Feb. 9, 1960 J. J. DALGLISH ET AL 2,924,405

LINK MULTIPLE HINGED CONNECTOR BARS

Filed April 2, 1954 2 Sheets-Sheet 1

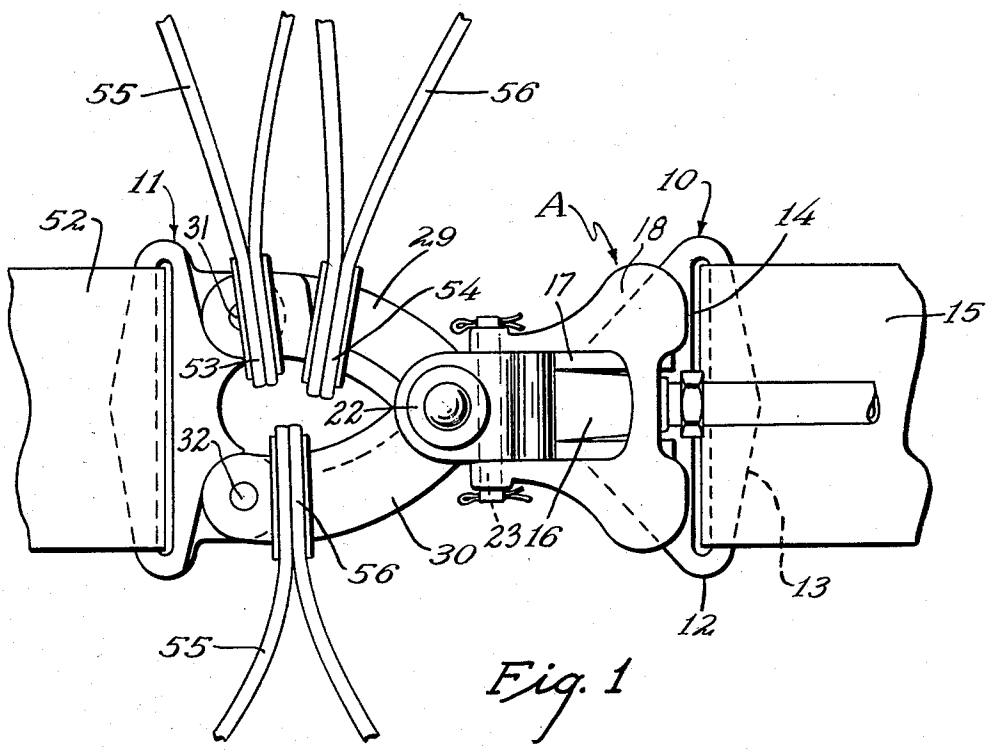


Fig. 1

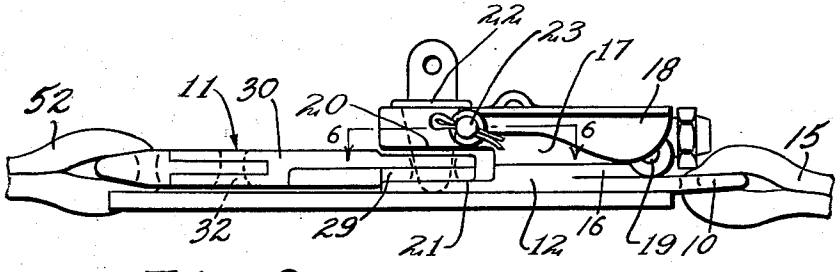


Fig. 2.

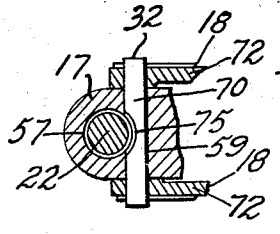


Fig. 6.

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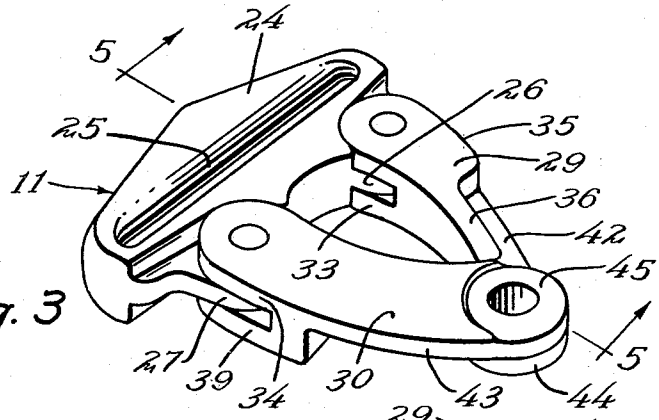


