Sept. 8, 1959 H. J. MORAN 2,902,737

QUICK DETACHABLE PARACHUTE HARNESS CONNECTOR

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Fig. 1.

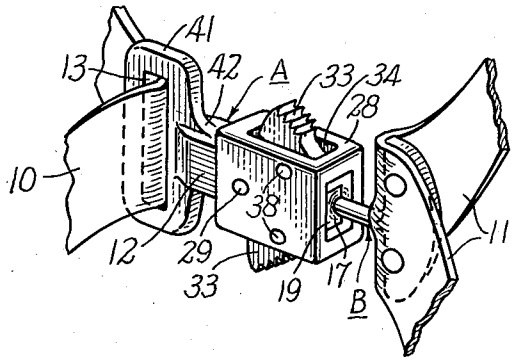

Fig. 2.

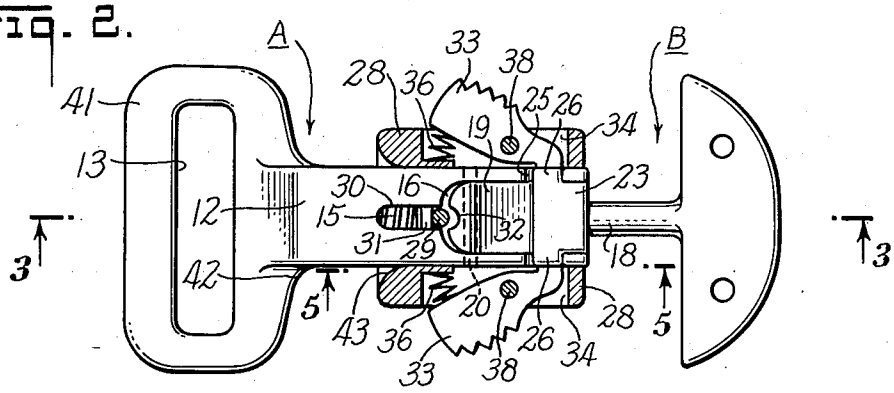

Fig. 3.

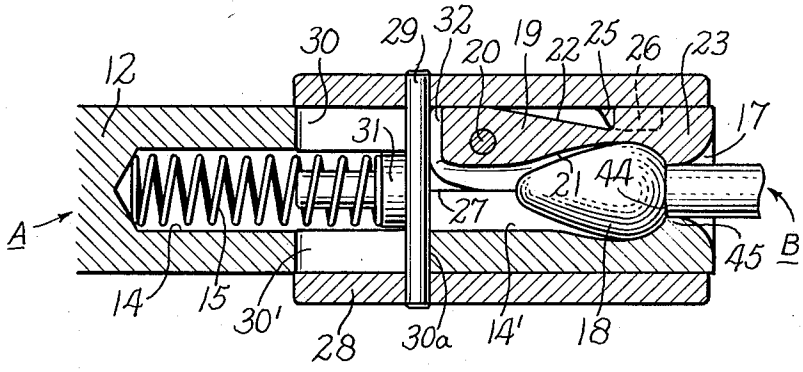

Fig. 4.

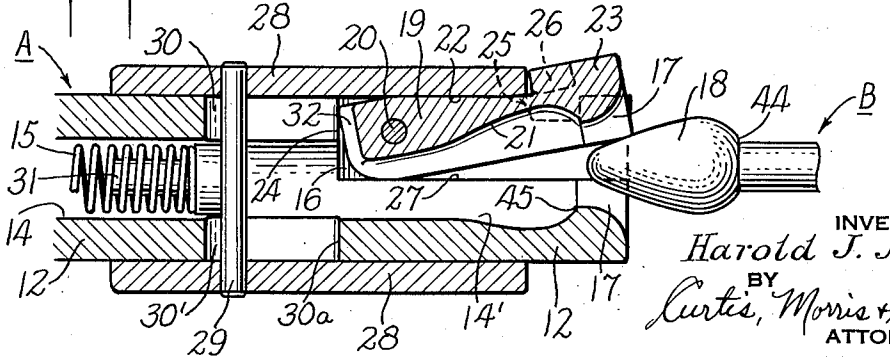

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Fig. 5.

