-biased sliding wedge, it has been found that certain resilient bias means are particularly advantageous. For instance, it has been found preferable to use coil spring means, mounted and balanced within the wedge pocket, as opposed to other conventional means, such as flat leaf springs. The coil springs will provide a longer service life for such applications and are less prone to failure, as well as possessing the aforementioned self-cleaning characteristics; further, they are relatively simple to install and assemble. By contrast, flat springs typically require special tools and involved less favored assembly techniques, e.g. in bending and inserting spring means into a wedge cavity and securing them there. Thus, it is a further ob-

ject to provide such improved buckles with internal coil spring bias means.

In the provision of said pocketed wedge buckles, it has been discovered, surprisingly, that a flat sliding disposition of the wedge is to be preferred; for instance as opposed to disposing it to slide up and down an inclined ramp. Thus, as detailed below, a tapered, V-shaped chamber (pocket) is preferably provided in the buckle housing, being defined by a pair of upper and lower pocket faces, with only the upper face being tapered, the lower face being made flat and adapted to slidingly engage the wedge. The taper of the upper face is such as to gradually "close" the pocket cross-section so that, at the innermost portion, it may engage a wedge and intermediate web. This has been discovered to not only facilitate a preferable "sliding mode" of wedge translation, but also to facilitate compaction of the overall buckle profile (thinner in cross-section), producing a slimmer overall structure — one that is more useful and aesthetic. This "slim" buckle cross section is also facilitated by so locating the "merging taper" only on the upper face of the pocket and disposing the lower pocket face as a flat sliding surface — thus rendering an "asymmetrically-tapered" housing pocket for the wedge.

It has also been found that such a design will maintain engagement with the web which is surprisingly more reliable and secure under higher loads in typical service. Thus, it is an object of the present invention to provide such as asymmetrically-tapered" pocket, with one surface of the buckle pocket so tapered and the other surface kept relatively flat, as a wedge-guide; and the overall housing construction being rendered more compact and more serviceable.

The design proceeding from the aforementioned features is found to be much simpler in construction and fabrication, and more effective in use. Such a buckle may be much more quickly and easily assembled; for instances, as opposed to a non-contained (unpocketed) spring wedge combination, or as opposed to a multielement wedge construction. According to the invention, the wedge and spring means are adapted to be packaged together in a simple unitary sub-assembly which is relatively quickly and easily assembled within the buckle housing, by simply inserting the wedge subassembly therein (with coil spring so pocketed therein), and then slideably-securing it in the housing — e.g. by running a shaft through opposing cam slots (in the housing or the wedge), then fastening it there with outboard rivets or the like. Workers in the art will also perceive that such a sliding wedge construction is considerably more reliable and serviceable in the use than what has heretofore prevailed.

As another feature of the foregoing construction, it has been found that design structures according to the foregoing parameters are relatively simple and easy to render in plastics. As workers in the art know, it is preferable to use non-metal buckle parts in many cases; e.g. for military service, to make them "non-shiny" (and thus less evident to enemy personnel under battle conditions — since the paint on a metal buckle tends to wear away and expose the shiny metal). Also, plastic construction renders parts somewhat lighter, less expensive and more readily fabricated by mass production (e.g. "molded plastic") techniques. At times a plastic coated with a dull metal may be preferable.
The foregoing design will also be seen as well adapted for accommodating different web sizes (thickness and width). Thus, it is more versatile, being readily and simply modified (e.g. by an adjusting spring size and strength) to accommodate different web dimensions, while nonetheless providing a secure lock when biased against the web.

One embodiment may be formed very simple with a self-locking return spring plus normal engagement means to temporarily unlock by displacing the wedge out of the pocket against its self-bias, whereby to insert or remove an intermediate web therein. Such buckle designs also provide a “quick release” feature which will readily be appreciated by those skilled in the art, as well as a relatively secure, “non-slip” characteristic (in the locking mode) with relatively inexpensive, simple construction — e.g. resisting loads on the order of 200 pounds without failing or slipping.

The foregoing and other objects will be seen as implemented by the preferred embodiment described below, to be considered in conjunction with the accompanying drawings.