Fig. 3

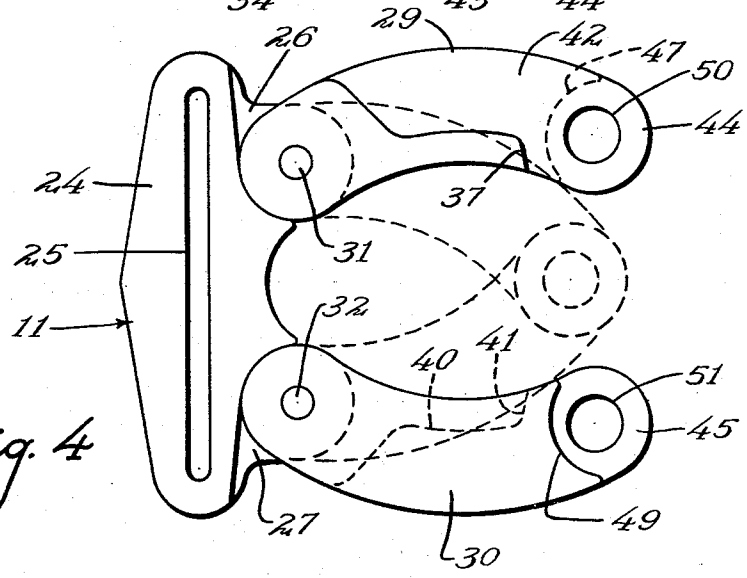


Fig. 4

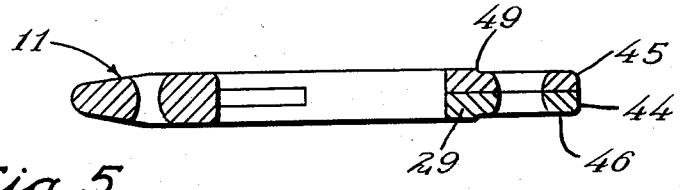


Fig. 5

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2,924,405

LINK MULTIPLE HINGED CONNECTOR BARS

James J. Dalglish, St. Paul, Ralph L. Holm, Minneapolis, and Earl W. Lager and Walter A. Beer, St. Paul, Minn., assignors of one-half to said James J. Dalglish, and one-half to said Ralph L. Holm, both of St. Paul, Minn.

Application April 2, 1954, Serial No. 420,618

5 Claims. (Cl. 244—122)

This invention relates to an improvement in split link construction and is particularly useful as a part of a quick detachable harness for use by airplane pilots and the like. In the high speed airplanes it has become more or less common practice to eject the pilot from the plane in the event of an emergency. A harness is usually employed for holding the pilot in place. This harness usually includes a belt anchored to the seat and encircling the body of the pilot. Shoulder straps are also provided which extend over the shoulders of the pilot to maintain the pilot in proper relation to the belt. A tie down strap is also often provided anchored to the seat and extending between the legs of the pilot and anchored to the belt. In the case of an emergency the pilot and seat are either ejected upwardly from the cockpit of the plane or dropped downwardly through an opening in the floor of the plane. Means must be provided for releasing all of the component parts of the harness shortly after the ejection operation so that the pilot may parachute to safety.

In the co-pending application of Ralph Holme et al., Serial No. 407,825 filed February 3, 1954 now Patent 2,754,073 for Quick Detachable Harness a quick detachable buckle is described which permits quick separation of the seat belt. In this structure one of the buckle parts serves as an anchor about which the shoulder straps and tie down strap may be looped. In certain cases where both shoulder straps and a tie down strap are employed it is desirable to use a split link which opens up to permit easier detachment of the various straps. It is the object of the present invention to provide such a link.

A feature of the present invention lies in the provision of a split link having an anchoring base portion to which is secured one end of the seat belt and to provide a pair of link arms pivotally attached to this base part. The link arms are supported to swing into converging relation or to swing into diverging relation. When the link arms are in converging relation they include aligned apertures through which a latch member on the other section of the seat belt buckle may engage to hold the belt in body encircling position. When this latch member is released the link arms may swing into diverging relation so that the looped ends of the shoulder straps and tie down strap may slip therefrom without difficulty.

A feature of the present invention lies in the provision of a seat belt buckle including a split link having arms which swing into converging relation and which are limited in their pivotal movement to a point where the apertures through the links are aligned. As a result the link arms may be swung together and inserted into the cooperable portion of the buckle without the necessity of hunting for the positions in which the apertures are aligned. It is essential that the belt buckle be operable in darkness as well as in light and that the buckle parts be quickly connected. By limiting the pivotal movement of the arms, the proper alignment of the openings therein is insured.