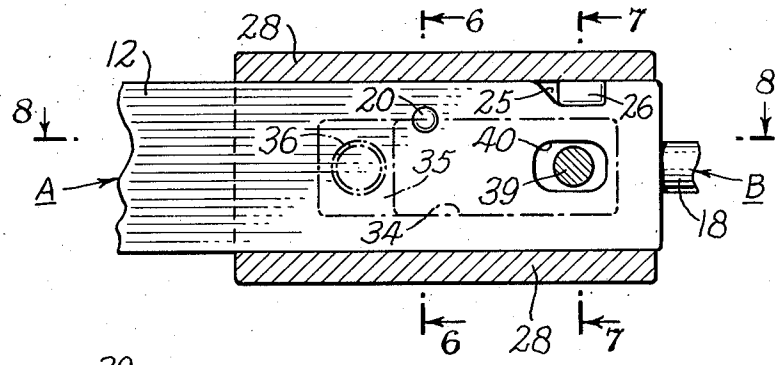


Fig. 6.

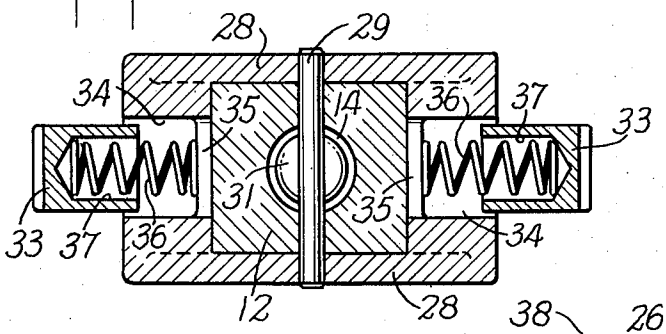


Fig. 7.

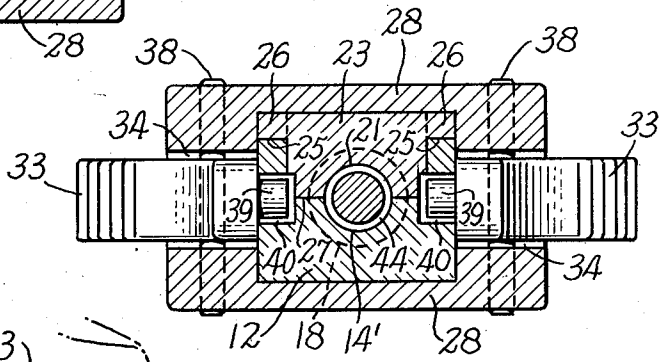
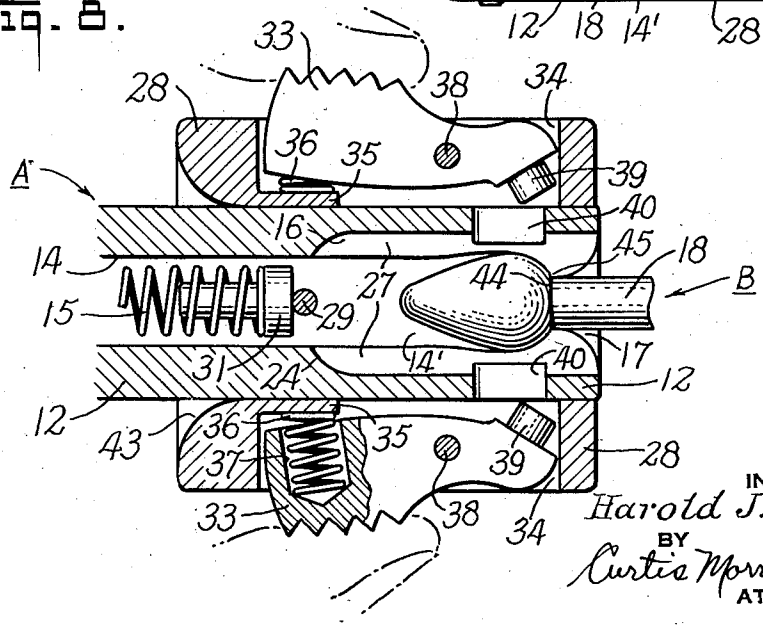


Fig. 8.



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United States Patent Office 2,902,737 Patented Sept. 8, 1959

2,902,737

QUICK DETACHABLE PARACHUTE HARNESS CONNECTOR

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Application February 13, 1956, Serial No. 564,916

4 Claims. (Cl. 24—211)

The present invention relates to an improvement in parachute harness connectors or couplings more particularly of the quick detachable type.

