Oct. 20, 1942. J. R. C. QUILTER 2,299,408

PARACHUTE

Filed Aug. 23, 1940 2 Sheets-Sheet 1

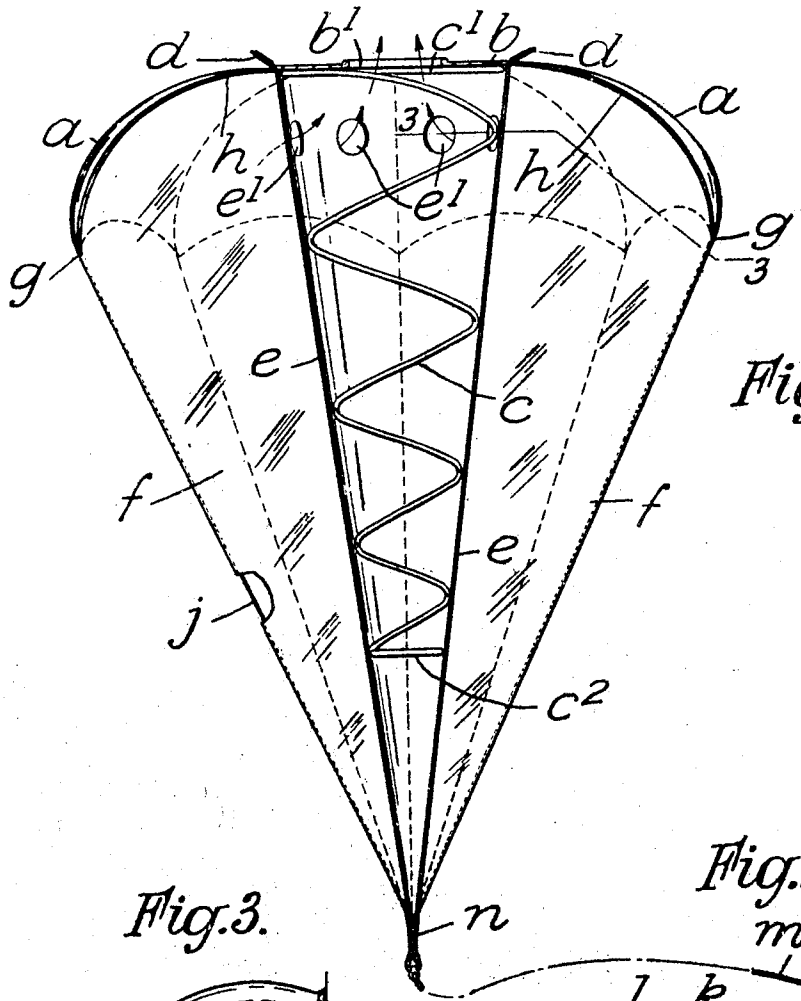


Fig.1.

Fig.2.

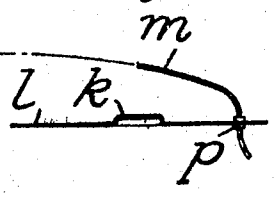
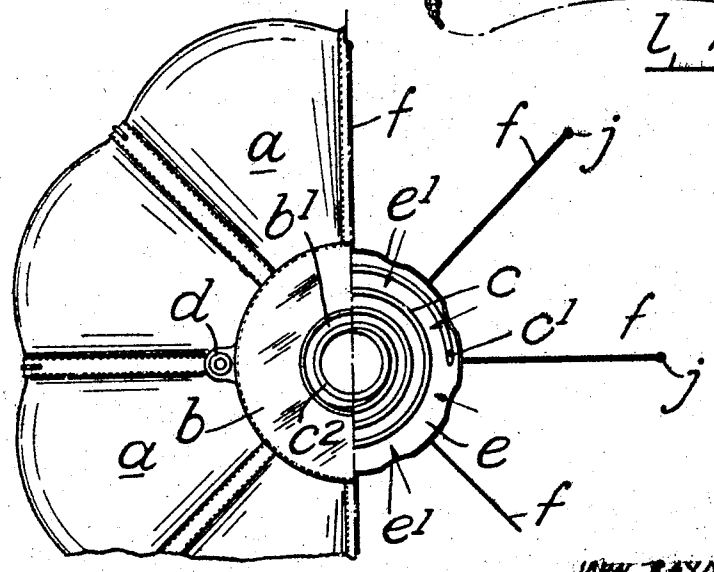


Fig.3.



