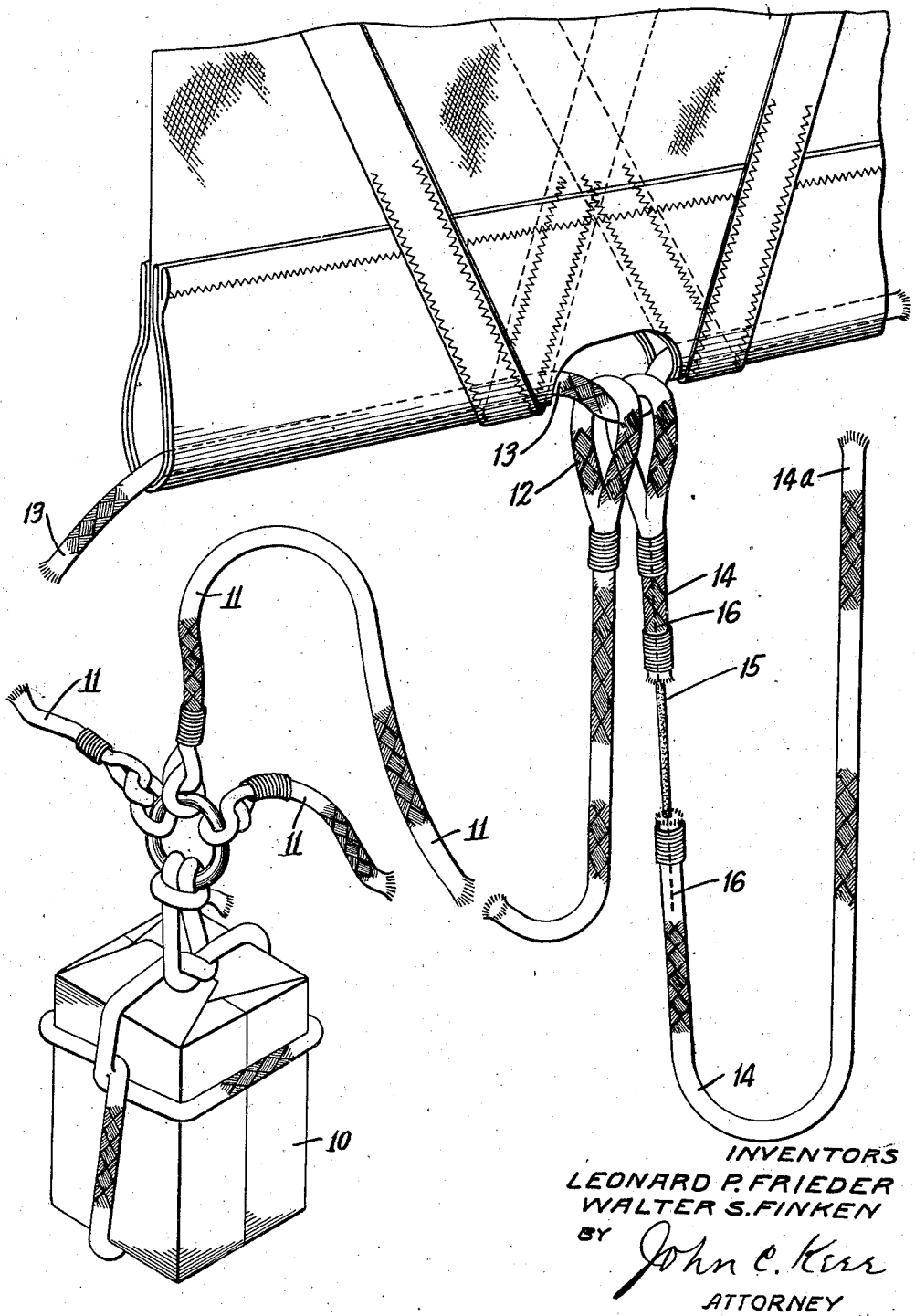
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PARACHUTE

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PARACHUTE

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This invention relates to parachutes which are launched from airplanes and the like with loads of various kinds attached and has for its object the provision of means for insuring quick opening of the parachutes. This is always important but it is of particular importance when the loads have to be dropped or men have to jump from planes flying at low altitudes.

