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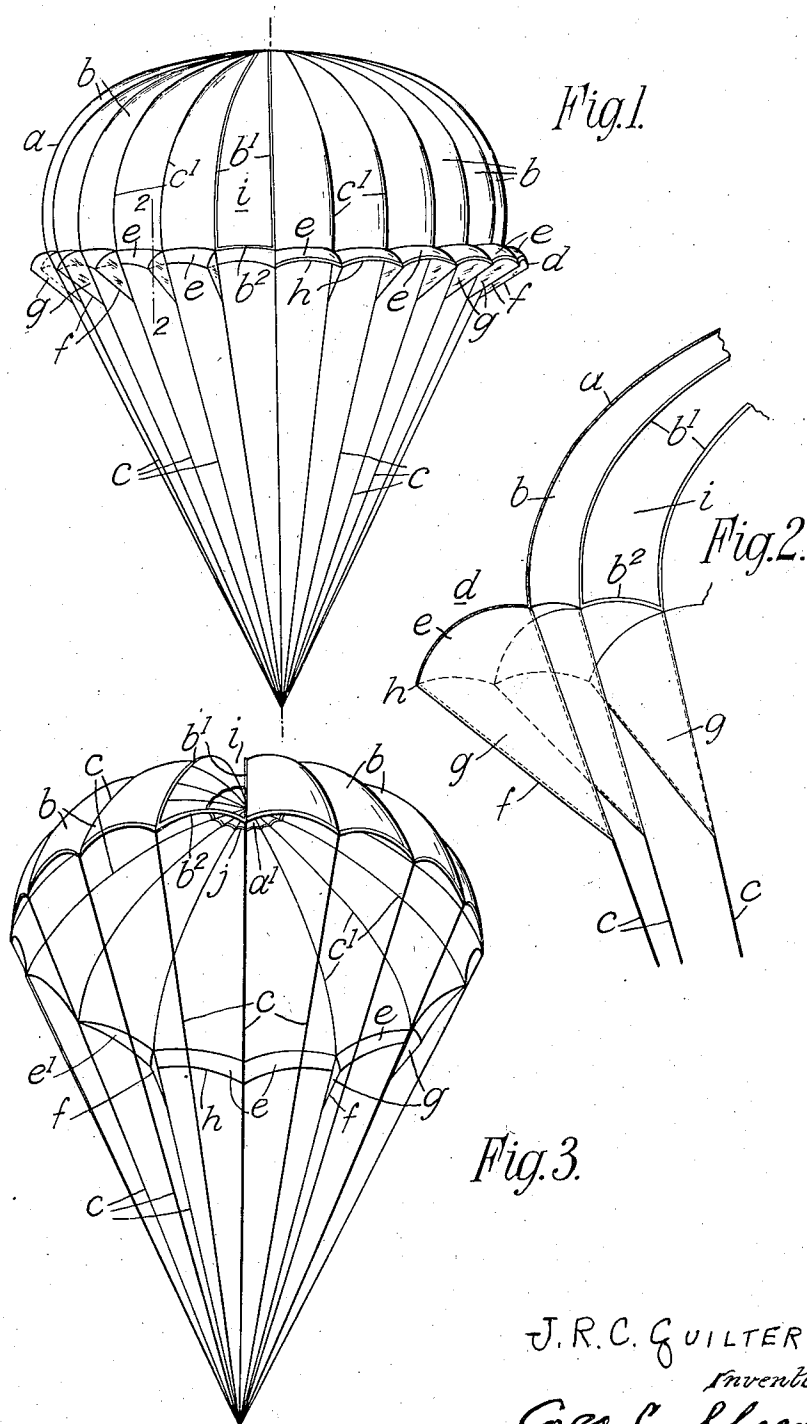
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2,392,946