Known forms of parachute harness connectors have various undesirable feaures or characteristics which limit or impair their availability or effectiveness for the intended use. Thus, some connectors are so heavy and cumbersome as to unduly and unnecessarily burden the wearer. Some types also have the disadvantage that they are too easily released or opened by accidental means. Other embodiments having various mechanical features cost more than is justifiable particularly where the more expensive factors are not necessary to speed and certainty of operation. Still other connectors which are secure when closed are too difficult to release under some conditions of use.

An object of my invention, therefore, has been to provide a compact light weight parachute harness connector which can be made at reasonable cost with maximum effectiveness in use. More specifically it is an object of this invention to make available a coupling which can be closed or completed in minimum time and by actuation of easily manipulated parts; which when in harness connecting condition presents optimum security against accidental opening or unlocking; and which can be opened or released rapidly and surely by manual pressure and the pulling or displacement of one part longitudinally in relation to another.

To achieve said objects and advantageous mode of operation a parachute harness coupling embodying my said invention broadly comprises a main body part or shank attachable to a harness strap, or the like, and having a socket recess with a latch at one end, a plug attachable to another harness strap, or the like, and having an end portion or head releasably engageable with said socket recess. A latch keeper in the form of a spring biased sleeve is mounted for limited endwise movement on said shank to and from latch keeping or locking position, retracting movement away from said position being yieldingly opposed by spring means carried by said shank. And said spring biased sleeve is releasably held in extended or latch keeping position by spring pressed detent means mounted on said sleeve and having a portion interengaging with said shank.

An embodiment of my invention incorporating the advantageous features aforesaid is described in the following specification and illustrated in the accompanying drawings wherein:

Figure 1 is a view in perspective of a harness coupling or connector with the parts as arranged when employed to releasably couple two parts, as the straps, of a conventional type of harness;

Figure 2, a side elevation of the coupling shown in Figure 1 but with a wall of the sleeve removed to show more clearly portions of the releasable sleeve locking means and the latch or plug retaining means;

Figure 3, a fragmentary view on enlarged scale in longitudinal section on the line 3—3 of Figure 2 with the latch arranged in operative plug head engaging and retaining relation and the sleeve arranged in latch locking position;

Figure 4, a view similar to Figure 3 but showing the parts in plug head releasing relation;

Figure 5, a fragmentary view in longitudinal section on the line 5—5 of Figure 2;

Figure 6, a transverse section on the line 6—6 of Figure 5;

Figure 7, a transverse section on the line 7—7 of Figure 5; and

Figure 8 is a longitudinal section on the line 8—8 of Figure 5, showing the parts in coupling relation but with the slide locking detents manually released to permit uncoupling.

As shown in Figure 1, one form of a coupler or connector according to my invention includes a main body A adapted to be connected with a strap **10**, for example of a conventional type of harness, and a coupling plug B adapted to be connected with another part of the harness, as a strap **11**. In use, said straps are releasably coupled or joined through said main body and said coupling plug.

As shown in Figure 2, the main body A comprises a shank **12** having at one end a strap receiving slot **13**. The other end of shank **12**, as seen more clearly in Figures 3, 4 and 8, is formed with an inner recess **14** which houses a spring **15**, and a socket or outer recess **14'** having at its outer end a lateral opening **16**, Figure 2, and an end opening **17**, Figures 3, 4 and 8. Said socket recess is shaped and dimensioned to receive the rounded and tapered terminal or head **18** of said coupling plug B. As seen in Figure 1, said coupling plug may be attached to strap **11** in fixed position thereon whereas the shank **12** is conveniently slidably adjustable along strap **10** so that it may be brought to a position opposite the outer end of said plug head when the parts are to be connected.

To provide suitable means for releasably clutching or gripping said head **18** in socket recess **14'**, a latch **19** is pivotally mounted on shank **12** to rock on a pivot pin **20** in said lateral opening **16** to and from plug head receiving position. The inner surface **21** of latch **19** is shaped to substantially the same inner surface contour as that of fixed wall portions of the shank which define said socket recess so that, when the parts occupy the relative positions shown in Figure 3, latch **19** is, in effect, a part of the wall of socket recess **14'**.

