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L. M. JOHNSTON

2,430,341

PARACHUTE HARNESS CONNECTOR

Filed May 31, 1944

Fig. 1.

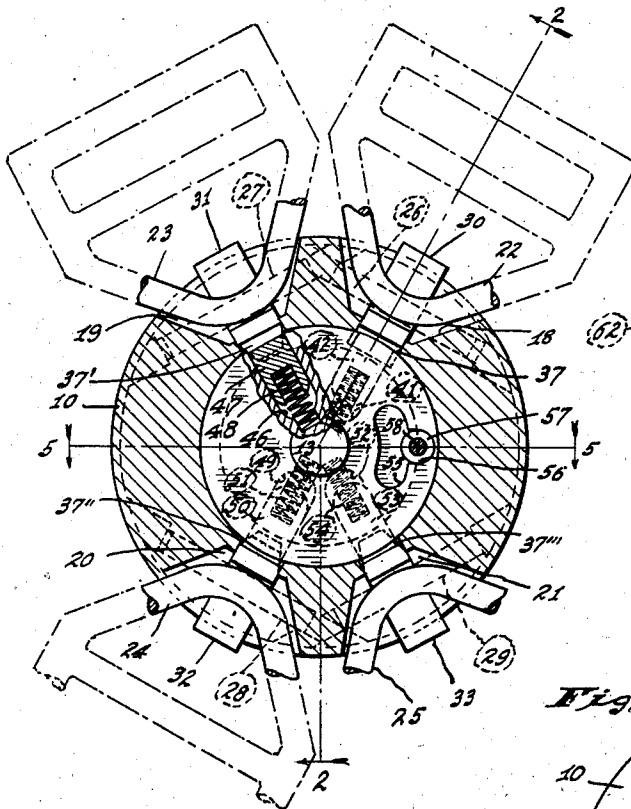


Fig. 2.

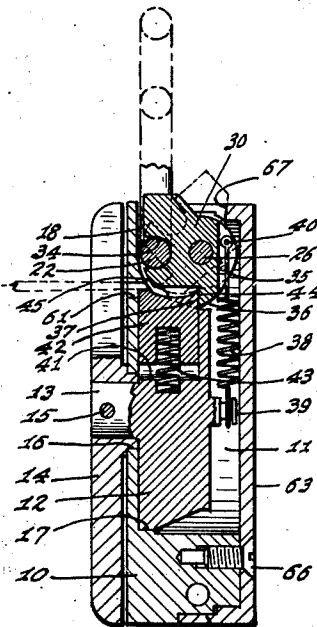


Fig. 4.

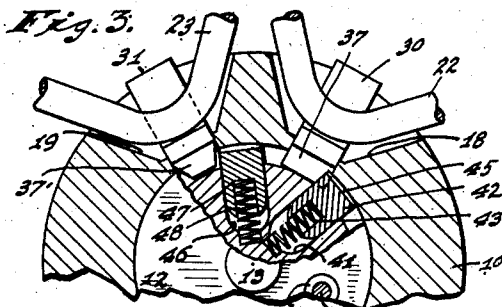
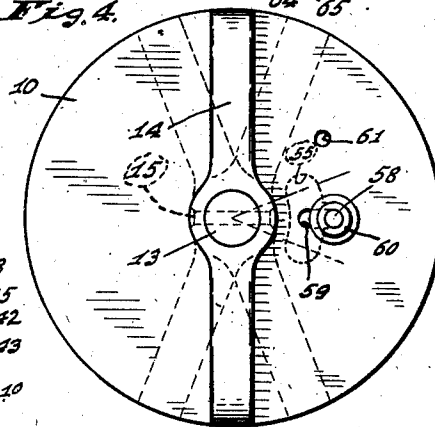


Fig. 5.

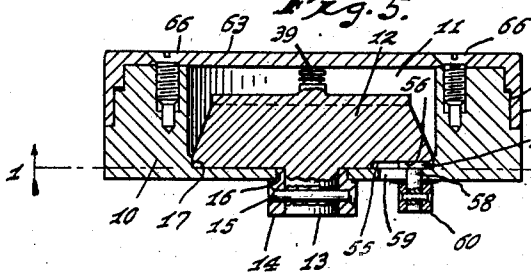
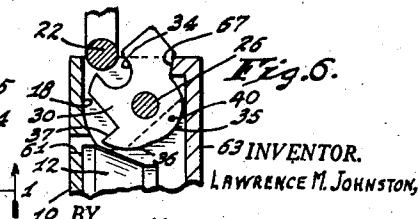


Fig. 6.