Parachutes used for dropping loads are usually folded in some sort of a pack or container and heretofore the apex of the canopy has been connected to the airplane by a cord so that when the pack and the load to be dropped are thrown overboard the cord will draw the chute from the pack and the cord will then break or may be cast loose. Trouble has been experienced with satisfactory operation of the parachutes under such conditions because when a parachute is pulled from its pack by stress applied at its apex the canopy will stream and after release will tend to continue to stream instead of opening. If the assembly is dropped from a high altitude there may be enough time for this condition to correct itself but there is no certainty that it will, and in low altitude operations the streaming and consequent failure to open is a particularly serious defect and causes great damage to loads and injury to men because the drop is not sufficiently retarded.

A main object of the invention is to provide a simple construction and method of launching parachutes which will insure quick and proper opening of parachute canopies so that they may be used to drop loads from planes flying close to the ground when occasion requires it.

With the foregoing and incidental objects in view the invention consists in a novel construction and arrangement of parts, and a novel method of launching parachutes illustrated in the drawing accompanying and forming a part of the description contained in this specification, the novel features being pointed out in claims appended hereto.

In the drawing the load to be dropped is represented by the package 10. It is tied or secured in any desired way to the shroud lines 11 of the parachute, only three of the shroud lines being indicated in the drawing. There are, of course, varying numbers of shroud lines depending upon the size of the parachute and the load to be supported. In the construction illustrated the shroud lines are connected by loops 12 on their ends passing around a hem cord 13. The hem cord 13 is slidable in a multi-ply hem on the canopy, the hem being constructed and reinforced substantially as shown and described in U. S. Patent

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2,365,184. The parachute canopy and the shroud lines are intended to be contained in a pack or casing of any desired kind. Usually the pack casing has some sort of a closure which holds or confines the parachute in the casing, this closure being opened or released before the apparatus is launched. The parachute is drawn out of the pack by a static cord or line 14 which is connected in any suitable way to an airplane. When pack is opened and the load and the pack are thrown overboard the cord 14 will pull the parachute from the pack or container. The cord 14 is provided with a weakened section 15 which will break as soon as the air resistance and/or the weight of the load is sufficiently applied to the cord 14. In the construction shown in the drawing the part 14a of the cord 14 will remain attached to the airplane.

It has been found that by pulling the parachute from its container by force applied to the hem the opening of the parachute is greatly facilitated and made much more certain. This is because it insures an opening of the edge of the canopy which is sufficient to insure the entrance of air to expand the canopy even though at the time the weakened section 15 of the cord 14 breaks the opening has only begun. Usually, however, because of the speed of the airplane, the canopy will snap to a fully opened position at substantially the instant the cord 15 breaks. The air resistance arising from descent of the load will further insure the quick opening and complete expansion of the canopy to give the intended support for the load. There is no chance for the canopy to stream as it is drawn from the pack or afterward and even though the load is dropped from a very low altitude the extremely quick and sure opening of the canopy insures full efficiency in retarding descent of the load during substantially the full period of time required for the load to land.

The weakened section 15 is preferably a cord which has been selected to have a breaking strength necessary only to insure drawing the parachute from its pack and at least starting the opening of the canopy. This strength will, of course, vary according to the size of the structure as a whole and other conditions, and the connection can in effect be calibrated for particular structures by breaking tests.

It is preferred to use a hollow center cord 14 of relatively large diameter which can be cut and the smaller cord 15 threaded into the cut ends and then secured by stitching 16. By this construction it is an easy matter to put in the proper cord 15.

The construction shown and described herein has been highly successful in dropping loads and this has been due to the construction described and the method in which the opening of the parachute is started by force applied by the moving plane. It is to be understood that reference to airplanes is not intended to exclude other forms of air vehicles with which the construction herein described may obviously be used.

While the form of connection shown has advantages and is preferred, it is obvious that the static line or cord 14 may be connected in other ways directly to the hem or edge: or to one of the shroud lines at a point close to said hem or edge. The basic idea is at least to start the opening of the parachute canopy by the temporary application of a stress to the edge or hem of the canopy as an incident to launching the loaded parachute.

It is also to be understood that the invention can be used in its various phases with parachutes which are not packed in containers or chute packs. In some instances the chute is folded up on the load and bound in place by a cord which is easily broken or which is secured by a slip knot. The static cord may be connected to break the binding cord or open the slip knot when the unit is clear of the plane. The weakened section 15 in a static cord 14 is, however, preferably always employed. A light cord having the desired strength might be used instead of the cord 14, 15, but because of the construction and greater cross-section of the cord 14 the danger of fouling is much less than if only the single light cord should be used.