PARACHUTE

Filed Oct. 27, 1942

2 Sheets-Sheet 1



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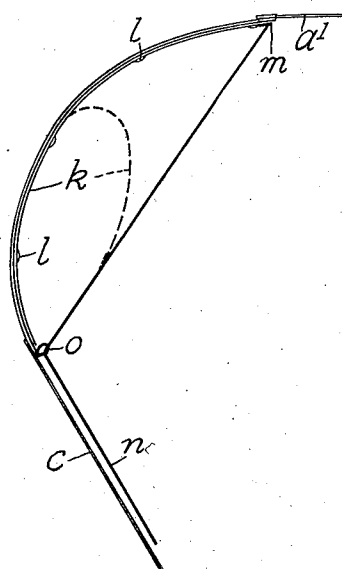
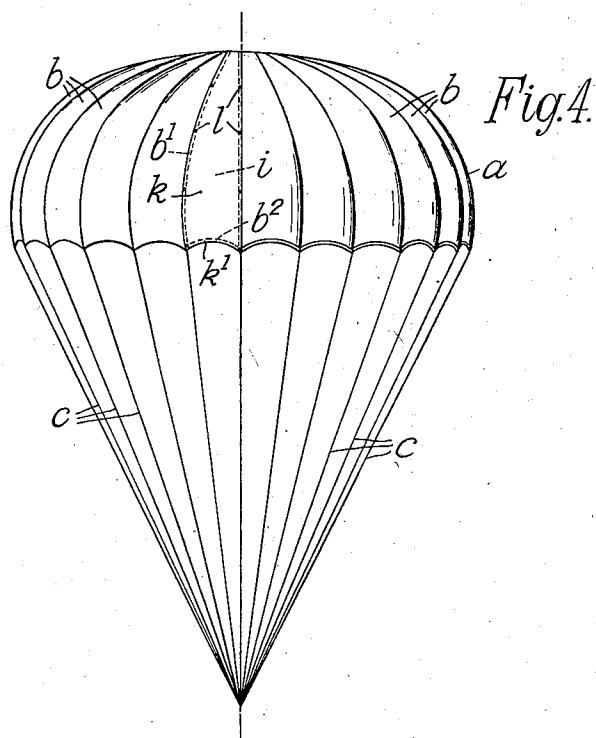
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PARACHUTE

John Raymond Cuthbert Quilter, Woking,
EnglandApplication-October 27, 1942, Serial No. 463,519
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3 Claims. (Cl. 244-152)

This invention relates to parachutes for aviation purposes.

The invention has for its main object to provide means for stabilizing the parachute during descent.

Another object is to provide means for controlling the air flow relative to the descending parachute.

A further object of the invention is to provide the parachute canopy with a lateral opening or openings which so alters the air flow relative to the descending parachute as to make the flight more stable.

The invention has also for its objects to provide means for boosting the initial inflation of the parachute canopy, and means for determining the orientation of the parachute and parachutist relative to the wind.

Other objects and advantages of the invention will hereinafter appear from the subsequent description, given with reference to the accompanying drawings, in which:

Fig. 1 shows in elevation, one half in section, a first embodiment of the invention.

Fig. 2 is a detail in section on the line 2-2 of Fig. 1, on a larger scale.

Fig. 3 is a perspective view, as seen obliquely from below, of a modification of this embodiment of the invention.

Fig. 4 shows in elevation, one half in section, another embodiment of the invention.

Fig. 5 is a detail in section on the line 5-5 of Fig. 4, on a larger scale.

Referring to Figs. 1 and 2, the parachute comprises a canopy *a*, built up in the usual manner from a plurality of approximately triangular gores or sectors *b*, for example from twenty-four to thirty-two in number, and a corresponding number of shroud lines *c* extending at *c*¹ along the seams of the two panels and over the top of the canopy. The parachute also comprises a lip or curtain *d* built up from a like number of rhomboidal panels *e*, each forming an outward extension of one of the main gores *b*; the curtain, which increases the flow of air into the canopy so as to give an added boost to the initial inflation of the canopy, may be composed of silk or like material similar to that used for the canopy *a*. The gathering lines *f* at the junctions of the curtain panels are connected by vanes *g* to the shroud lines *c* below the canopy, and are also connected together by a cord *h* extending along the free edge of the curtain, all these lines *f* and *h* as well as the vanes *g* being kept taut by the

upward pressure of air against the inclined lip or curtain *d* during the descent of the parachute.

One of the gores *b*, viz. the gore located next to and on the left hand side of the vertical center line of Fig. 1, is cut out to afford a triangular opening *i* of almost the same area as each of the gores *b*, leaving only narrow margins *b*¹ for the seams attached to the shroud line extensions *c*¹ at the sides of this opening, and a narrow strip *b*² for connecting together the edges of the gores *b* on opposite sides of the opening or gap, and for seaming to the corresponding curtain panel *e* at the periphery of the canopy. Through this opening *i* the enclosed air, including that fed in by the curtain *d*, can escape from the interior of the canopy, the greater part of this air passing through the broader portion near the periphery, and in a substantially horizontal direction; the narrower portion of the opening, near its apical extremity *i*¹, may form a substitute for the ordinary vent at the middle of the canopy, such vent being omitted.