An added feature of the present invention lies in the fact that the link arms are limited in their outward swinging movement. This is essential as it prevents the arms from separating to a point where the disengagement of the straps is hindered.

These and other objects and novel features of my invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of the specification:

Figure 1 is a planned view of a section of the seat belt and cooperable harness belts showing the connecting buckle in assembled position.

Figure 2 is an edge view of the buckle shown in Figure 1.

Figure 3 is a perspective view of the split link with the arms thereof in converging position.

Figure 4 is a planned view of the split link with the link arms in partially open position.

Figure 5 is a sectional view through the split link, the position of the section being indicated by the line 5—5 of Figure 3.

Figure 6 is a sectional view on the line 6—6 of Figure 2.

The assembled unit is best illustrated in Figure 1 of the drawings. This figure shows a buckle A including a latching portion **10** and a split link portion **11**. The latch portion **10** is best described in the application for patent referred to previously. This portion includes a base plate **12** having a widened portion **13** containing an elongated slot **14** through which one end **15** of the seat belt may be secured. The base plate also supports a barrel **16** including a locking pin for preventing the hinging of the hinged portion **17** of the latch from opening. The hinge part **17** is hinged to the base portion **19** and swings away from the base plate as described in the previous application.

A notch **20** is provided in the free end of the hinged part **17** and a cooperable notch **21** is provided in the base plate **12** for the accommodation of the end of the split link **11**. A parachute key **22** may be locked in place by a locking member **23** controlled by a bifurcated lever **18** and extends through the hinged part **17** and through a portion of the split link to normally latch these parts together. The parachute key **22** is removable and forms a part of the parachute apparatus normally worn by the pilot.

The split link **11** is constructed as best illustrated in Figures 3, 4 and 5. This link includes a base portion **24** which is relatively wide and includes a slot **25** through which the second end of the seat belt may be looped. The base **24** is provided with two parallel projecting ears **26** and **27** which extend from the base **24** in parallel relation and are a fraction of the thickness of the base portion **24**. In the particular construction illustrated the ears **27** are approximately one-third the thickness of the base portion **24** and project from the base **24** midway between the upper and lower surfaces thereof.

A pair of link arms **29** and **30** are hinged to the ears **26** and **27** by pivots **31** and **32** respectively. These arms **29** and **30** are provided with bifurcated ends **33** and **34** respectively which straddle the ears **26** and **27**. The pivots **31** and **32** extend through the bifurcated ends **33** and **34** and through the ears **26** and **27** to pivotally connect these parts.

The arm **29** at its bifurcated end is of substantially the same thickness as the base **24** to which it is attached. The full thickness portion of the arm **29** extends along the outer edge of the arm for a short distance to form a shoulder **35**. The full thickness portion also extends as a rib **36** along the inner edge of the arm to a point spaced from the free end of the arm. The end **37** of this rib **36** forms a shoulder as will be later described.

The arm 30 also includes a full thickness portion at its bifurcated end 34 which is substantially equal in thickness to the base portion 24. This full thickness portion extends a short distance along the outer edge of the arm 30 forming a shoulder 39. As indicated in dotted outline in Figure 4, the full thickness portion extends as a rib 40 along the inner edge of the arm 30 forming a shoulder 41 at its extremity which is at a point spaced from the free end of the arm 30.

As is evident from the drawings the remainder of the arms 29 and 30 which are not of full thickness are offset so that the free ends of the arms may overlap. The portion 42 of the arm 29 which is of full thickness extends substantially flush with the under surface of the base 24 and is of approximately one-half the thickness of the base portion 24. Similarly, the portion 43 of the arm 30 which is not of full thickness extends substantially flush with the upper surface of the base portion 24 and this portion is of substantially one-half the thickness of the base portion. As a result the ends of the arms may overlap until the shoulder 37 of the arm 29 engages the inner edge of the arm 30 and the shoulder 41 on the arm 30 engages the inner edge of the arm 29.

As is indicated in Figures 3 and 5, the extremities 44 and 45 of the arms 29 and 30 are of somewhat reduced thickness, the under surface of the arm 29 being cut away as indicated at 46 along an arcuate edge 47 and the upper surface of the arm end 45 is cut away as indicated along an arcuate line 49. The purpose of this arrangement is to permit the arm extremities to be easily inserted into the latch portion of the belt buckle which is defined by the notches 20 and 21 and the shouldered edges 47 and 49 tend to hold the arms in proper relation to the latch portion of the buckle so that the parachute key 22 may be easily inserted.

The end 44 of the arm 29 is provided with an aperture 50 therethrough and a similar aperture 51 is provided in the end 45 of the arm 30. These apertures 50 and 51 are aligned when the arms 29 and 30 are swung into the converging relation shown in Figure 3 and shown in dotted outline in Figure 4.

