May 10, 1949. J. R. C. QUILTER 2,469,574

DETACHABLE CONNECTOR FOR TENSILE MEMBERS

Filed March 13, 1947

Fig.1.

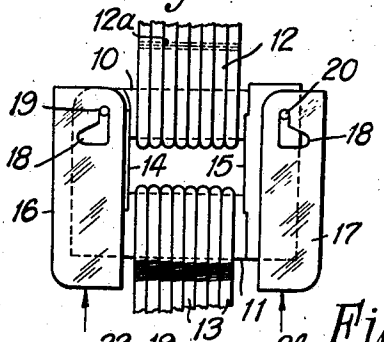


Fig.2.

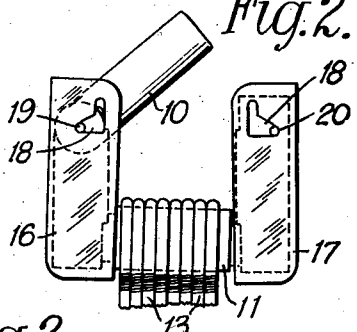


Fig.3.

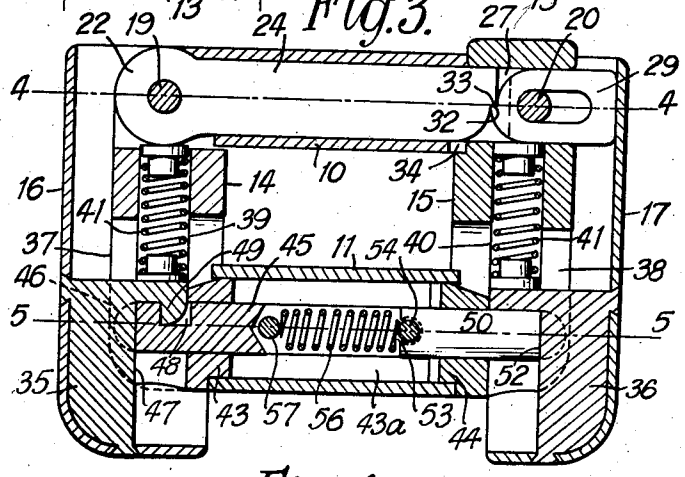


Fig.4.

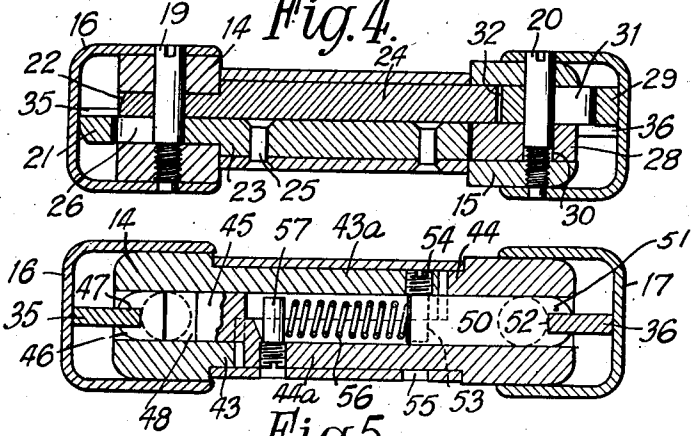


Fig.5.

Inventor

John Raymond Cuthbert Quilter

by: [signature]

His Attorney.

Patented May 10, 1949

2,469,574

UNITED STATES PATENT OFFICE

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DETACHABLE CONNECTOR FOR TENSILE MEMBERS

John Raymond Cuthbert Quilter,
Woking, England

Application March 13, 1947, Serial No. 734,302
In Great Britain March 21, 1946

4 Claims. (Cl. 294—83)

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This invention relates to detachable connectors for parachute harness.

The main object of the invention is to provide an improved device of this character, adapted for manual disconnection of lift webs and like members of the harness, even while under tension, the improved device being particularly applicable to tensile members formed by a number of cords in looped engagement with shackles or the like.

A further object of the invention is to provide a detachable connector which can be readily operated by one hand, so that an aviator can disconnect a pair of lift webs or the like simultaneously by using both hands, the necessary movements being such that they can be performed readily even when thick gloves are being worn.