LIST OF DRAWINGS

FIG. 1 is a top, exploded perspective view of a knapsack type buckle embodiment according to the invention, with
FIG. 2 providing a bottom perspective of the housing therefor;
FIG. 2A a bottom plan view of the wedge therefor;
FIGS. 3 and 4 providing respectively an upper plan view and a side sectional view thereof; and
FIGS. 4A and 4B side sectional views of the wedge and housing, respectively.

FIG. 5 indicates an alternate belt buckle embodiment to that of FIG. 1, shown in a similar exploded, top perspective view, with
FIGS. 6 and 7 providing, respectively, an upper plan view and a side sectional view thereof; and
FIG. 8 indicating a rear sectional view of the wedge-in-housing of the embodiment of FIG. 1 during assembly.

FIRST EMBODIMENT: KNAPSACK BUCKLE

A captured wedge type buckle 1 is indicated, as a preferred embodiment in FIGS. 1–4. Buckle 1 will be understood by those skilled in the art as a quick release, non-slip buckle as used, for instance, as a knapsack buckle and comprising a housing 3, preferably of molded plastic, with a sliding wedge 5 cooperating with housing 3 to secure an intermediate web (w in FIG. 4). Wedge 5 is adapted to be inserted into one side of an inner, hollow V-shaped convergent chamber, or pocket (POK), in housing 3, being inserted only from the enlarged “entry end” thereof (left side of POK in FIG. 4). This end POK-i is larger in cross-section than wedge 5 with pocket POK being formed to converge along its length to gradually reduce its crosssection to a terminal value at its opposite, exist end POK-e where, of course, it is smaller in crosssection than the wedge (except for the tapered leading edge 5-T thereof). Wedge 5 is preferably made of cast aluminum (diecast, or, less preferably, wear resistant or plated plastic) and is provided with a toothed, or otherwise frictionly surfaced, upper engagement face 54 and an associated surface coating (anodized for wear resistance as known in the art.

A quick release cord (e.g. nylon lanyard 7) is secured to wedge 5 for manual translation thereof, along with the base surface 56 of pocket POK. Cord 7 is preferably removably attached, being simply threaded through two apertures 5-a in wedge 5, and tied therebetween. Cord 7 is adapted to retract the wedge (as discussed more fully below) against the resistance of the return spring means — thus withdrawing the wedge from its innermost position in pocket POK to allow insertion or withdrawal of the engaged web. Housing 3 also includes a terminal retainer slot 3-a (defined by an extended retainer bar 31) in which a non-adjustable web segment W is to be fastened and looped securely therearound to provide a pulling linkage in a first pulling direction L-I, as indicated in FIG. 4.

Of course, a second web segment W-3 (e.g. of the same web loop W) is adapted to be inserted into, and adjustabley positioned in, POK between wedge 5 and the upper, engaging, tapered pocket fact 34-F, body 3 being threaded around bottom housing surface 33 and up through exit and POK-e of pocket POK, re-entringly, as indicated between belt segments W-1 and W-2 of FIG. 4. Once secured therein, the web is of course locked between wedge 5 and face 34-F such that withdrawal forces are resisted (e.g. withdrawal force L-II pulling on the free and w-I of the web). End w-2 is typically unrestrained and free to be inserted, and adjustable positioned, in the buckle pocket, as known in the art. Stated otherwise, this buckle arrangement is adapted to receive, and effectively lock, a webbing W within itself at adjustable portions along the webbing length, the webbing being a prescribed thickness W-D and assembled width W-T, accommodated by the associated dimensions of pocket POK and wedge 5. The web is preferably somewhat resilient and/or “penetrable” to be locked in the pocket by biting “tooth means” (face 54), as well as to be otherwise gripped, as discussed below. With web W threaded through pocket POK, it will be understood as intended for locking engagement between wedge 5 and the pocket face 34-F, with wedge 5 being mounted to slide on the lower pocket face 56 and being spring-urged against the web. The wedge is adapted to frictionally engage the web with toothed or serrated face 54, and so urge the web against opposed pocket face 34-F.