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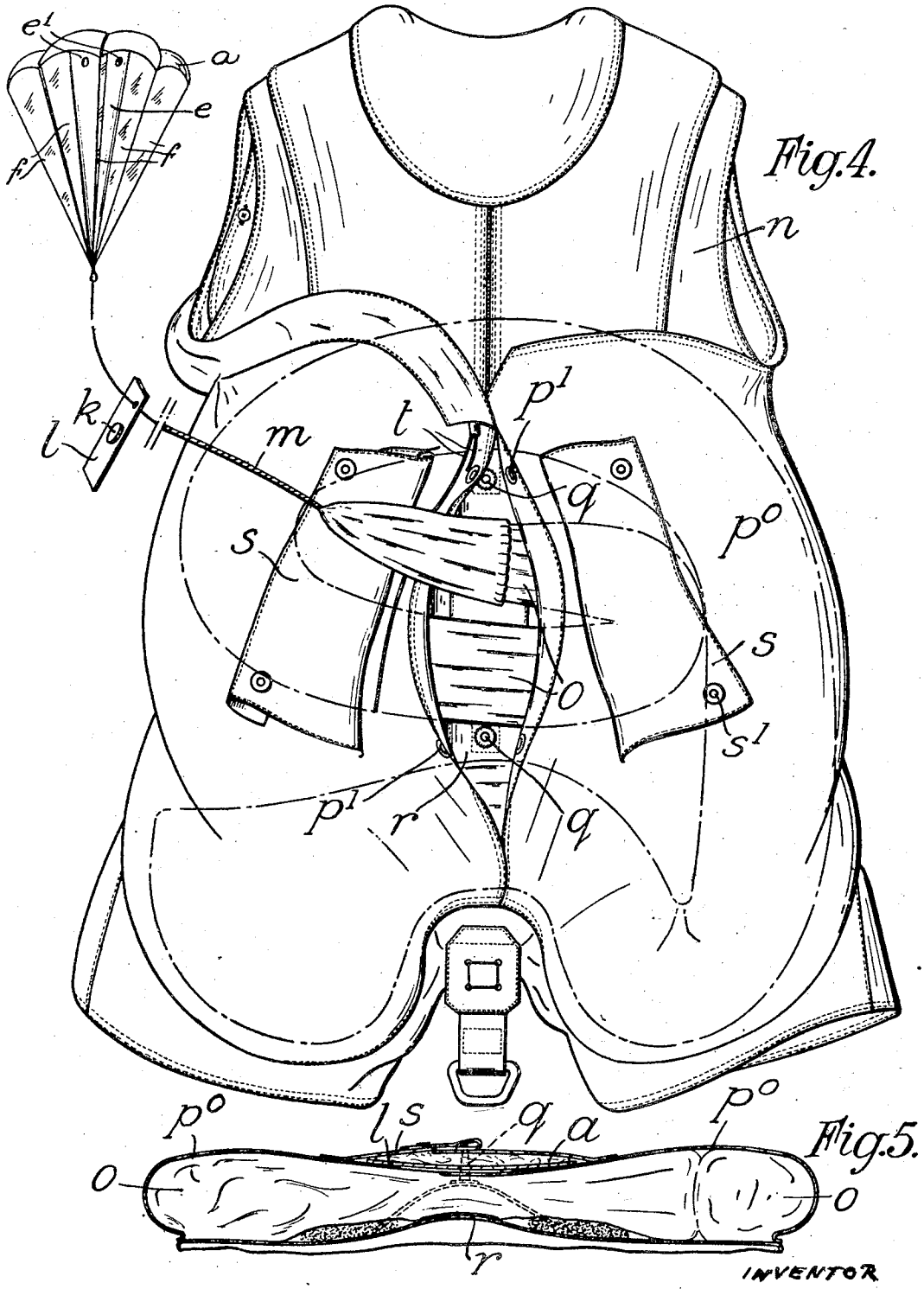


Fig.4.