Another object of the invention is to provide an improved detachable connector for tensile members such as lift webs, wherein a preliminary unlocking movement is effected by sliding a pair of spring-controlled grips in the direction of the load-tension on said members, after which the two grips are squeezed or closed together in order to produce the disconnection of the tensile members.

Other objects and advantages of the invention will hereinafter appear from the following description of a preferred embodiment, given with reference to the accompanying drawings, in which:

Fig. 1 is an elevation of the connector in normal position, with the tensile members attached to its parallel crossbars.

Fig. 2 is an elevation showing the grips displaced in order to release the upper crossbar, the latter being shown as swinging around a pivot at one end for its tensile member to slip off.

Fig. 3 is a sectional elevation of the connector in normal position on a larger scale.

Figs. 4 and 5 are plan views in section on the lines 4—4 and 5—5 respectively of Fig. 3.

In the embodiment of the invention shown in these drawings, the connector comprises two parallel members or cross bars 10, 11, with which the looped ends of the lift webs or cords 12, 13 are engaged, two side-pieces 14, 15 of substantially square cross section, and two grips 16, 17 arranged as channel members fitting upon the side pieces and guided by means of L-shaped slots 18 in the channel flanges; the two opposite slots 18 of each grip or channel engage respectively with the head and the point of a screw 19 or 20 respectively, passing through the side-piece in line with the axis of the cross-bar or

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member 10 which swings for release of the tensile connection 12, as shown in Fig. 2. Normally the screws 19, 20 occupy the parallel portions of the slots, but sliding movement of the grips, in the longitudinal direction (as indicated by the arrows in Fig. 1), will bring the middle angled portions of the slots as far as the screws; subsequent closing movement of the two grips 16, 17 towards one another (to the position illustrated in Fig. 2) will slide the transverse portions of the slots 18 along the screws 19, 20, this movement producing the release of the crossbar 10 to swing around a pivot at one end and allowing the cords 12 to slip off at the other end. These cords 12 are sewn together by cross-stitching, as indicated at 12a, so as to form a sleeve fitting loosely upon the crossbar 10 in order to facilitate its slipping off, whereas the cords 13 are fitted with tight loops upon the crossbar 11 in order to avoid tilting under load.

The swinging member or crossbar 10 is pivoted upon the screw 19 passing through the side piece 14, this member 10 being formed by a tube having a joint-knuckle 21 secured thereto and having a second knuckle member 22 slidable inside the tube; the knuckles are integral with stems 23, 24 of semicircular section, fitting side by side in the bore of the tube 10, one stem 23 being fixed by rivets 25 or the like, as shown in Fig. 4, and the other stem 24 being free to slide longitudinally in relation to the tube. The fixed joint-knuckle 21 has a slotted engagement at 26 with the pivot screw 19, but the slidable knuckle member 22 engages as a close fit upon this screw; thus the tube 10 can move longitudinally to a limited extent in relation to the side-piece 14 and screw 19, its fixed knuckle 21 normally projecting beyond the other knuckle and making contact with the interior of the grip or channel, as shown in Fig. 4. In this position, the slidable knuckle-stem 24 will project from the opposite end of the tube 10, where it engages in a cylindrical recess 27 in the other side-piece 15, which is traversed by the corresponding screw 20 for guiding its grip or channel member 17; inside this recess 27 there are fitted two semi-circular shoes 28, 29, both traversed by the guide screw 20 which passes through a close-fitting circular hole 30 in the shoe 28 aligned with the knuckle stem 23 secured to the tube or swinging crossbar 10, and through a slotted hole 31 in the shoe 29 aligned with the slidable knuckle-stem 24. The latter shoe 29 has its inner end, adjacent to the slidable knuckle-stem, formed with a tooth or ledge 32 at right

angles to its axis, the end surface of the shoe being curved away above and below this tooth, as shown in Fig. 3; a corresponding tooth or overhang 33 is provided on the adjacent end of the slidable knuckle-stem 24, these two teeth resting flat on one another to limit the return of the swinging member 10 to normal position, when the slidable knuckle-stem 24 is pushed into the recess 27 and the shoe 29 thereby forced out into contact with the interior of the grip or channel 17 on this side of the connector. In order to allow the swinging of the tube or cross-bar 10 about its pivot screw 19, without hindrance by the tooth 32 upon the slotted shoe 29, a notch 34 is cut on the end of the tube in a position to clear the tooth 32 on the shoe.

