PATENT SPECIFICATION

587,983

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PROVISIONAL SPECIFICATION

Parachute Mechanism

I, WILLIAM HERBERT SMITH, a British subject, of The Cottage, Imber Court, East Molesey, Surrey, do hereby declare the nature of this invention to be as follows:—

This invention relates to parachute mechanism and is directed towards the provision of improved means for reducing the impulse force on the article or person (hereinafter called article) carried by the parachute and the parachute itself when the parachute opens.

In the mechanism of the present invention I provide means whereby, on the opening of the parachute, the member connecting the parachute to the article increases in length against a resistance until it reaches a pre-determined amount.

In one mechanism according to the invention I use the strain energy of a plastic material to provide the resistance.

In one form this takes the form of a casing attached at the top to the parachute and carrying a drum and three round projecting studs.

A strip of ductile steel is wound into a close spiral with the inner end fixed to a round stud on which the drum is mounted; the strip passes from this drum and then round the first stud in the reverse direction and then in succession over the two other studs and passes out of the casing at the bottom, being there fixed to the article.

The arrangement is such that at each bend the material passes beyond the yield point and the tension and compression sides become successively reversed.

Such a mechanism would conveniently pay out approximately six feet of strip as the parachute opens and reduce the impulse force from something like 7 times the weight of the article as in existing mechanisms to 1½ times the weight thereof.

It will be understood that the invention is not restricted to the details of the specific embodiments described which may be varied without departing from the broad idea underlying it.

Dated the 18th day of August, 1944.

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COMPLETE SPECIFICATION

Parachute Mechanism

I, WILLIAM HERBERT SMITH, a British subject, of The Cottage, Imber Court, East Molesey, Surrey, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to parachute mechanism and is directed towards the provision of improved means for reducing the impulse force on the article or person (hereinafter called article) carried by the parachute and the parachute itself when the parachute opens.

In the mechanism of the present invention I provide means whereby, on the opening of the parachute, a member of ductile metal connecting the parachute to the article increases in length so that the major part of the kinetic energy of the article which is absorbed is taken up by the inelastic strain energy of the ductile metal as the separation between the article and the parachute increases.

By strain energy I mean the energy absorbed in straining the metal; this is sometimes called "internal work".

In one form of apparatus according to the invention this takes the form of a casing attached at the top to the parachute and carrying a drum and rollers.

A strip or wire of ductile steel is wound into a close spiral with the inner end fixed to a round stud on which the drum is mounted; the strip passes from this drum and then round the first stud in the reverse direction and then in succession over the other studs and passes out of the casing at the bottom, being there fixed to the article.

The arrangement is such that at each bend the material passes beyond the yield point and the tension and compression sides become successively reversed.

Such a mechanism would conveniently

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pay out approximately six feet of strip as the parachute opens and reduce the impulse force from something like 7 times the weight of the article as in existing mechanisms to 1½ times the weight thereof.

In the accompanying drawings which illustrate the invention,

Fig. 1 shows in elevation one form of shock absorber according to the invention,

Fig. 2 shows a corresponding side view,

Figs. 3 and 4 show similar views of an alternative construction.

Referring first to Figs. 1 and 2 a circular casing 1 made in two halves connected by bolts 2, 3, 4, 5, 6, 7, 8, 9 houses a coil of mild steel strip 20.

A hanger 21 is carried by the case and provides for connection to a parachute.

The steel strip is anchored to a central pin 10 at one end; the strip passes from the coil over rollers 11, 12, 13, 14, 15, 16, 17 (having bearings on bolts already referred to) which cause reversely directed bends in the strip and the other end 18 of the strip passes out of an opening 22 in the casing 1 and is secured in a shackle 19.

To this shackle 19 the article to be dropped by the parachute is connected.

Referring now to Figs. 3 and 4 this shows an apparatus of greater energy absorptive power than the previous and has two energy-absorbing strips of ductile material arranged in parallel.

This has two circular cup-shaped members 30, 31 clamped to a central plate 32 by bolts 33, 34, 35, 36, 37, 38, 39, 40.

Each coil of strip is anchored at one end 41 to a pin 50 and passes from the outside of the coil over rollers 42, 43, 44, 45, 46, 47 which give bends in successive reversals of direction and the end 48 of each strip passes out of an opening 49 in the bottom of the members 30, 31 and is anchored to the shackle 19 to which is connected the article to be dropped by the parachute.

Appropriate sizes for the strips are 25 Standard Sheet Gauge in thickness, 1½in. in width and of length 7 feet upwards according to the load to be carried by the parachute.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Means for reducing the impulse force between a parachute and an article carried by it when the parachute opens, comprising a member of ductile metal connecting the article to the parachute, the arrangement being such that the major part of the kinetic energy of the article which is absorbed is taken up by the inelastic strain energy of the ductile metal as the separation between the article and the parachute increases.

2. Means as in claim 1 including a casing secured to the parachute housing a wound strip of ductile metal secured to the casing at one end and to the article at the other end and passing over rollers which cause reversely directed bends to take place in the strip as it unwinds.

3. Means as in claim 2 in which the strip of ductile metal is constituted by a strip of mild steel.

4. Means as in claim 2 having a plurality of wound strips arranged in parallel substantially as described.

5. Means as in claim 2 in which rollers are arranged in the casing outside the wound strip and on both sides thereof substantially as described.

6. Means as in claim 2 in which rollers are arranged in the casing outside the wound strip on one side only thereof.

7. Means for reducing the impulse force between a parachute and an article carried by it when the parachute opens substantially as described with reference to Figs. 1 and 2 of the accompanying drawings.

8. Means for reducing the impulse force between a parachute and an article carried by it when the parachute opens substantially as described with reference to Figs. 3 and 4 of the accompanying drawings.

Dated the 12th day of July, 1945.

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pay out approximately six feet of strip as the parachute opens and reduce the impulse force from something like 7 times the weight of the article as in existing mechanisms to 1½ times the weight thereof.

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Appropriate sizes for the strips are 25 Standard Sheet Gauge in thickness, 1½in. in width and of length 7 feet upwards according to the load to be carried by the parachute.

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2. Means as in claim 1 including a casing secured to the parachute housing a wound strip of ductile metal secured to the casing at one end and to the article at the other end and passing over rollers which cause reversely directed bends to take place in the strip as it unwinds.

3. Means as in claim 2 in which the strip of ductile metal is constituted by a strip of mild steel.

4. Means as in claim 2 having a plurality of wound strips arranged in parallel substantially as described.

5. Means as in claim 2 in which rollers are arranged in the casing outside the wound strip and on both sides thereof substantially as described.

6. Means as in claim 2 in which rollers are arranged in the casing outside the wound strip on one side only thereof.

7. Means for reducing the impulse force between a parachute and an article carried by it when the parachute opens substantially as described with reference to Figs. 1 and 2 of the accompanying drawings.

8. Means for reducing the impulse force between a parachute and an article carried by it when the parachute opens substantially as described with reference to Figs. 3 and 4 of the accompanying drawings.

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