A portion of the upper (as seen in Figures 2 and 3) or outer face of latch **19** is inclined in a direction to form a notch **22** between the head **23** of said latch and pivot pin **20**. The arrangement is such that the maximum depth of notch **22** occurs where the inclined portion thereof meets the inner end wall surface of head **23**. And the angle of inclination of said inclined surface and the depth of said notch are such as to permit the outer end of latch **19** to be deflected to the head releasing position thereof shown in Figure 4. The extent of such deflecting or opening movement of latch **19** may in part be limited by a portion of the rear interior wall of recess **14'** which forms a detent shoulder **24**. The rear end face of latch **19** is of rounded cross contour such that when said latch is deflected to full open position a portion of the rear outer edge of said end face will engage said detent shoulder **24** and thereby stop or limit the extent of deflection or opening movement of said latch **19**, if any, beyond that indicated in Figure 4.

As seen in Figures 2 and 5, portions of the side walls which between them define the opening **16** are cut away to form opposed notches **25**. Head **23** of latch **19** is provided with lugs or ears **26** extending laterally from opposite sides of said latch **19** and are interfitting, Figures 2 and 3, with said notches **25** when the parts are in

coupling position. With this arrangement, tension, if any, operating from plug head 18 through latch 19 is transmitted directly therefrom to the fixed portion of the wall of shank 12 instead of through the latch supporting pivot pin 20.

Referring to Figures 7 and 8, the socket recess 14' is also formed to provide longitudinally extending lateral bearing surfaces or shoulders 27 which, as shown in Figures 3 and 4, are adapted to engage and support the latch 19 when in closed position, Figure 3.

Thus, it appears that latch 19 when subjected to pulling forces in use is snugly fitted in the lateral opening 16 in such a manner as to close the socket recess 14' of shank 12 and, to such extent, is held against twisting movement in relation to said shank.

Means for releasably locking latch 19 in operative plug retaining position include a sleeve 28 slidably mounted for limited longitudinal movement on shank 12 between the closed or locking position shown in Figure 3 and the open or plug releasing position shown in Figure 4. As shown in said figures, sleeve 28 carries a detent pin 29 which extends through opposed parallel slots 30 and 30' in said shank 12. The spring 15 in recess 14 normally presses a plunger 31 outwardly against pin 29, which in this position, Figure 3, brings one end portion of pin 29 through the open end of slot 30 to a position opposite a notch 32, Figure 2, in the inner end wall of latch 19.

Another portion of said pin 29 yieldingly engages and is stopped by the closed end 30*a* of slot 30', Figure 3.

Means for positively and releasably locking sleeve 28 in its extended operative position shown in Figures 1 and 3 include detent levers 33 mounted in parallel slots or recesses 34 at opposite sides of said sleeve 28, each of said recesses having at one end a shoulder 35 providing a seat for one end of a spring 36, Figure 6, the other end being engaged in hole 37, Figures 6 and 8, in lever 33 provided at one side of pivot 38 which supports lever 33 in said recess 34 of sleeve 28. At the other side of pivot 38, levers 33 have projecting lugs 39 arranged and adapted to extend into and engage recesses 40 in opposite wall portions of shank 12, Figures 2, 5 and 8.

To releasably connect straps 10 and 11 equipped as above described, the operator presses the exposed serrated ends of levers 33 toward each other to release sleeve 28. Said sleeve is retracted manually against the biasing effect of spring 15 to the position shown in Figure 4, thus permitting latch 19 to rock to open or plug head receiving position when head 18 is inserted into the clutch recess. The connecting operation is completed automatically as soon as the operator lets go of sleeve 28. Under such circumstances, spring 15 forces sleeve 28 to its normal extended or latch covering position, Figure 3, where it is releasably held by lugs 39 which engage detent recesses 40. The dimensions of the parts are such that sleeve 28 also covers slots 30 and 30', thus protecting spring 15. To disconnect straps 10 and 11 when joined as above described, the operator again depresses the serrated end portions of levers 33 to the position shown in Figure 8 and pulls sleeve 28 to its retracted position, Figure 4, against resistance of spring 15, whereupon a longitudinally applied tension or pull on body A or plug B, or a longitudinal pull or tension on one in a direction away from the other will disengage head 18 from latch 19.

As shown more clearly in Figure 2, the slotted head 41 joins shank 12 through a neck having faces 42 which conform in contour with the adjacent faces 43 of sleeve 28. This arrangement provides reinforcing strength at the junction of shank 12 with head 41 and permits full play or maximum relative endwise movement between shank 12 and sleeve 28 and, to that extent, facilitates effective disengagement of the coupling plug B from the above described clutch means carried by A, Figure 1.

