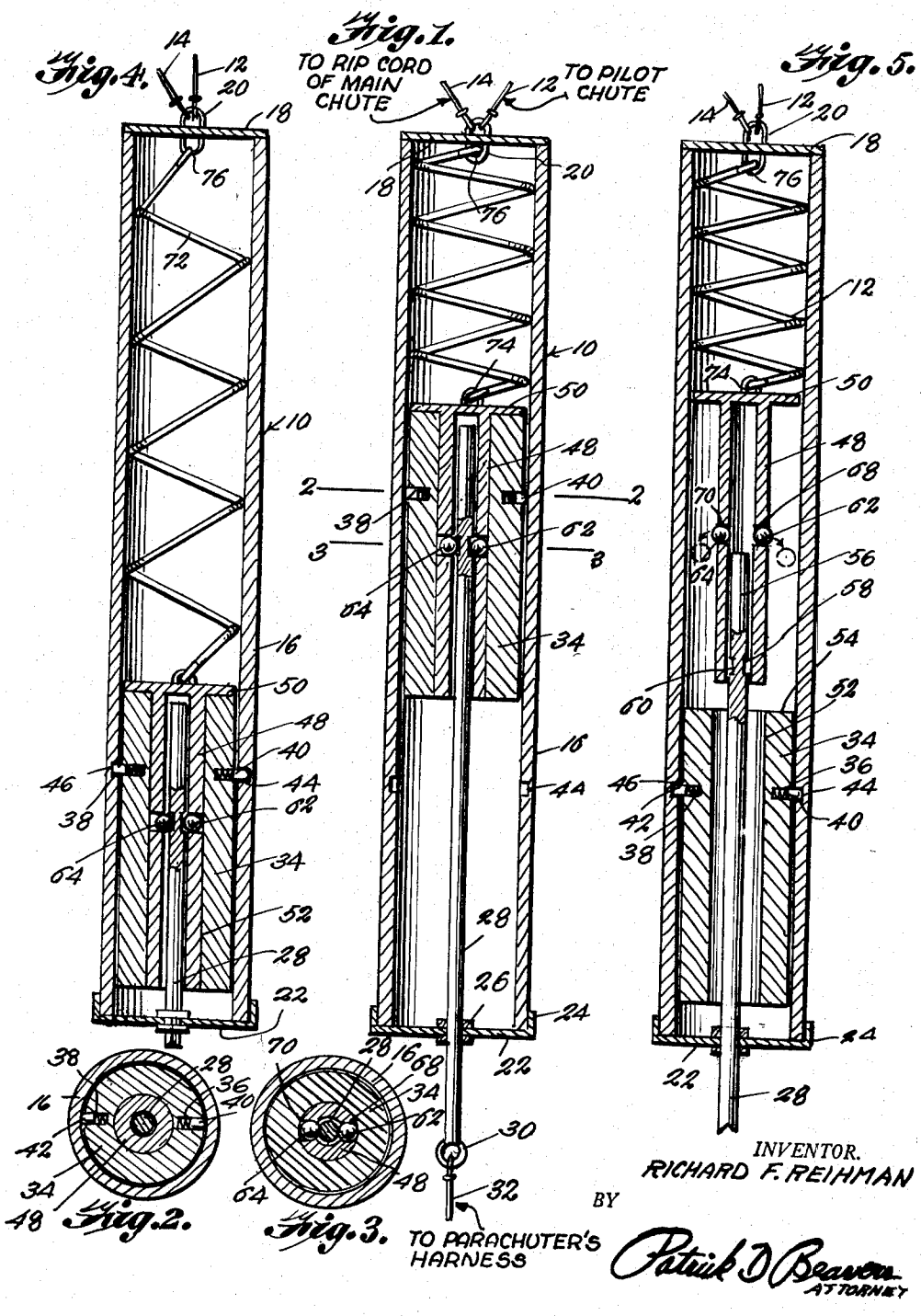
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SHOCK ABSORBING COUPLER FOR PARACHUTES

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SHOCK ABSORBING COUPLER FOR PARACHUTES

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This invention appertains to improvements in devices for retarding the opening of a parachute and controlling the speed of descent, the primary object of this invention being to provide a shock absorbing device and coupler, which is connectable between a jumper or load and a pilot chute, the coupler, when disengaged from the load or jumper, enabling the pilot chute to pull the rip-cord on the main chute and thus open the main chute.

Another object of this invention is to provide means for effecting a safe and rapid discharge of material or a parachutist from rapidly moving aircraft and to provide means for lessening the initial shock of the opening of a parachute on the load or on a parachutist.

A further object of this invention is to provide a coupling device, which will automatically uncouple itself after being subjected to a certain amount of strain and then having the imposition of strain relaxed.

These and ancillary objects and structural features of merit are obtained by this invention, the preferred embodiment of which is set forth in the following description and illustrated in the accompanying drawing, wherein:

Figure 1 is a longitudinal sectional view of a coupling device, constructed in accordance with the principles of this invention, and especially designed for connection between a load or parachutist and the pilot chute and rip-cord of the main chute;

Figure 2 is a transverse sectional view taken on line 2—2 of Figure 1;

Figure 3 is a transverse sectional view taken on line 3—3 of Figure 1;

Figure 4 is a longitudinal sectional view, with the parts moved to a subsequent position from the normal position of Figure 1, and,

Figure 5 is a longitudinal sectional view, similar to Figures 1 and 4, with the parts moved to their final position in operation.