Fig.5.

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PARACHUTE

John Raymond Cuthbert Quilter, Woking, England

Application August 23, 1940, Serial No. 353,946
In Great Britain October 10, 1939

12 Claims. (Cl. 244—149)

This invention relates to parachutes for the occupants of aircraft, and more particularly to pilot or auxiliary parachutes co-operating with main parachutes in order to ensure the withdrawal of the latter from a pack or storage when required for use.

The main object of the invention is to provide an improved pilot parachute of the kind having an opening spring to effect the unfolding of the parachute when released from its pack and having also a plurality of vanes or gusset pieces fitted to the shroud lines in order to prevent entanglement during the unfolding and deployment of the parachute.

Another object of the invention is to provide a pilot parachute with an opening spring which serves also to extend the vanes or gusset pieces fitted to the shroud lines.

A further object of the invention is to provide a pilot parachute with an opening spring enclosed in a tubular bag or stocking to which the vanes or gusset pieces are connected, the spring being of conical spiral shape and attached at one end to the center of the canopy so as to extend axially from the latter and to open out the vanes at the same time as the canopy.

A still further object is to provide a pilot parachute with an opening spring enclosed in a tubular bag or stocking through which the air may escape to an upper vent from the segmental pockets or spaces between radial vanes or gusset pieces fitted to the shroud lines.

Other objects and advantages of the invention will be apparent from the following description of a preferred embodiment, given with reference to the accompanying drawings, in which—

Fig. 1 is a sectional view of the improved pilot parachute in the deployed state, showing the spring extended.

Fig. 2 is a sectional view of a kicker board or separator attached to the pilot parachute.

Fig. 3 is a partial plan of the pilot parachute, the right-hand half being shown in section on the line 3—3 of Fig. 1.

Fig. 4 is a rear elevation of a flying suit arranged for stowage of main and pilot parachutes in the back of the garment, the pilot parachute being represented diagrammatically as having been expelled from the pack. Fig. 5 is a cross section of the garment upon the line 5—5 of Fig. 4, but showing both parachutes in stowed condition.

As shown in Figs. 1 and 3, the pilot parachute *a* is provided with a flat circular top panel *b*, made for example of linen, to the circumference of which there is attached the larger end of a conical spiral spring *c* extending down the axis of the parachute; the outer edge of the panel *b* is provided externally with a pair of eyeletted tabs or grommet flaps *d* at diametrically opposite points, and is seamed or stitched to the top spring coil c^1. The body of the spring *c* is enclosed in a conical bag or stocking *e* from which radial vanes or gusset-pieces *f* extend to the peripheral points *g* and to the dome *h* of the canopy, the connections to the dome *h* being along radial lines from the periphery of the canopy to the outer edge of the panel *b*; the inner edges of the vanes *f* may be stitched or otherwise secured to the wall of the bag *e*, while their outer edges are seamed to enclose the shrouds or rigging lines *j* connected to the points *g*, as shown on the left of Fig. 1.