More particularly, and referring especially to FIGS. 3 and 4, wedge 5 is slidingly retained on a support shaft 53 fastened to housing 3 and fitted apertures 3-B formed in opposing side walls 3-S, with matching cam slots 5-S provided in the sides 5-D of wedge 5 to allow sliding, guided reciprocation thereof along base 36. A pair of rivet means 5-r fastened on the end of shaft 53 retain shaft 53. Wedge 5 is thus fashioned to slide along the lower face 32 of pocket POK until coming into contact either with the web (or with opposing face 34-F if no web is present) as permitted by the accommodating length of slots 5-S and along an axis determined by the opposed pocket sidewalls 3-S. Wedge 5 is urged by a prebiased coil compression spring 9 into locking position (assuming a prescribed intermediate web segment W-3 of prescribed thickness range W-D), toward opposing pocket face 34-F so as to engage that surface, or an intermediate web section, with the aforemen- tioned serrated face 54.

Thus, buckle 1 will be understood as adapted to be pulled in a first direction L-I (being anchored for this by the second web W', as understood in the art). The
other webbing segment W is threaded through the buckle and adapted to anchor the buckle, coupling it in a second direction L-II, opposite to L-I. With web W adjustably positioned and locked by the spring-biased wedge 5, if the "anchor web" W then pulls in the opposite direction L-II (e.g. with the order of 200 pounds as contemplated for certain frictional webbing and certain versions of this buckle), this buckle embodiment will be seen to hold the engaged web W fast, and thus provide an effective non-slip action against such opposing tension.

Quick release is nonetheless provided too, so that with simply a tug on wedge 5 (for instance, on lanyard 7 attached as a release grip to wedge 5), to pull it a bit out of pocket POK. Wedge 5 will be withdrawn, sliding against its bias, out of locking engagement and away from the engaged web segment, compressing spring 9 in the process. Thus the web will be released to be adjustably repositioned, or removed, as known in the art.

Of course, housing 3 comprises, basically, four walls defining pocket POK, between upper surface 34, including inclined mergent face 34-F, opposite lower face 32, and two connecting sidewalls 3-S. The bottom surface 33 of housing 3 is thus spaced from top surface 31 a prescribed height to accommodate pocket POK, with portion 31 having a tapered crosssection for compactness and aesthetic reasons; whereas lower portion 33 is concavely curved to accommodate web segment w-1, etc., guidingly. Housing 3 is preferably comprised of a rigid plastic material, preferably a polycarbionate resin like "Celcon" or the like, and may have a textured, matte surface coating.

Locking wedge 5 comprises a relatively flat, thin cu-niform (wedge-shaped) bar with a bottom flat surface 36 adapted to slide along the engaged surface 32 of the housing pocket, and an opposite top surface 55 adapted to present forward tapered toothed portion 54 so as to be in position to bite into and positively frictionally engage the intermediate web section, thrusting it against opposing face 34-F.

An inner chamber or pocket 5-C is provided within wedge 50 and adapted to receive and house the resilient spring bias means. Preferably this bias comprises a single, centered, balanced coil compression spring 59, normally a prescribed amount between the forward edge of this pocket and mounting shaft 53 secured therein. Shaft 53 is held between a pair of rivets 5-r and thereby captured between opposing walls 3-S of housing 3, in apertures 3-B. This shaft acts as a sliding-cam to guide wedge-travel along slots 5-S as well as to capture and retain the wedge therein. A pair of (knurled) end-knobs 5-K are provided on wedge 5 and adapted to be gripped by the user to help in manually withdrawing the wedge against the resilient bias.

As discussed above, a preferred form of the return bias 9 is a helical coil compression spring (preferably of "music wire" or like high-carbon steel, for this embodiment, and providing enough force to resist prescribed dislodgement forces, even given a slick, smooth web).

Spring 9 is preferably adapted to be inserted and positioned inside wedge 5 by a prescribed assembly techniques as a feature hereof. That is, as illustrated by FIG. 8, spring 9 is inserted into cavity 50-C and held there with pin P inserted therethrough (in slots 5-S); then the spring-wedge sub-assembly is inserted into pocket POK with pin P in registry with bores 3-B (per FIG. 8) and shaft 57 then inserted to eject pin P and hold the spring-wedge in place. The so-retained wedge sub-assembly may then be secured with rivets 5-r fastened on the ends of shaft 53 to retain it there. Workers in the art will recognize how simple and convenient such an assembly mode is thus afforded. Prior art techniques are far more cumbersome and less efficient.