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PARACHUTE HARNESS CONNECTOR

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13 Claims (Cl. 24-205)

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The present invention relates to a parachute harness connector, and the primary object thereof is to provide a quick-release device for securing the D-hooks at the ends of the straps of a harness whereby a parachutist is connected to his chute, so that, although the harness is firmly and securely held in place at all desired times, and although the device is guarded against accidental operation, nevertheless the parachutist can, when the time is ready, instantaneously release the straps of the harness, thus disconnecting himself from his chute.

Among the major objects of the invention are the provision of a device of the character described which shall require only a very slight movement of the actuating mechanism to release the harness, and which the degree of stress applied to the parts of the connector by the harness straps will not materially affect the ease of actuation of the release mechanism, in which the pull on the harness straps is applied to the latch means in such a direction as actually to facilitate movement of the latch elements to hook-releasing position, in which the straps may be associated with the latch elements regardless of the position of the blocking means, and in which all the above desirable features can be incorporated in a simple mechanism of minimum dimensions, minimum weight, and minimum complexity of operating parts. Further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, my invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific construction illustrated and described, so long as the scope of the appended claims is not violated.

Fig. 1 is a transverse section taken substantially on the line 1-1 of Fig. 5;

Fig. 2 is an axial section taken substantially on the line 2-2 of Fig. 1;

Fig. 3 is a fragmental view similar to Fig. 1 but showing the parts in a different position;

Fig. 4 is a front elevation of the device of the present invention;

Fig. 5 is a horizontal section taken substantially on the line 5-5 of Fig. 1; and

Fig. 6 is a fragmental sectional view, taken upon a plane parallel with the plane of the upper portion of Fig. 2, with the parts in hook-releasing position.

In the illustrated embodiment of my invention, I provide a body 10 formed with a rear cavity 11

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in which is journaled for oscillation a member 12 having a stem 13 to which is secured a hand lever 14 by means of a pin 15, or the like. The lever 14 is formed to provide a hub which is journaled in a suitable bearing aperture 16 formed in the front wall of the body 10, and it will be noted that the member 12 likewise finds a journal bearing upon the surface 17 within the cavity 11 of the body 10.

The body 10 is formed with a plurality of perimetrically spaced outwardly opening sockets 18, 19, 20, and 21, and it is to be noted that I prefer to locate the sockets 18 and 19 peripherally close together, the angular interval between said sockets being preferably less than 60°. The sockets 20 and 21 are similarly spaced from each other, whereby the straps attached to the D-hooks 22, 23, 24, and 25 will lead substantially straight away from the connector to the points at which they pass over the wearer's shoulders or about his legs.

Suitable bores are provided in the body 10 for the accommodation of fulcrum pins 26, 27, 28, and 29 located within the respective sockets 18, 19, 20, and 21 and traversing the same, each of said pins providing a pivotal mounting for one of the latches 30, 31, 32, and 33.

Except for one feature, which will be described hereinafter, the said latch elements are identical, and therefore only one is illustrated, and will be described, in detail.

The latch 30 is formed with a notch 34 opening through its periphery, said notch being so located that, in one position of the latch element, its mouth is guarded by a wall of the socket 18, while in another position of the latch element, its mouth opens through the mouth of the socket 18 (see Figs. 2 and 6). The periphery of the latch element is further formed to provide a surface one portion 35 of which is substantially concentric with the pin 26, and which merges with another portion 36 which progressively retreats from said axis and terminates in a substantially radial portion 37. A spring 38 has one end anchored upon a hub 39 projecting from the member 12, and its other end anchored at 40 upon the latch 30 at a point eccentric to the axis of the pin 26, whereby said spring 38 urges said latch resiliently toward the position of Fig. 6.

The member 12 is formed with a plurality of radially opening recesses or sockets, one of which, 41, is illustrated in Fig. 2. Reciprocally mounted in the recess 41 is a plunger 42 resiliently urged radially outwardly by a spring 43. Said plunger 42 is formed to provide a surface 44 which, when

the parts are in the positions illustrated in Figs. 1 and 2, engages the surface 37 of the latch element 30 to block said element against movement out of the illustrated position. Thus, the plunger 42 may be referred to as a blocker means for the latch element 30. Said plunger 42 is further formed with a curved end surface 45 which, when the plunger is in its fully projected position, is engageable by the portion 36 of the peripheral surface of the cam element 30.