Although it is contemplated that, in use, plug B under tension will readily separate from shank 12 of main part A when sleeve 28 is retracted to the position shown in Figure 4, it is also desirable to form the head 18 and interior surface portions of socket recess 14' and latch 19 so that, in normal use, head 18 will, while the parts are locked or coupled, transmit tension to shank 12 primarily axially or in a longitudinal direction. For this purpose, head 18 is formed with an outwardly exposed narrow convexly curved annular face or ledge 44 which, when the parts are related as shown in Figure 3, transmits to a limited extent the longitudinal pull or tension to a corresponding inwardly exposed concavely curved face or shoulder 45 partly on latch 19 and partly on shank 12, without, however, wholly displacing or relieving lateral or radial components of said tension force which are transmitted from tapered and curved portions of head 18 to correspondingly contoured inner surfaces as 21 of shank 12 and latch 19 when the free end of the latter is freed from the restraining action of locking sleeve 28, as in Figure 4, so that the outer end of said latch 19 will swing outwardly to release the convex shoulder 44 of head 18 from the concave shoulder 45 of the socket and clutch means and thus permit head 18 to be freely separated from coupling engagement with the shank 12.

A connector or coupling as above described is especially effective for use with parachute harness. In this environment, my improved device affords maximum strength and security with minimum weight. In these respects it represents important advantages over known types of connectors which are both cumbersome and heavy thus creating a weight burden out of proportion to any resultant safety or effectiveness in use. Also, a coupling device according to my invention cannot easily be released by accidental means, since it requires not only pressure simultaneously on both levers 33 to release the sleeve 28 but also a retracting pull on said sleeve to clear head 23 of latch 19. The arrangement described permits both of these manual operations to be made with maximum speed and effectiveness.

What is claimed is:

1. Quick detachable parachute harness coupling, comprising in combination a coupling plug of generally circular transverse sectional contour and having an enlarged terminal head of convexly rounded contour at its base and tapering to a rounded end, a socket member adapted for releasable swivel engagement with said head, said member including a shank having at one end a base wall and spaced lateral walls extending along opposite sides of said base wall, and a head retaining and releasing latch pivotally mounted to rock between said lateral walls, said base wall having its interior surface shaped to form a recess substantially semicircular in cross sectional contour and having an end portion convexly curved in central longitudinal sectional contour to provide a flared opening at said end portion of the recess, and other portions of said recess adjacent to said flared opening are concavely curved in central longitudinal sectional contour and intersect with said convexly curved portion to provide a bearing shoulder for swivelling engagement with said base of said head, said latch having plug head engaging portions on its inner surface arranged opposite said inner surface of the base wall and formed with a generally semi-circular transverse sectional contour and with a portion having a central longitudinal sectional contour symmetrically arranged in relation to the opposed interior surface portion of said base wall, said interior surface portions of the latch being arranged and adapted, when said latch is in head retaining position to provide, in cooperation with said base wall, a swivel connection between said socket and said head which is adapted for ready release of the head from the socket under conditions which produce longitudinal tension between the socket member and the plug.

2. Harness coupling according to claim 1 and wherein said latch is held in position to engage and releasably retain said head in the socket recess by a sleeve slidably

mounted on said shank when said sleeve is in latch closing position, and means for releasably locking said sleeve in head retaining position, said sleeve locking means being manually operable to release said sleeve and permit movement thereof by manual force from latch locking to latch releasing condition and thereby permit separation of said plug head from said socket recess.

3. Harness coupling according to claim 1, and wherein said latch is a pivoted arm interfitting at its outer end with said wall portions of said shank and is engaged and retained in operative position by a sleeve mounted on said shank to slide to and from latch releasing position, the lateral and outer end surfaces of said arm being substantially flush with adjacent lateral and end surfaces of the shank when said latch is in latching position, and said arm having an outwardly exposed lateral face positioned between its pivot and its outer end and inclined in a direction to form a notch whereby when said sleeve is moved to latch releasing position, the outer end of said latch will be free to rock outwardly until said inclined surface thereof comes into engagement with said sleeve, thereby to release said connecting plug head from said socket recess.

4. Quick detachable parachute harness coupling according to claim 1 and wherein the latch has portions which interlock with the shank when said latch is in plug head retaining position, and a latch controlling sleeve slidably mounted on said shank is spring-pressed in one direction to hold said sleeve yieldingly in latch locking position, and means for releasably locking said sleeve in said latch locking position include a spring biased lever arm pivoted on said sleeve and having a detent lug on one end which is arranged and adapted to extend through an opening in said sleeve and into yielding engagement with a detent recess in said shank.

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