The top panel *b* is formed with a vent b^1 placing the interior of the bag *e* in communication with the atmosphere above the canopy; the wall of the bag is also formed with apertures e^1, equal in number to the vanes *f*, each aperture being placed midway between two adjacent vanes and preferably at a level nearer to the top of the canopy than to the periphery. These apertures allow the air collecting in the segmental pockets between the vanes during descent of the parachute to escape upwardly into the interior of the bag *e* and thence by the vent b^1 into the atmosphere so as to avoid undue oscillation of the parachute, the aggregate area of the apertures e^1 being approximately equal to that of the vent; the edges of the apertures may be reinforced by eyelets or the like, and the vent by an eyelet or ring. If preferred, two or more vents of the desired aggregate area may be employed.

The smaller end of the spring, to which the bag *e* and the inner edges of the vanes *f* may be attached in any suitable manner, for example by stitching around the end coil c^2 of the spring, is arranged to encircle a shallow circular boss *k* at the center of a substantially rectangular separator or kicker board *l*, such as described in my patent application Serial No. 327,885, filed April 4, 1940. The kicker board serves to separate the pilot parachute *a* from the main parachute *o* when stowed one over the other in a pack, for example at the back of a flying garment *n*, as seen in Fig. 5, and also resists the pressure exerted by the opening spring *c*. In the collapsed position of the stowed pilot parachute, the spring rests approximately flat against the kicker board with the pilot parachute *a* folded around it so as to leave the tabs *d* clear of the

folds; the cord *m*, connected at one end to the rigging line loop *n* of the pilot parachute and at the other end to the main parachute canopy at o^1 passes through a hole in the board *l*, as shown in Fig. 2, this cord being preferably fitted with rubber rings *p* between which the board is gripped, so as to ensure the withdrawal of the board by the outward movement of the cord in order that it shall not interfere with the release of the main parachute when withdrawn by the pull exerted by the pilot parachute *a* after the latter has been released into the air.

The main parachute is stowed in any preferred manner, for example as described in the pending application Serial No. 312,786 filed January 6, 1940, and as illustrated in Figs. 4 and 5 of the present drawings, within the space provided at the back of the flying suit *n*; this main parachute, which is indicated at *o*, is covered by a pair of main closure flaps *p* extending from the sides of the garment and having eyelets p^1 at their meeting edges, which overlap upon two locking cones or studs *q* projecting from the base *r*. The kicker board *l* is placed over these flaps and fits loosely between the cones, but the pilot parachute *a* stowed behind the board is engaged with the same cones by means of the eyeletted tabs *d*; two external lateral flaps *s*, attached to the main closure flaps *p* and made large enough to cover the stowed kicker board *l* and pilot parachute *a*, are likewise provided with eyelets s^1 for engaging the two locking cones, both pairs of flaps *p*, *s*, the two parachutes *a*, *o*, and the kicker board *l* being normally held in the stowed position by the rip-cord wires *t* engaged in the usual transverse holes at the tips of the locking cones.

Upon operation of the rip-cord, which withdraws the wires *t* from the locking cones, the coiled spring *c* opens out the pilot parachute *a*, pushing the external flaps *s* off the locking cones so as to release the eyeletted tabs *d*; the spring then jumps freely off the board and kicks the pilot parachute out into the airstream. As soon as it is deployed by the air, the pilot parachute draws out the connecting cord *m* carrying the kicker board *l* and by means of this cord pulls out the main parachute *o* and its shroud lines from between the inner or main closure flaps *p*, the deployment of the main parachute then taking place in the usual manner after it has been drawn out into the airstream.

What I claim is:

1. A parachute comprising a canopy, shroud lines secured at their upper ends to the periphery of said canopy, means for securing together the lower ends of said shroud lines, a coiled spring having one end secured to a central area of said canopy, a tubular bag enclosing said spring, and gusset pieces of flexible material connecting said bag to said shroud lines.

2. A parachute comprising a canopy, shroud lines secured to the periphery of said canopy, a coiled spring having one end secured to a central area of said canopy, a tubular bag enclosing said spring, and gusset pieces of flexible material connecting said bag to said shroud lines and canopy, said gusset pieces extending substantially radially of said canopy.