From an inspection of Fig. 1, it will be seen that, when the member 12 is in its intermediate position, the axis of the socket 41 lies in the median plane of the latch 30. A similar socket 46 is similarly related to the latch 31, and provides a mounting for a plunger 47 spring urged outwardly by a spring 48; and in the same way, a socket 49 mounts a plunger 50 influenced by a spring 51 in association with the latch 32 and a socket 52 mounts a plunger 53 influenced by a spring 54 and associated with the latch 33. Each of these plungers, like the plunger 42, acts as blocker means for its associated latch element.

The body 12 is formed with an arcuate socket 55 in its forward surface, having a radial branch 56. A roller 57 is received therein and is mounted upon a pin 58 projecting through a radial slot 59 in the front surface of the body 10, said pin carrying a button 60 outside the body. Obviously, when the parts are in the position illustrated in Figs. 1 and 5, the roller 57 acts to prevent movement of the member 12; but if said pin 58 is shifted radially inwardly through the slot 59, the roller 57 will be brought into registry with the socket 55 to permit limited oscillatory movement of the member 12 in either direction.

With the parts in the positions illustrated in Figs. 1 and 2, the hooks 22, 23, 24, and 25 will be solidly held in place by the latches 30, 31, 32, and 33. If, however, the roller 57 is moved into the socket 55, the member 12 can be moved, in either direction, through a limited arc. Thereby, the blocking plungers 47, 50, and 53 will be moved out of engagement with the surfaces 37', 37'', and 37''' of the latches 31, 32, and 33, in the manner illustrated in Fig. 3. It is to be noted that these surfaces are narrower than the surface 37 of the latch element 30, so that such movement of the member 12 does not disengage the plunger 42 from the latch surface 37. The moment the plungers 47, 50, and 53 are disengaged from the said surfaces 37', 37'', and 37''', the latches 31, 32, and 33 are free to swing about their axes to shift their notches into the position opening through the mouths of their respective sockets 19, 20 and 21, whereby the hooks 23, 24, and 25 are released. The springs corresponding to the spring 38 bias the latch elements toward such movement, and of course any stress upon the straps attached to the said hooks will also tend to produce such movement. Thereby, the parachutist is completely released from his harness.

The surface 37 of the latch 30 is wide enough so that the limited movement of the member 12 does not disengage the plunger 42 from said surface; so that the hook 22 remains engaged with the connector. This is for the purpose of preventing loss of the connector, which thus remains attached to the harness.

However, if it is desired to remove the connector from the hook 22, a rod-like tool, indicated at 62 in Fig. 2, may be projected through a hole 61 formed in the outer surface of the body 10 to engage the outer end of the plunger 42. The tool may thereupon be rocked to depress the

plunger 42 until the surface 44 thereof is disengaged from the surface 37, whereupon the latch element 30 is free to swing to release the hook 22.

It will be obvious that, so long as the handle 14 remains in either of the dotted line positions indicated in Fig. 4, the hooks 22, 23, 24, and 25 may be reengaged with the connector. That is, any one of the latches being in the position illustrated in Fig. 6, if a hook is pressed inwardly into its body socket, it will engage in the notch 34 of the associated latch and rotate that latch in a counterclockwise direction, as viewed in Fig. 6, to the position illustrated in Fig. 3. But it is desirable that said hooks be engageable with the connector even if the handle is in the solid-line position of Fig. 4.

All of the latches being in the position of Fig. 6, the member 12 is free to move between the two dotted-line positions of the handle 14 shown in Fig. 4, since the curved surfaces 45 of the plungers 42 will barely clear the surfaces 36 of the latch elements. If the handle 14 is, then, returned to the solid-line position and locked in place by shifting the pin 58 to the position of Figs. 1, 4, and 5, counterclockwise rotation of a latch, under the influence of a hook being entered in its socket, will cause the surface 36 to cooperate with the surface 45 by a camming action to depress the associated plunger 42, 47, 50, or 53 until the extreme end of the surface 36 clears the plunger. Thereupon, the spring associated with the plunger will cause the plunger to be projected to the position of Fig. 2, wherein said plunger will engage the surface 37 (et cetera) of its associated latch to hold such latch in hook-retaining position.

It will be clear on inspection that one or more additional latch assemblies may be incorporated in the connector if it is desired to connect more than four harness straps.

I prefer to close the cavity 11 by means of a cover plate 63 having a peripheral flange 64 snugly fitting a peripheral surface 65 on the body 10, said cover being held in place by screws 66 or the like. Of course, the flange 64 will be notched, as at 67, at each latch station to permit movement of the latches to the position illustrated in Fig. 6.