SECOND EMBODIMENT: BELT BUCKLE

A second belt buckle embodiment 1' is shown in FIG. 5 in exploded, upper perspective view and further shown in plan view and side sectional view in FIGS. 6 and 7, respectively. Belt buckle 1' is designed and constructed along the lines of knapsack buckle 1 described above, except as otherwise mentioned hereafter, and may generally be considered as a modified embodiment thereof, however, having its own special unique features as described below.

Belt buckle 1' may be characterized as a non-slip, pocketed wedge, spring-biased buckle, especially suited as a buckle for garments (e.g. for trousers or the like), being adapted to securely grip one (proximate) and w-p' of a belt web w', while releasably engaging an opposite remote (distal) portion w-d' thereof. This engagement will be effected for quick release, however, and adjustably-positionable mode so the engaged web segment w-E' may be readily inserted into, or withdrawn from, the buckle pocket POK' provided. The adjustably-variable, wedge-shaped gap (gap between wedge 55 and the upper face of the pocket POK') will be set to vary between a minimum clearance (slightly less than the thinnest contemplated web) up to slightly more than the thickest contemplated web, as known in the art.

More particularly, as with buckle 1, a housing 3', preferably of plastic, is constructed, basically to define this pocket confinement, or tunnel therethrough, this tunnel (pocket POK') being, of course, wide enough to accommodate the widest web anticipated and having an exit portion POK'-E' high enough to accommodate the wedge plus a web of maximum contemplated thickness, tapering along a prescribed length down to a minimum height, adjacent entry portion POK'-E'. The inner, upper face 34' defining pocket POK' is, accordingly, fashioned to merge toward the opposite flat bottom surface 36' of the pocket, preferably being brought there-toward along a prescribed angular engaged face section 34' thereof, terminating in a flat entry face, 34'-E' parallel with base 33' (and adapted merely to guide the web into the pocket POK'). The top 35' of the housing may be fashioned in any manner reflecting the configuration of the pocket POK: for instance, being curved downward toward the entry portion of the pocket, as illustrated, for compactness. A lip portion 38' of the base of pocket base 36' is extended to protrude somewhat beyond pocket POK' and is adapted to support wedge 5' slidingly to be resiliently reciprocated along the top surface thereof. The outward side portions of this lip 38' include a pair of opposed side bracket portions 39, each including a bore. These bores are disposed in registry to retain and journal a shaft 61 extending sufficiently below lip 38' to accommodate an associated locking clamp 6' carried rotatably thereon.

Clamp 6' is adapted to releasably-hold an intermediate web section w-d' (shown in phantom, FIG. 7), thrust thereby up against the opposing flat bottom surface 33', as known in the art. More particularly, lock-
ing clamp 6' mounted on shaft or roll pin 61 is L-shaped, as known in the art, including a serrated tooth section 65' and an extended transverse section 63', so that as section 63' is rotated up against the web and base 33', the teeth on section 65' will lockingly bite into and grip the intermediate clamped web as known in the art. Reverse rotation of 63' will release this web section.

As further mentioned below, housing 3' also includes a pair of opposite registered side-bores 3'-a (along side walls 3-W' thereof), these being adapted to mount shaft 57' securely, preferably with end rivets 5-R' or the like, as known in the art.

Turning now to the sliding wedge portion 5' of buckle 1', it will be seen as generally somewhat similar to wedge 5 of buckle 1 described above. (Of course, alternately and less preferably, the sliding cam slots may be provided in the opposed sides of the housing.) Thus, the center of wedge 5' is hollowed-out to fashion a cavity 50-c' there, to receive and house the return spring 9'. Thus, as before, wedge 5' comprises a sliding wedge having an upper surface 55' and a sliding lower surface 56', together with a crosssectionally tapered forward portions 5'F, including a frictionally-surfaced (e.g. serrated) engaging face 54', terminating in a leading edge 55'-1', which is bevelled for facile engagement with an entrant web end. The opposite trailing end 5'-E of wedge 5' is provided with a pair of outboard enlarged protruding side portions, or knobs, 5'-k, which are knurled or otherwise frictionally treated for positive gripping by a user, in the course of withdrawing wedge 5' from pocket POK'.