3. A parachute comprising a canopy, shroud lines secured at their upper ends to the periphery of said canopy, means for securing together the lower ends of said shroud lines, a coiled spring having one end secured to a central area of said canopy, a bag enclosing said spring, and gusset pieces connecting said bag to said shroud lines, said gusset pieces being attached to said bag and shroud lines along substantially the entire length thereof.

4. A parachute comprising a canopy, shroud lines secured to the periphery of said canopy, a coiled spring having one end secured to a central area of said canopy, a bag enclosing said spring, and gusset pieces connecting said bag to said shroud lines and canopy, said gusset pieces being attached to said bag and shroud lines along substantially the entire length thereof and also attached to said canopy along substantially the entire length from the periphery of said canopy to the outer edge of said central area.

5. A parachute comprising a canopy, shroud lines secured to the periphery of said canopy, a coiled spring of conical spiral shape having its larger end secured to a central area of said canopy, a conical bag enclosing said spring, and gusset pieces connecting said bag to said shroud lines.

6. A parachute comprising a canopy, shroud lines secured at their upper ends to the periphery of said canopy, means for securing together the lower ends of said shroud lines, a coiled spring of conical spiral shape having its larger end secured to a central area of said canopy, a conical bag enclosing said spring, and gusset pieces connecting said bag to said shroud lines, said gusset pieces extending substantially radially of said canopy.

7. A parachute comprising a canopy, shroud lines secured at their upper ends to the periphery of said canopy, a coiled spring of conical spiral shape having its larger end secured to a central area of said canopy, a conical bag enclosing said spring, said bag extending down to the lower ends of said shroud lines, and gusset pieces of flexible material connecting said bag to said shroud lines, said gusset pieces being attached to said bag and shroud lines along substantially the entire length thereof.

8. A parachute comprising a canopy, said canopy including a stiff central area, shroud lines secured to the periphery of said canopy, a coiled spring of conical spiral shape having its larger end secured to the outer edge of said central area, a bag enclosing said spring, and gusset pieces of flexible material connecting said bag to said shroud lines, said gusset pieces being attached to said bag and shroud lines along substantially the entire length thereof.

9. A parachute comprising a canopy, said canopy including a stiff central area, shroud lines secured to the periphery of said canopy, a coiled spring of conical spiral shape having its larger end secured to the outer edge of said central area, eyeletted members secured to the outer edge of said central area externally of said canopy, a bag enclosing said spring, and gusset pieces connecting said bag to said shroud lines, said eyeletted members engaging with locating means of a parachute pack.

10. A parachute comprising a canopy, shroud lines secured to the periphery of said canopy, a coiled spring having one end secured to said canopy, a tubular bag enclosing said spring, and gusset pieces connecting said bag to said shroud lines, said bag being apertured to admit air from the spaces between said gusset pieces, and said canopy being apertured within the perimeter of said spring-end to discharge air from said bag.

11. A parachute comprising a canopy, shroud lines secured to the periphery of said canopy, a coiled spring having one end secured to said

canopy, a tubular bag enclosing said spring, and gusset pieces connecting said bag to said shroud lines and canopy, said gusset pieces extending substantially radially of said canopy, said bag being apertured at points lying radially between said gusset pieces, and said canopy being apertured within the perimeter of said spring-end to discharge air from said bag.

12. A parachute comprising a canopy, shroud lines secured at their upper ends to the periphery of said canopy, means for securing together the lower ends of said shroud lines, a coiled spring of conical spiral shape secured at its larger end to a central area of said canopy, a conical bag enclosing said spring, and gusset pieces connecting said bag to said shroud lines and canopy, said gusset pieces being attached to said bag and shroud lines along substantially the entire length thereof and also attached to said canopy along radial lines from the periphery of said canopy to the outer edge of said central area, said bag being apertured at points between said gusset pieces to admit air to the interior of said bag, and said canopy being apertured within said central area to discharge air from the interior of said bag.

JOHN RAYMOND CUTHBERT QUILTER.