The operation of my split link is believed obvious from the foregoing description. The link 11 attached to a seat belt portion 52 is swung across one side of the body and the other belt end 15 bearing the latch portion 10 is swung over the body from the offset side. The looped ends 53 and 54 of the shoulder strap portions 55 and 56 respectively are threaded onto the link arm 29. The tie down strap 55 is provided with a looped end 56 which is threaded onto the arm 30. The arms 29 and 30 are swung together between the fingers of one hand and are inserted into the notch 20, 21 of the latch portion 10 of the buckle. The parachute key is next inserted into the latch portion 10, this key extending through suitable apertures in the hinged portion of the latch and the base portion thereof and through the apertures 50 and 51 of the arms 29. A latching device 23 is then operated to lock the parachute key in position to prevent its accidental removal. In normal operation at the end of a flight the pilot pivots the latch device 23 to release the parachute key 22 which is then removed. Removal of the parachute key separates the belt buckle and permits the link arms 29 and 30 to swing apart. The shoulder strap loops 53 and 54 and the tie down loop 56 then slip from the arms 29 and 30 and the entire harness is disengaged.

In the event of an emergency if it becomes necessary for the pilot to leave the plane in flight, suitable means are provided to eject or to drop the pilot's seat from the plane. Either simultaneously with the ejection or after a delayed period, the pin holding the hinged part 17 of the latch is withdrawn permitting the hinged part 17 to pivot relatively to the base part 12 and withdrawing the parachute key from the base plate while still retaining this key in the hinged portion of the buckle. This separates the ends of the seat belts and permits the link arms 29 and 30 to swing apart, allowing the looped ends of the shoulder straps and tie down belt to slip from the ends of these arms. In other words all of the equipment of the pilot is disengaged with the exception of the parachute key. As the pilot falls away from the seat, the parachute key acts to start a suitable timing apparatus which opens the parachute automatically after a predetermined time period or when a suitable elevation is reached.

In accordance with the patent statutes. We have described the principles of construction and operation of my split link and while we have endeavored to set forth the best embodiment thereof, we desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of our invention.

We claim:

1. A parachute harness assembly including, in combination, a divided safety belt, a strap having a looped end, a split link connector including a base portion having an elongated slot therein through which one end of said divided safety belt extends, a pair of arms pivotally connected at one end to said base portion on one side of said slot and spaced longitudinally thereof, pivots having parallel axes connecting said arms to said base portion, the other ends of said arms each having an aperture extending therethrough, said other ends being relatively offset to overlap in one pivotal position thereof, said apertures being aligned in said one pivotal position, said arms converging together toward said apertured ends when overlapped, a buckle connected to the other end of said divided safety belt, means attached to said buckle and extendable through said aligned apertures for detachably connecting said buckle to said arms, said looped end of said strap encircling one of said arms, said arms diverging apart in another pivotal position of said arms, whereby said looped end of said strap will slide free of said one arm, and cooperable means on said arms and on said base limiting outward pivotal movement of said arms to said diverging position.

2. The structure of claim 1 and including cooperable shoulder means on each of said arms limiting swinging of said arms toward overlapping position when said apertures are aligned.

3. A link connector for use in combination with a safety belt including a base portion having an elongated belt slot therein, said base portion having a pair of pivot apertures therethrough on one side of said slot and spaced in a direction longitudinally of said slot, a pair of identical arms having pivot apertures at one end thereof, pivots extending through said pivot apertures in said arms and in said base portion to pivotally attach said arms to said base portion, said arms including ends of reduced thickness which overlap in one pivotal position of said arms, said reduced thickness arm ends having apertures therethrough which are aligned in overlapping position of said arms, said arms converging toward each other throughout their length when in overlapping position, each arm including shoulder means thereon engaging the other of said arms when said arms are overlapped.

4. The structure of claim 3 and in which said arms are slightly curved in an outward direction, and including cooperable means on said arms and on said base portion limiting the outward pivoting of said arms to a position in which the reduced thickness ends of said arms are in diverging relation.

5. A link connector for use in combination with a safety belt including a base portion including means thereon for connection with a belt, said base having spaced pivot apertures therethrough, a pair of identical arms having pivot apertures through an end thereof, parallel pivots extending through said pivot apertures in said arms and in said base portion to pivotally attach said arms to said base portion, said arms including ends of reduced thickness which converge together at an acute

angle and overlap in one pivotal position of said arms, said reduced thickness arm ends having apertures therethrough which are aligned in overlapping position of said arms, each arm including shoulder means thereon engaging the other of said arms when said arms are overlapped.

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