The displacement of the grips or channels 16, 17 in relation to the side-pieces 14, 15, is also controlled by keys in the form of blades 35, 36 fixed on the interior of the grips and passing through narrow longitudinal slots 37, 38 in the outer faces of the side-pieces; the inner ends of these blades work in cylindrical recesses 39, 40 bored longitudinally of the side-pieces and enclosing coiled springs 41, fitted with caps 42 at their extremities. One end-cap of each spring presses down upon the corresponding blade 35 or 36 so as to hold the grip in normal extruded position, while the other end-cap presses up against the two knuckles 21, 22 in the one case and against the two shoes 28, 29 in the other case.

The parallel member or crossbar 11, to which the other tensile connection 13 is attached, comprises an outer sleeve supported by two hollow trunnions 43, 44 at the ends of the side-pieces; inside the sleeve 11, these trunnions are cut away to semi-annular section, the two cut-away portions 43*a*, 44*a* overlapping and being slidable side by side in the interior of the sleeve. The trunnion 44 has an axial extension 45 of circular section slidable in the bore of the other trunnion 43, this extension having a rounded end 46 which is notched diametrically at 47 to engage with the blade 35 of the adjacent grip; near the end of the extension, it is notched transversely, at right angles to the first-mentioned notch, this transverse notch 48 being normally engaged by a hook or tooth 49 projecting from the blade, within the cylindrical recess 39 which houses one of the coiled springs 41, the back of the hook wedging against the side of this recess, as seen in Fig. 3.

The side-piece 15 and the adjacent portion of the hollow trunnion 44 enclose a sliding rod 50 having a rounded outer end 51 which is also notched diametrically at 52 to engage with the blade 36 of the grip 17 on that side-piece; the inner end of this rod is notched transversely at 53, at right angles to the notch 52 at its outer end, to engage with a pin 54 screwed into the wall of the semi-annular portion 43*a* of the trunnion 43, this pin 54 being inserted and removable through a hole 55 in the outer sleeve 11 which can be turned to register the hole with the pin. Against this pin there rests one end of a coiled spring 56 loosely fitted between the two semi-annular trunnion portions, the other end of the spring bearing against a second pin 57 screwed into the semi-annular wall 44*a* of the trunnion 44; the pressure of this spring tends to force the trunnions 43, 44 axially together, thus holding the side-pieces 16, 17 in rigid engagement with the sleeve 11, and maintaining the notched ends 46, 51 of the extension 45 and sliding rod 50 in engagement with the blades 35, 36 of the respective grips.

In operation, with the lift webs 12, 13 or the like under tension, a quick release of the connector will be obtained by grasping the two grips 16, 17 with one hand, sliding them longitudinally of the side-pieces 14, 15 against the action of the coiled springs 41 inside the latter, and then squeezing the grips together until the pivoted cross bar 10 swings aside and frees the looped end of the cords 12 attached to it. The initial movement brings the angled middle portions of the guide slots 18 up to the screws 19, 20 passing through the side-pieces 14, 15 and slides the keys or blades 35, 36 fixed inside the grips along the slots 37, 38 in the side-pieces, thereby compressing the springs 41 inside the latter and lifting the hook 49 formed on the blade 35 out of the transverse notch 48 in the axial extension 45 of the trunnion 44 projecting from the opposite side-piece 15; the grips 16, 17 will thus be prepared for inward movement. Upon squeezing the grips together, the side-pieces 14, 15 will be separated by a distance approximately equal to the approach of the grips towards one another. In the case of the pivoted member or crossbar 10, its slotted knuckle 21 is pushed inwards by contact with the interior of the grip 16, the other end of the knuckle-stem 23 therefore pushing back the side-piece 15 by abutment against the fixed shoe 28 in the cylindrical recess 27; conversely the slidable shoe 29 is pushed inwards by contact with the interior of the second grip 17, causing the slidable knuckle-stem 24 to push back the other side-piece 14. The separation of the side-pieces 14, 15 thus produced is sufficient for the slidable knuckle-stem 24 to escape from the cylindrical recess 27, so that the crossbar formed by the tube 10 and knuckle members can swing clear around its pivot screw 19 to release the cords.

