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G. DREYFUS

SHOCK-ABSORBING DEVICES OF THE FRICTIONAL TYPE

Filed Feb. 28, 1941

Serial No.

381,153

2 Sheets-Sheet 1

Fig. 1

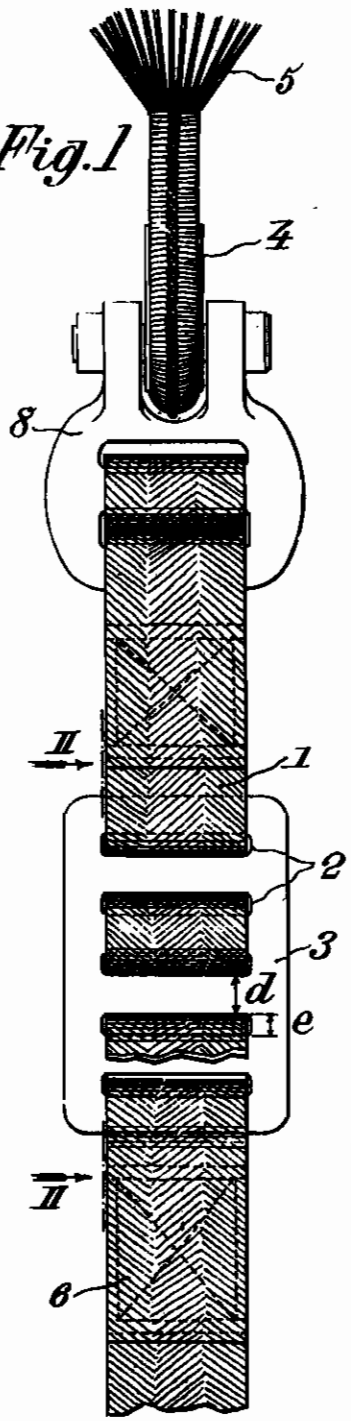

Fig. 2

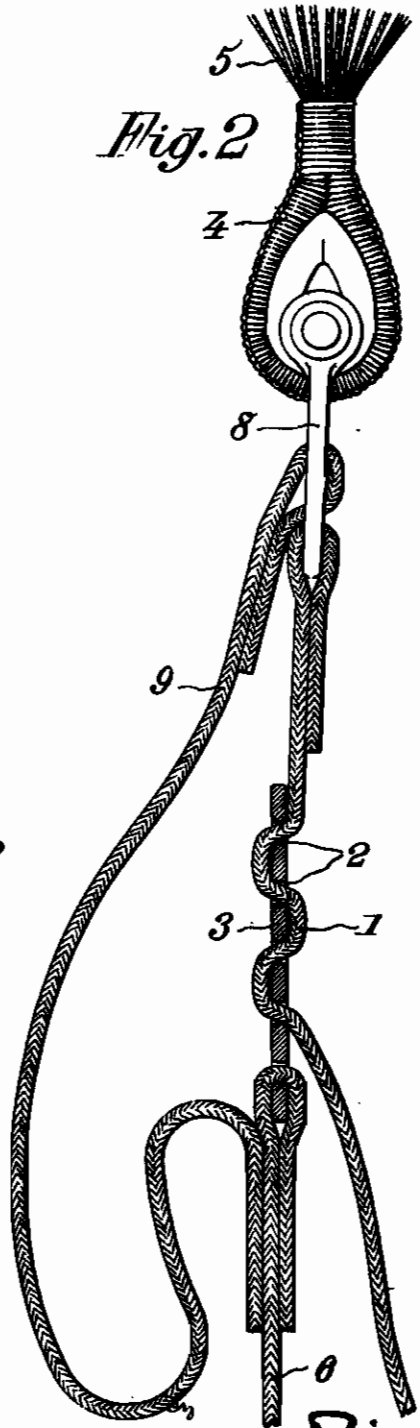

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Fig. 3

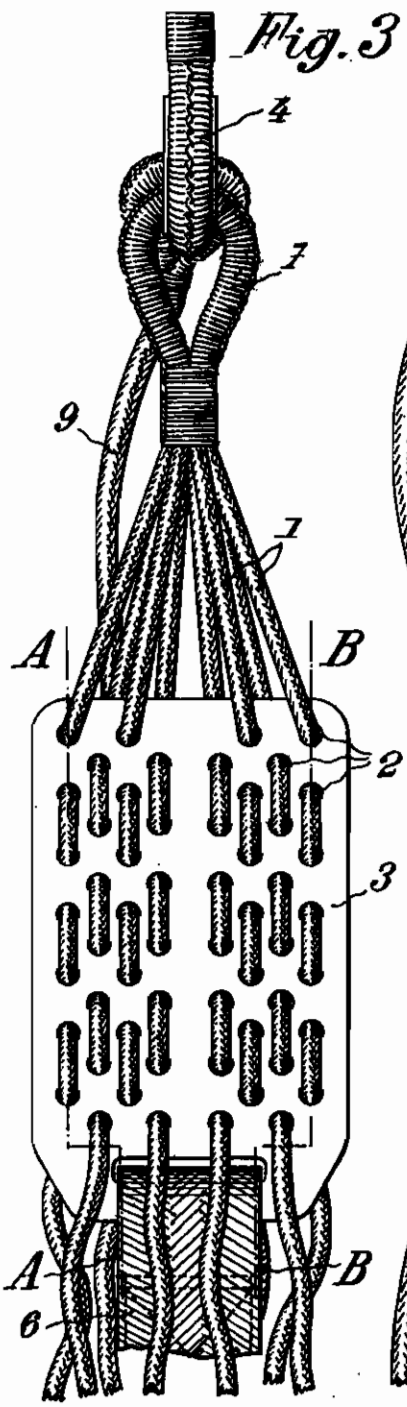


Fig. 4

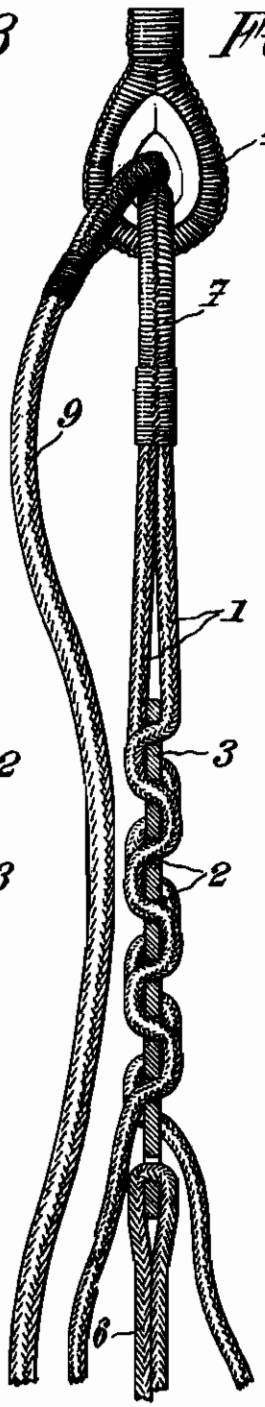
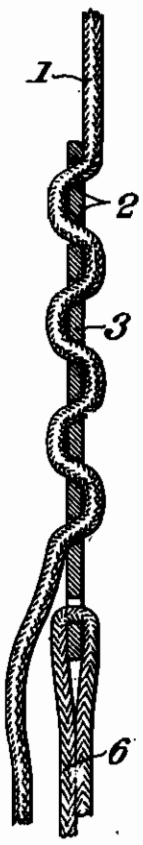


Fig. 5



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ALIEN PROPERTY CUSTODIAN

SHOCK-ABSORBING DEVICES OF THE FRICTIONAL TYPE

Georges Dreyfus, Montauban, France; vested in the Alien Property Custodian

Application filed February 28, 1941

The present invention relates to shock-absorbing devices of the frictional type, such in particular as are to be used in connection with parachutes in order to absorb the shock produced on the belt or harness when the parachute opens.

The object of the present invention is to produce a device of this kind, which is better adapted to meet the requirements of practice than those used for the same purpose up to the present time and, in particular, which is simpler and more efficient than the other shock-absorbing devices.

According to an important feature of the invention, in order to absorb the energy of the shock, the device includes at least one flexible part, such as a strap, a cable, a rope, etc., which is caused to pass successively through a plurality of orifices, the whole being arranged in such manner that the displacement of the said part through said orifices creates frictional stresses which produce the desired shock-absorbing action.

Other features of the present invention will be hereinafter described with reference to the accompanying drawings given merely by way of example, and in which:

Fig. 1 is an elevational view of a shock-absorbing device for parachutes according to the present invention, said device being shown in connection with the various elements of the parachute with which it is to cooperate;

Fig. 2 is a sectional view of line II—II of Fig. 1;

Fig. 3 is a view analogous to Fig. 1, showing another embodiment of the invention;

Fig. 4 is a section of the line IV—IV of Fig. 3;

Fig. 5 is a vertical sectional view of a modification of these devices.

The following description of my invention will be made with reference to a shock-absorbing device adapted for use in connection with a parachute, for absorbing the shock resulting from the opening of said parachute. However, it should be well understood that the invention is in no way limited to this application and that it might be used in connection with other apparatus than parachutes.

The device according to the invention includes at least one flexible part 1 adapted to pass successively through several orifices provided in at least one suitable support 3. The whole is interposed between the parachute proper and the harness or belt through which the pilot is supported so that the shock resulting from the opening of the parachute causes the flexible part to slide in these orifices so as to produce a friction capable of absorbing the shock.