It is sometimes necessary or advisable to discharge a number of parachutes, with loads attached, in tandem or multiple series. In this practice either an unweakened static cord 14 or a weakened static cord 14, 15 may be connected between the hem of the first parachute and, for example, the load of the next one and so on for the entire series, the hem of the last parachute only being connected to the plane by a weakened static cord 14, 15. This makes possible a speedy launching of a number of units while insuring that the canopy for each load will open instantly. This idea can be utilized to advantage where paratroopers are to be landed from planes flying at low altitudes. The hem of each parachute can be connected by a weak or weakened static cord to the next following chute pack or paratroopers and so on for the series, the hem of the last parachute being connected to the plane as previously described.

The invention is also useful in connection with signalling devices in which a signal such as a light is supported by a parachute. It is ordinary practice to pack the signal and the parachute in a container from which the parachute and signal are discharged, usually by an explosive. In this embodiment a weakened static cord 14, 15, may be connected between the hem of the parachute and a resistance element which may be a part of the container so that upon discharge the resistance inertia of a freed component part of the signal assembly will open the hem of the parachute to admit air under the canopy and break the weak link in the static cord. This is particularly advantageous in instances where the signal and parachute are packed in a small compass and kept packed for a period of time, resulting in a tendency to crease the material of the canopy. Even though the material may have been packed so long that there is a tendency for the creases to take a permanent set, the use of this invention will insure quick and prompt opening of the canopy to support the load.

In explaining the invention the details of the illustrative embodiment have been gone into at some length but it is not the intention to be limited by those details except to the extent indicated in the claims which follow.

What is claimed is:

1. In an apparatus of the character described, a unit comprising a normally unopened parachute canopy and a load connected by shroud lines to the canopy, and a single static cord directly connecting one point only of the outer edge of the canopy to the airplane from which the unit is launched or dropped whereby the interior of the canopy is opened to air resistance, said cord constituting the only connection between the unit and the airplane at the time of launching and being so constructed that it will break under the strain applied by the opening of the canopy and weight of the load.

2. In an apparatus of the character described, a unit to be dropped from an airplane comprising a normally unopened parachute canopy and a load connected by shroud lines to the canopy, and a weakened static cord secured at one end to one point only of the outer edge of the canopy and at the other end to the airplane whereby the canopy edge will be opened to admit air under the canopy when the unit is launched and before the weakened static cord breaks under strain applied by air resistance on the canopy and weight of the load, said cord constituting the only connection between the loaded canopy and the airplane at the time of said launching.

3. In an apparatus of the character described, a unit to be dropped from an airplane comprising a normally unopened parachute canopy and a load connected by shroud lines to said canopy, a single static cord connected at one end to the outer edge or hem of the canopy and secured at its other end directly to the airplane from which the unit is to be dropped, said cord comprising two sections of relatively large diameter connected together by a cord section which is weaker and smaller in diameter than said two sections and is in axial alignment with said two sections, the weaker cord section being selected according to the size of the canopy and weight of the load, to break by air resistance against the canopy and the load.

4. In an apparatus of the character described, a static line connecting one point only of the hem of a parachute canopy directly to an airplane consisting of two spaced apart end sections of a hollow center cord and a smaller and weaker cord having its ends within said hollow centers and secured against withdrawal from said hollow centers whereby said weaker cord will break under strain imposed upon the static line, said weaker cord being selected as to size and strength according to the magnitude of the strain to be resisted before it breaks.

5. An apparatus for dropping loads from a moving airplane comprising a normally unopened parachute canopy and a load connected by shroud lines to the canopy and a static cord secured at one end to one point only of the outer edge of the canopy and connected at its other end directly to the airplane whereby when the canopy and its load are launched said cord will pull out the portion of the edge of the canopy to which it is secured to admit air resistance under the canopy, said cord being so constructed that it

will break under the strain imposed on it by the air resistance on the canopy, said cord constituting the only connection between the canopy and the airplane at the time the loaded canopy is launched.

6. A method of launching load-carrying parachutes which includes connecting one point only of the edge or hem of the parachute directly to an airplane which is in flight in such a manner

that when launched the edge or hem of the canopy is pulled out by said connection to admit air under the canopy, launching the parachute and its load, and utilizing the air resistance against the opening canopy to break the connection between the canopy and the airplane.

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