Fig. 3 shows a modification, in which the lip or curtain *d* extends only partly around the periphery of the canopy, and at the side opposite to the lateral aperture *i* through which the air escapes from the interior; as shown, there are five panels in the curtain, the middle three *e* being of approximately rectangular shape, but the two panels *e*¹ at the ends of the curtain being of bevelled or triangular shape to merge with the periphery of the canopy *a*. The curtain is maintained at a suitable inclination by the lines *f* and *h*, as well as by the vanes *g* connected to the shroud lines *c*, as in the first embodiment described, in order to deflect air towards the interior of the canopy during descent; the air thus displaced from the interior by the action of the curtain escapes in a substantially horizontal direction through the opening *i*, the curtain *d* therefore intensifying the effect of the aperture *i* as regards stabilizing and orienting the descending parachute, as well as giving the added boost to the initial inflation of the canopy. In this embodiment of the invention, the canopy is shown provided with a central area *a*¹ encircled by a reinforcement ring *j* to which the shroud line extensions *c*¹ are connected; the opening *i* does not therefore continue up to the center of the canopy, its narrower extremity *i*² being located at the position of the canopy reinforcement ring *j*, so that the aperture has the approximate shape of a wedge frustum.

Figs. 4 and 5 represent another embodiment of the invention, in which the canopy *a* is pro-

vided with an apertured gore affording an opening *i* similar to that in the first embodiment described with reference to Figs. 1 and 2, the lip or curtain *d* being however omitted. In this embodiment, the opening is controlled by a removable gore or panel *k* arranged within the canopy so as to cover the opening and prevent the escape of air therethrough. The removable gore *k* is of approximately triangular shape, and substantially of the same size as each of the gores *b* of the canopy; its sides are fitted with disconnectible devices such as press-stud fasteners *l* co-operating with corresponding devices upon the hems or margins *b*¹ of the apertured gore, and its base *k*¹ is sewn to the peripheral strip or margin *b*² of the said gore.

The apex of this removable gore *k* is fitted with a reinforcing tab or web *m*, from which a line or cord *n* is passed through one or more guide loops or rings *o* at the base of the apertured gore, this cord being continued along with the shroud lines *c* to a convenient point on the harness, flying suit or other garment worn by the parachutist; the cord *n* is of such length that it will remain slack when the parachute is deployed and fully open, but it can then be operated by the parachutist at the appropriate moment, for example by means of a handle or D-shaped ring, in order to pull back the removable gore *k* from the canopy *a*, as indicated in dotted lines in Fig. 5, thereby freeing the opening *i* so that the air from within the canopy *a* can escape in a radial direction determined by the momentary position of the said opening.

It will be understood that in the above embodiments of the invention, the presence of the lateral aperture or apertures so alters the air flow relative to the descending parachute as to make the flight more stable. The tendency of the parachutist to swing like a pendulum is almost entirely overcome or damped by the out-of-balance effect of the eccentrically apertured canopy, and at the same time the substantially horizontal air current through the aperture has a tendency to control the orientation of the canopy in relation to the wind. The force of the air current meeting the force of the wind will tend to bring the apertured side of the canopy downwind, so that the vent or aperture always sets itself in the down-wind direction; consequently,

if the harness is so connected to the shroud lines *c* as to support the wearer in a position facing towards the apertured side of the canopy *a*, it can be assured that he will be brought automatically to face down-wind, which is the most convenient position for safe landing. This orientation takes place at the moment when the parachute becomes deployed and begins to assume the velocity of the surrounding air, so that in the case of air-borne troops landing from low altitudes, they will alight facing down-wind; likewise the orientation may take place whenever the parachute descends into a stratum where the wind has a different direction from that in the stratum through which the parachute has just descended, so that in the case of a normal drop from a considerable altitude, the parachutist will still alight facing down-wind when he reaches the ground, although the wind may have changed during the descent.

What I claim is:

1. A parachute comprising a canopy having a continuous periphery of substantially circular shape when fully deployed, load lines connected to the periphery of said canopy, said canopy being apertured to provide an opening for flow of air to the exterior during normal descent, said opening being of approximately triangular shape with its apex towards the center of said canopy and its base adjacent to but spaced from the periphery, a part of the continuous periphery forming a spacing connection between opposite sides of said opening above its base, a triangular closure for said opening, said closure being attached to said canopy adjacent to the base of said opening, disconnectible fastener devices along two sides of said closure, and co-operating fastener devices upon said canopy adjacent to two corresponding sides of said opening.

2. A gored parachute canopy having one gore completely removed, with periphery and apex bands retained.

3. A parachute canopy formed by a plurality of gores of substantially equal dimensions, the number of said gores being one less than the number required to cover the area of said canopy, and continuous bands forming the peripheral and apical zones of said canopy.

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