I claim as my invention:

1. A quick-release connector comprising a body, a member journaled for oscillation therein, a plurality of latch elements journaled in said body for oscillation about axes transverse to the axis of said member, and blocker means associated with said member and positionable therewith, at times, to block said elements against movement about their axes of oscillation toward latch-release position, but movable with said member out of blocking relation with certain of said elements.

2. A quick-release connector for a plurality of hooks comprising a body formed with a plurality of perimetally-spaced slots, a latch element mounted in each of said slots for oscillation about an axis, each latch-element being formed to provide a surface movable, upon such oscillation, into and out of position to engage and retain one of such hooks in its slot, a member mounted in said body for oscillation about an axis normal to the plane of said latch element axes, and blocker means associated with said member and positionable therewith, at times, to block said elements against movement out of retaining posi-

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tion, but movable with said member out of blocking relation with certain of said elements.

3. In combination, a body having a perimetral opening socket, a latch element mounted in said socket for oscillation about an axis traversing the mouth of said socket, said element being formed with a notch opening through said mouth at times and at times located within said socket and closed by a wall of said body, said notch being adapted to receive a securing device, blocker means in said body, and means for shifting said blocker means into and out of position to block said latch element against movement out of its last-mentioned position.

4. A quick-release connector for a plurality of hooks, comprising a body, formed to provide a plurality of perimetral spaced sockets into and from which said hooks may be moved, a latch element pivotally mounted in each of said sockets for oscillatory movement in the line of such movement of its associated hook into and out of hook-retaining position, and blocker means in said body adapted, in one position, to block all of said latch elements against movement out of hook-retaining position and shiftable to release certain of said latch elements.

5. A quick-release connector for a plurality of hooks, comprising a body, a member centrally journaled in said body, said body being formed to provide a plurality of perimetral opening sockets radiating from the axis of said member and into and out of which said hooks may be moved, a latch element pivotally mounted in each of said sockets for oscillation about a trans-radial axis into and out of hook-retaining position, each of said latch elements being formed to provide a surface substantially radial with respect to said member, and said member providing surfaces cooperable with said latch surfaces, at times, to hold said latches against movement out of hook-retaining position, said member being shiftable about its axis to remove its said surfaces from cooperative relation with certain of said latch elements.

6. A quick-release connector for a plurality of hooks, comprising a body, a member centrally journaled in said body, said body being formed to provide a plurality of perimetral opening sockets radiating from the axis of said member and into and out of which said hooks may be moved, a latch element pivotally mounted in each of said sockets for oscillation about a trans-radial axis into and out of hook-retaining position, each of said latch elements being formed to provide a surface substantially radial with respect to said member, and said member providing surfaces cooperable with said latch surfaces, at times, to hold said latches against movement from hook-retaining position to hook-releasing position but ineffective to prevent movement of said latches from hook-releasing position to hook-retaining position, said member being shiftable about its axis to remove its said surfaces from cooperative relation with certain of said latch elements.

7. A quick-release connector for a plurality of hooks, comprising a body, a member centrally journaled in said body, said body being formed to provide a plurality of perimetral opening sockets radiating from the axis of said member and into and out of which said hooks may be moved, a latch element pivotally mounted in each of said sockets for oscillation about a trans-radial axis into and out of hook-retaining position, each of said latch elements being formed to provide a surface substantially radial with respect to

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said member, and a plurality of radially projecting elements carried by said member and located, in one position of said member, to engage said latch surfaces to block movement of said latch elements to hook-releasing position.

8. A quick-release connector for a plurality of hooks, comprising a body, a member centrally journaled in said body, said body being formed to provide a plurality of perimetral opening sockets radiating from the axis of said member and into and out of which said hooks may be moved, a latch element pivotally mounted in each of said sockets for oscillation about a trans-radial axis into and out of hook-retaining position, said member being disposed entirely outside the paths of movement of said latch elements, each of said latch elements being formed to provide a surface substantially radial with respect to said member, and a plurality of plungers radially movably carried by said member and adapted, when radially projected and when said member is in one position, to engage said surfaces of said latch elements to hold said latch elements against movement from hook-retaining position, said plungers being radially retractible to positions outside the paths of movement of said latch elements.

9. A quick-release connector for a plurality of hooks, comprising a body, a member centrally journaled in said body, said body being formed to provide a plurality of perimetral opening sockets radiating from the axis of said member and into and out of which said hooks may be moved, a latch element pivotally mounted in each of said sockets for oscillation about a trans-radial axis into and out of hook-retaining position, said member being disposed entirely outside the paths of movement of said latch elements, each of said latch elements being formed to provide a peripheral cam surface terminating in a surface substantially radial with respect to said member, and a plurality of plungers radially movably carried by said member and adapted, when radially projected and when said member is in one position, to engage said radial surfaces of said latch elements to hold said latch elements against movement from hook-retaining position, said latch cam surfaces being cooperable with said plungers, when said member is in said one position, to cause retreat of said plungers during movement of said latch elements from hook-releasing position to hook-retaining position.