The specific construction of such a device may of course correspond to many different embodiments.

For instance, the flexible part or parts abovementioned may be made either of a textile material or of a combination of several textile materials (cotton, silk, hemp, etc.) or, again, of a combination of textiles and other materials.

Said part or parts 1 may be made of any suitable shape and section.

For instance, in the embodiment illustrated by Figs. 1 and 2, there is a single flexible element consisting of a strap 1 passing through elongated apertures 2. In other embodiments of the invention, such for instance as those illustrated by Figs. 3, 4 and 5, I provide one or several flexible elements 1, which may be for instance of circular, oval or similar shape, this rounded shape being advantageous in particular when there is a plurality of flexible elements. These elements consist for instance of cables, ropes or the like, which pass through a series of holes 2 and I may provide a single element passing through each hole 2 or several elements extending through the same hole.

These holes or apertures 2 are provided in at least one piece 3, suitably connected to the parachute or to the harness or belt of the parachute according as said flexible elements are themselves carried by said harness or belt or by said parachute respectively. Piece 3 is made either of metal, preferably good conductor of heat, or of a textile material, or again of any other suitable material or combination of materials.

If necessary, supplementary means, such for instance as cooling fins, may be provided for improving the evacuation of the calories produced by the shock-absorbing friction in the course of the operation.

In the drawings, it has been supposed that the flexible element or elements 1 were connected, at least at one end, to a loop 4 secured to the lower end of the ropes 5 which are directly fixed to the periphery of the parachute proper. This loop might be constituted by a portion of said ropes. The other end of element or elements 1 is then either loose or fixed to the harness or belt of the parachute.

On the other hand, in the embodiment illustrated by the drawings, piece 3 is connected to said harness or belt, for instance through a strap 6.

Concerning now the section to be given to apertures 2 with reference to the section of the element or elements 1 that pass through said apertures, the following remark should be made:

Up to the present time, in the shock-absorbing devices of the friction type, a strap or cable had to be wedged in a holding piece with respect to which it slided. In the present invention, it is not at all necessary to give apertures 2 a section equal to or smaller than that of the flexible element engaged therein as it would be the case if such a wedging had to be obtained.

On the contrary, it is advantageous to make the aperture or apertures of piece 3 of a section

greater than that of the element or elements passing therethrough. This greatly facilitates the assembly of the parts and has no detrimental effect on the working of the system since the flexible element, in view of the sinuous shape of the path through which it has to move, is caused to slide with a considerable friction against at least the edges of the apertures when said flexible element is violently pulled by the opening of the parachute.

Of course, in order to avoid breaking by shearing said edges of the apertures are made of convex rounded shape as shown by Figs. 1 to 4, and any way they are so arranged as to include surfaces which are in substantially tangential contact with the corresponding surfaces of the flexible element.

Eventually, as shown by Fig. 5, the inner surfaces of said apertures may be given directions corresponding to those which the corresponding portions of the flexible elements tend to assume under the effect of a shock.

Concerning the distance *d* to be left between two successive holes, it will be easy for any person skilled in the art to determine the optimum value thereof in accordance in particular with the nature of the flexible element that is used. For instance, it seems that when flexible element 1 is a strap such as shown by Fig. 1, with apertures 2 of a width *e* averaging several millimeters, it is advantageous to choose a distance *d* averaging 12 m/m, this indication being of course given merely by way of example. Eventually this distance *d* might be variable for the apertures or holes co-acting with the same flexible elements or for the apertures coacting with two different flexible elements.

Advantageously, when use is made of several flexible elements (Figs. 3 and 4) these elements are arranged in such manner as to constitute a continuous connection between piece 3 and loop 4 or the like. For this purpose, it suffices, for instance, to pass through two series of holes such as A—A and B—B the same flexible element which forms a loop. The various loops thus formed are then connected together so as to form a ring 7 which is engaged in loop 4 and which advantageously replaces the fixation device 8 shown by Figs. 1 and 2.

The system according to the invention will be preferably completed by a safety device connecting the parachute to the belt or harness such a device, designated by reference number 9 being for instance constituted by a strap, as in Figs. 1 and 2, or by a cable as in Figs. 3 and 4.

Whatever be the particular embodiment that is chosen, the operation of the device results sufficiently clearly from the preceding description for making it unnecessary to enter into further explanations.

The device according to the invention has over devices of the same kind such as used up to the present time many advantages the most important of which are the following:

The device according to the invention is very simple to manufacture and in particular much simpler than the braking devices including one or several wedging elements.

My device is considerably quicker to assemble. It is also very efficient and reliable.

Of course, the flexible element 1 might be made of any material other than a textile.

On the other hand, the apertures 2 of a series of apertures through which extends a flexible element 1 may be located along a line which is not necessarily rectilinear.

GEORGES DREYFUS.