In the meantime, at the other end of the connector, the squeezing of the grips 16, 17 has caused their blades 35, 36 to press inwards the notched ends of the trunnion-extension 45 and sliding bar 50, against the action of the spring 56 mounted between them, the two trunnions 43, 44 and the corresponding ends of the side-pieces therefore moving apart sufficiently to loosen their support for the outer sleeve 11 which normally binds them rigidly together; the two side-pieces 14, 15 are thus left free to rock slightly in relation to one another, in order to facilitate the release of the pivoted crossbar 10 at the other end of the connector and to make it possible to re-engage the bar afterwards. When the looped cords 12 have been attached once more to the crossbar 10, the latter is swung down into place, until arrested by the engagement of the teeth 32, 33, whereupon the spring 56 draws together the adjacent ends of the side-pieces 14, 15, causing the end of the slidable knuckle-stem 24 to snap into the cylindrical recess 27, as soon as the squeeze upon the grips is eased; the two springs 41 return the grips to normal position, and the connector has thus become rigid again, the trunnions 43, 44 being locked together by the engagement of the blade hook 49 in its transverse notch 48 as the sliding movement of the grips is completed.

What I claim is:

1. A detachable connector for tensile members, comprising two side-pieces, two crossbars, each crossbar having its extremities engaged in the respective side-pieces, said crossbars being

adapted to receive adjacent ends of the connected tensile members, two grips mounted upon the side-pieces and slidable longitudinally thereof, means normally locking said side-pieces together through one of said crossbars, said locking means being controlled by longitudinal sliding movement of said grips, a pivot secured in one of said cross-pieces, the other of said crossbars having an extremity engaged with said one cross-piece by means of said pivot and its opposite extremity engaged with the other cross-piece by sliding engagement in a recess therein, said grips being movable inwardly towards one another after their longitudinal sliding movement, and means operated by the inward movement of said grips for disengaging said other crossbar from said recess for swinging movement about said pivot to release the respective tensile member.

2. A detachable connector for tensile members, comprising two normally parallel members, said parallel members being adapted to receive the adjacent ends of the connected tensile members, two normally parallel side-pieces, said parallel members extending transversely between said side-pieces and having their opposite extremities engaged therein, two grips mounted on said side-pieces and slidable longitudinally thereof, said grips being also movable inwardly towards one another after completion of their longitudinal sliding movement, means normally locking said side-pieces together through one of said parallel members, said locking means being controlled by longitudinal sliding movement of said grips, a pivot secured in one of said side-pieces, the other of said parallel members having an extremity engaged with said pivot to form its engagement with the respective side-piece, the opposite extremity of said other parallel member being slidable in a recess in the other side-piece to form its engagement therewith, and means operated by the inward movement of said grips for disengaging said other parallel member from said recess for swinging movement about said pivot to release the respective tensile member.

3. A detachable connector for tensile members, comprising two tubular members adapted to engage within loops on said tensile members, two

side-pieces engaging with the extremities of said tubular members, one of said side-pieces including a pivot engaging with a knuckle at one extremity of one tubular member and the opposite extremity of said one tubular member engaging in a recess in the other side-piece, said side-pieces including hollow trunnions engaged externally by the opposite extremities of the other tubular member, an extension from one of said trunnions passing through the interior of said other tubular member and through the interior of the other trunnion to within said one side-piece, a hook secured inside the grip mounted upon said one side-piece, said hook normally locking with the extremity of said extension projecting beyond said other trunnion, said hook being displaced to unlock said extension by the sliding movement of said grips, and means operated by the inward movement of said grips for disengaging said one tubular member from said recess for swinging movement about said pivot to release the respective tensile member.

4. A detachable connector for tensile members, adapted for manual disconnection while under tension, comprising two normally parallel members over which the adjacent ends of the tensile members are looped, two side-pieces in which the extremities of said parallel members are engaged, two spring-controlled grips mounted on said side-pieces, said grips being adapted for sliding longitudinally of the respective side-pieces and subsequent closing movement towards one another, a pivot mounted in one of said side-pieces, one of said normally parallel members having one extremity carried by said pivot, the opposite extremity of said one normally parallel member being engageable in a recess in the other of said side-pieces, and means for locking said side-pieces together, the sliding movement of said grips first releasing said locking means, and the closing movement of said grips then disengaging said one normally parallel member from said recess for swinging movement about said pivot to free the respective tensile member.

JOHN RAYMOND CUTHBERT QUILTER.

No references cited.