10. A quick-release connector for a plurality of hooks, comprising a body, a member centrally journaled in said body, said body being formed to provide a plurality of perimetral opening sockets radiating from the axis of said member and into and out of which said hooks may be moved, a latch element pivotally mounted in each of said sockets for oscillation about a trans-radial axis into and out of hook-retaining position, said member being disposed entirely outside the paths of movement of said latch elements, each of said latch elements being formed to provide a peripheral cam surface terminating at one end in a surface substantially radial with respect to said member, and a plurality of plungers carried by said member, radially reciprocable with respect thereto, and resiliently urged outwardly, each of said plungers having a surface disposed, when said member is in one position and when said plunger is radially projected, to engage said radial surface of its latch element to hold the latter against movement from hook-retaining position, and each of said plungers having a further surface substantially coinciding, when said

member is in its said one position and said plunger is radially projected, with the position occupied by the opposite end of said latch cam surface when said latch is in hook-releasing position.

11. A quick-release connector mechanism comprising a body having a laterally-opening socket therein adapted to receive a hook, a latch element pivotally mounted in said socket, said latch element being provided with a radially-opening notch and being oscillable between a position in which the mouth of said notch is guarded by a wall of said socket and a position in which the mouth of said notch opens through the mouth of said socket, the periphery of said latch element further being formed to provide a surface having a portion progressively retreating from said axis and terminating in a substantially radial portion, blocker means mounted in said body and providing a surface cooperable with said last-named latch element surface portion, when said latch element notch is in its first-mentioned position, to hold said latch element against movement toward its second-mentioned position, and providing a surface cooperatively positioned with respect to said retreating portion of said latch element surface when said latch element notch is in its second-mentioned position, said retreating portion of said latch element surface operatively cooperating with said last-mentioned surface of said blocker means as said latch element is moved to shift its notch from its second-mentioned position to its first-mentioned position, to move said blocker means temporarily away from the axis of said latch element, and means for shifting said blocker means out of the path of said latch element surface.

12. A quick-release connector mechanism comprising a body having a laterally-opening socket therein adapted to receive a hook, a latch element pivotally mounted in said socket, said latch element being provided with a radially-opening notch and being oscillable between a position in which the mouth of said notch is guarded by a wall of said socket and a position in which the mouth of said notch opens through the mouth of said socket, means resiliently biasing said latch element toward its second-mentioned position, the periphery of said latch element further being formed to provide a surface having a portion progressively retreating from said axis and terminating in a substantially radial portion, blocker means mounted in said body and providing a surface cooperable with said last-named latch element surface portion, when said latch element notch is in its first-mentioned position, to hold said latch element against movement toward its second-mentioned position, and providing a

surface cooperatively positioned with respect to said retreating portion of said latch element surface when said latch element notch is in its second-mentioned position, said retreating portion of said latch element surface operatively cooperating with said last-mentioned surface of said blocker means as said latch element is moved to shift its notch from its second-mentioned position to its first-mentioned position, to move said blocker means temporarily away from the axis of said latch element, and means for shifting said blocker means out of the path of said latch element surface.

13. A quick-release connector mechanism comprising a body having a laterally-opening socket therein adapted to receive a hook, a latch element pivotally mounted in said socket, said latch element being provided with a radially-opening notch and being oscillable between a position in which the mouth of said notch is guarded by a wall of said socket and a position in which the mouth of said notch opens through the mouth of said socket, the periphery of said latch element further being formed to provide a surface having a portion progressively retreating from said axis and terminating in a substantially radial portion, blocker means mounted in said body and providing a surface cooperable with said last-named latch element surface portion, when said latch element notch is in its first-mentioned position, to hold said latch element against movement toward its second-mentioned position, and providing a surface cooperatively positioned with respect to said retreating portion of said latch element surface when said latch element notch is in its second-mentioned position, said retreating portion of said latch element surface operatively cooperating with said last-mentioned surface of said blocker means as said latch element is moved to shift its notch from its second-mentioned position to its first-mentioned position, to move said blocker means temporarily away from the axis of said latch element, means for shifting said blocker means out of the path of said latch element surface, and shiftable means operative, in one position, to prevent operation of said last-named means and, in another position, to limit the degree of operation thereof.

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The following references are of record in the file of this patent:

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