Referring now more particularly to the accompanying drawing, the coupling device 10 is especially designed for connection between a load or parachutist and the connecting cord 12 of a pilot chute (not shown) and the rip-cord 14 of the main chute (not shown).

The coupling device includes an elongated cylinder 16, which forms a housing and has a closed end 18 through which an elliptical ring 20 is extended, the outer end of the ring receiving one end of the rip-cord 14 and one end of the cord 12.

The opposing end of the cylinder is opened

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and a cap 22 is affixed thereto by means of a peripheral flange 24. A center opening 26 is formed in the cap and a rod 28 is slidably disposed therethrough, the outer end of the rod terminating in an integral ring or eye 30, which is connected by means of a cord 32 to the harness on the load or parachutist.

An inner cylinder, having a thick wall, is slidably disposed within the cylinder 16 and is formed with diametrically opposed radial openings 36 and 38, within which spring loaded detents 40 and 42 are housed. The detents are adapted to lockingly engage in sockets 44 and 46 formed interiorly of the outer cylinder 16 and disposed in diametrically opposed relation.

A sleeve 48 is formed at one end with an end plate 50, which encloses the end of the sleeve and extends laterally therefrom, the peripheral edges of the plate being slightly spaced from the inner surface of the outer cylinder 16. The sleeve 48 is axially movable within the bore 52 of the cylinder 34, the plate being of a diameter equal to the diameter of the cylinder 34 and the end 54 of the cylinder being engageable on the under side of the plate, as seen in Figure 1.

The rod 28 is formed adjacent its inner end 56 with opposed grooves 58 and 60, which are adapted to receive ball bearings 62 and 64, the balls being disposed in apertures 68 and 70 formed in the sleeve. The ball bearings 62 and 64 are of a diameter slightly less than the depth of one of the grooves 58 or 60 plus the thickness of the walls of the sleeve 48.

A spring 72 is coiled within the outer cylinder 16 and is affixed at its inner end to a boss 74, which extends from the outer face of the plate 50. The opposite end 76 of the spring is connected to the inner end of the ring 20 and the spring is of a size and tensioned to permit the inner cylinder and sleeve to move to the position, illustrated in Figure 4, before retracting the sleeve, after the inner cylinder is locked, as seen in Figure 5.

The coupling device is illustrated in its normal position in Figure 1 with the load or the parachutist being connected to the outer end 30 of the rod 28 and the cords 12 and 14 being connected to the outer end of the ring 20.

In operation, when the user of the parachute jumps from the aircraft, the pilot chute is opened and the initial shock of the opening of the pilot chute causes the cylinder and sleeve to move from the position in Figure 1 to the position in Figure 4, where the spring loaded detents lockingly engage in the slots 44 and 46 formed in the outer

cylinder, the spring 72 being tensioned by being distended.

As the resistance between the parachutist and the pilot chute lessens, due to decreased velocity, the spring 72 will be operative to pull the sleeve 48 outwardly from the bore 52 and the inner cylinder, the balls 62 and 64 disengaging from the grooves 58 and 60 in the rod and, thereby uncoupling the rod 28 from the sleeve 48. The rod 28 is thereby free to slide completely out of the cylinder 16 from the end 22, permitting the pilot chute to effect a direct pull on the rip-cord 14 and open the main chute. Of course, the main chute is carried by the harness of the parachutist or load in a conventional pack and until the rod slides out from the housing, the housing and inner cylinder and sleeve are carried by the rod, which is connected directly to the parachutist. However, when the rod is disengaged, the housing is pulled upwardly by the pilot chute and the connection between the pilot chute and the rip cord of the main chute is through the housing at the ring 20.

While the device has been described and illustrated in connection with the opening of a parachute, it is obvious that the coupling device can be effectively employed as a coupling means in any type of linkage or a like assembly, where it is desired to automatically have one member uncouple from another, subject to the imposition of a certain amount of strain on the member and the relaxation of the strain.

Having thus described this invention, what is claimed is:

1. For use with a pilot chute and a main chute, a shock absorbing coupler comprising a housing, a rod slidably disposed through one end of the housing, said rod being adapted for attachment to a parachutist, the opposing end of the cylinder being connectable to the pilot chute and the rip cord for the main chute, means in said housing releasably locking said rod therein, said last means including a cylinder having a bore and being slidable in said housing, a member mounted in the bore of the cylinder for sliding movement, means limiting movement of the member in the direction of pull of the rod, balls carried by said member urged by the inner wall of the cylinder into engagement in grooves formed in the rod, means for locking the cylinder in the housing and means for sliding the member from the cylinder when the cylinder is locked so that the balls are disengaged from the grooves and the rod is free to slide from the housing, said last-mentioned means including a spring coiled in the housing and connected between the end of the housing opposite the end receiving the rod and the member.

2. The combination of claim 1 wherein said member includes a sleeve and said movement limiting means includes a plate on one end of the sleeve closing off said end and extending laterally from the sleeve for abutting engagement of one end of the cylinder.

3. The combination of claim 1, wherein said locking means for the cylinder includes spring loaded detents carried by the cylinder and engageable in openings in the inner surface of the housing.

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