As mentioned, wedge 5' is provided with a mounting shaft 57'' adapted to be coupled to associated compression return spring 9' which, as before, is adapted to be centered and balanced in cavity 50-c'. Slot 5-S' is cut out across the midsection of wedge 5' so as to provide a channel completely across the wedge, being high enough to accomodate insertion of the shaft 57' (e.g. during assembly thereof), and being long enough to define the contemplated reciprocating excursion of the wedge (when fastened in place in pocket POK'), that is, the length and position of slot 5-S' define the initial (locking) and outer (release) extreme positions of the wedge in pocket POK', in conjunction with an intermediate web, as known in the art, and in the manner of the foregoing embodiment.

Cavity 50-c' is dimensioned and shaped to the profile of the coil spring 9', being adapted to receive spring 9' as inserted therein and retain it, centrally aligned and positioned along the center line axis of pocket POK', as known in the art. A feature of this invention is that, by so attaching spring 9' to shaft 57' and inserting these in slot 5-S', with the spring seated in cutout 50-c', the spring will be kept compressed and aligned quite simply, thus serving to bias and align the reciprocating movement of wedge 5' during use.

Thus, in use, belt buckle 1' will be seen to effect the recited functions and features. The buckle housing 3' and wedge sub-assembly are able to be assembled as for buckle 1, with wedge 5' captured therein. Such wedge disposition for sliding reciprocation, for quick-release of a web, and for holding a web normally locked, provides an improved buckle action. The return spring arrangement provides for normally (releaseably) lock-engaging the web against withdrawal in one direction ("unidirectional locking").

That is, once a web or belt W' is inserted with its free end W-F' protruding from the exit portion of the buckle 1', and an intermediate section W-E' is engaged between knurled wedge face 54' and opposed, inclined pocket face 34'-F, considerable force must be applied to the web in the locking direction, L'-A, before it is released—e.g. up to about 35 pounds observed in use. the buckle will resist withdrawal in that direction, as a normal garment belt buckle should.

Despite this, and with no particular sacrifice in the positive locking action provided, the web W' may nonetheless be very readily released by displacing wedge 5' just a bit in the release direction (L'-B)—either directly by manually pulling on it, or indirectly by pulling on the free web end. The web will be readily released from engagement and, if the user grips the wedge (knobs 5'-K), briefly to maintain clearance between the wedge and housing, the web may readily be withdrawn or repositioned in the buckle. Workers in the art will recognize that this is precisely the way such a buckle is supposed to work ideally, and that it is quite surprising and unexpected that such a simple, yet novel, structure of the type described should be able to provide this function in such a positive and reliable manner.

The sliding wedge is, of course, mounted on its shaft 57' and adapted to reciprocate slidingly along the base of pocket POK', within limits established by the length of its cam slot 5'-S as mentioned. One should also understand that in both embodiments, the overall buckle is engaged and pulled by two oppositely-loaded web segments—i.e., for the knapsack buckle 1, the pull is L-I vs. L-II, whereas for belt buckle 1', the pull is L'-A vs. L'-B. Of course, the pull of a web toward the exit end of pocket POK only helps to further jam the wedge into the pocket and thus increase tension on the buckle, increasing the locking forces.

The web sections preferably comprise opposite ends of the same belt, that is, the loose and fixed ends of the belt embodiment comprise a single loop so that loading can be oppositely directed with one web end clamped fixedly on the housing and the other web end engaged in the pocket between wedge and housing faces. The wearer of belt buckle 1', having clamped one one W-d' of the belt lockingly in clamp 6', would wrap the rest of the belt around the secured object (e.g. his own waist), and thread the free end W-f" through the buckle pocket (having retracted wedge 5' manually enough to admit the web thickness therethrough). Then, selecting his lockposition (of web segment to be engaged), he releases wedge 5' to thrust this segment against the pocket face and be held there under the urging of return spring 9' (and possibly holding tension L'A' as well).

The web will be held so engaged unless and until wedge 5' is somehow retracted. This retraction invokes the quick release action mentioned, such as by simple tug on free end W-f" of the web to withdraw wedge 5' out of the pocket POK', and hold it so retracted (manually); then pulling on the opposite end W' (direction L'-A) and withdrawing or relocating the web as known in the art. This acts to effect a quick, efficient release without compromising the secured, non-slip character of the locking mode. That is, until release is triggered, the web is held so engaged despite an increase in load or pulling from the secured end.

Workers in the art will recognize that the foregoing embodiments have provided, according to the inven-
tion, a number of novel features readily adaptable for use in buckle structures. For instance, using a wedge inside a buckle pocket, together with pocketed return spring means, derives advantages in buckle assembly, in freedom from jamming and fouling and other advantages, including the rectified self-cleaning feature. Further, in such a structure, using a pocketed, coil-spring return bias means will be recognized as providing a longer, more reliable service-life, as well as the mentioned self-cleaning and ease of installation and assembly.

Moreover, such a design with a sliding wedge adapted to be reciprocated along a flat (non-inclined) surface will be seen as providing further advantages, such as providing a buckle which is more compact in crosssection, and one exhibiting more reliable engagement under higher loads. A further feature is the rendering of parts as described in forms which lend themselves to inexpensive, mass production and to simple, efficient assembly techniques (e.g., plastic molding), while yet providing a secure, reliable structure. The versatility of this buckle and its adaptability to different web sizes, thicknesses, etc., will be apparent despite its relatively simple construction.

For instance, it has been found possible to produce a very rugged workable belt buckle whose dimensions are on the order of one-and-a-half by two inches by about one-half inch high, forming a pocket readily adapted to accommodate web segments on the order of one to one-and-a-quarter inches wide by one to several sixteenth-inches thick. Such compactness combined with strength, reliability and ease of manufacture will certainly surprise and delight those skilled in the art. This will be especially so in light of the resistance provided, for instance, by such a belt buckle—on the order of 35 pounds, or more, with the knapsack buckle being even better (200 lb. load is feasible).

While the invention has been particularly described and illustrated herein, the reference to its use in knapsack and belt buckles, it will be clear that the subject features can be advantageously employed, separately or together with other related equipment; for instance, as adapted for loading buckles, seat belt buckles and the like. Obviously, other equivalent parts, materials, and/or methods may be employed, separately or cumulatively, with the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. A buckle for securing strap means comprising a housing having oppositely positioned side wall portions, and oppositely positioned top and bottom wall portions, the opposite ends of said housing being open, the top and bottom wall portions converging towards one of said housing ends, a shaft attached to said housing and extending between the side wall portions thereof, a wedge member slidably retained in said housing on said shaft, said wedge member having an elongated slot formed therein, said shaft being fitted in said slot to permit longitudinal movement of said wedge member relative to said housing, said wedge member having a tapered forward portion, said forward portion facing towards said one of said housing ends towards which the top and bottom housing wall portions converge, spring means mounted in said housing for resiliently urging the forward portion of said wedge member towards said one of said housing ends, said wedge member having a second elongated slot opening out of a face thereof and extending substantially normally to said first mentioned slot, said spring being fitted in said second slot, one end of said spring abutting against an end wall of said second slot, and means on said housing for securing a first portion of the strap means thereto, a second portion of the strap means being fitted between the wedge member and the housing, said spring means urging the forward portion of said wedge member against the second portion of the strap means to clamp the strap means between the wedge member and the converging top and bottom housing wall portions.

2. The buckle of claim 1 wherein said shaft is attached to said housing near the end of said housing opposite to said one of said ends thereof towards which the top and bottom housing wall portions converge.

3. The buckle of claim 1 wherein said spring means comprises a coil spring, the other end of said spring being connected to said shaft.

4. The buckle of claim 1 wherein the tapered forward portion of said wedge member has a toothed portion which abuts against the strap means.

5. The buckle of claim 1 wherein said means for securing said first portion of the strap means to the housing comprises a bar formed in said housing, said first portion being wrapped around said bar.

6. The buckle of claim 1 wherein said means for securing the first portion of the strap means to the housing comprises an L-shaped locking clamp, a shaft fixedly attached to the housing, the clamp being rotatably supported on said shaft, said clamp having a toothed section which engages the strap means and clamps it to the housing when the clamp is rotated to a locking position.

7. The buckle of claim 1 wherein said wedge member has serrated knob portions formed on opposite sides thereof to facilitate manual movement thereof relative to the housing to effect release of the second portion of the strap means.

8. The buckle of claim 1 and further including a quick release cord secured to the wedge member to facilitate movement of said wedge member relative to the housing.

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