

Dec. 19, 1944.

C. A. VOLF

2,365,230

VENTED PARACHUTE WITH CONE

Filed May 21, 1942

3 Sheets-Sheet 1

Fig. 1.

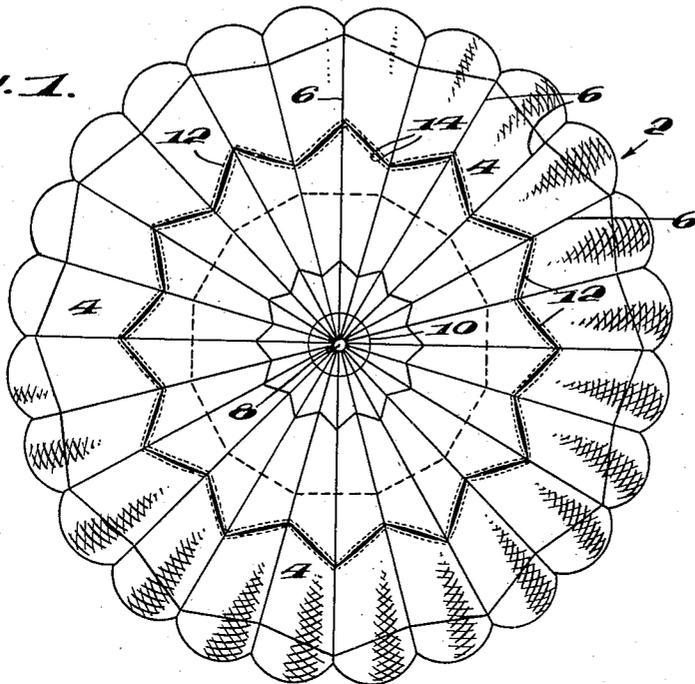
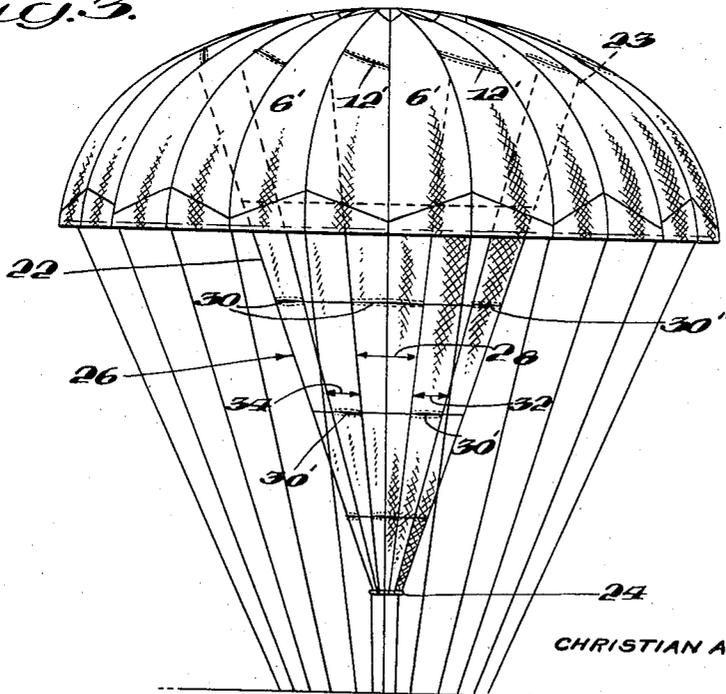


Fig. 3.



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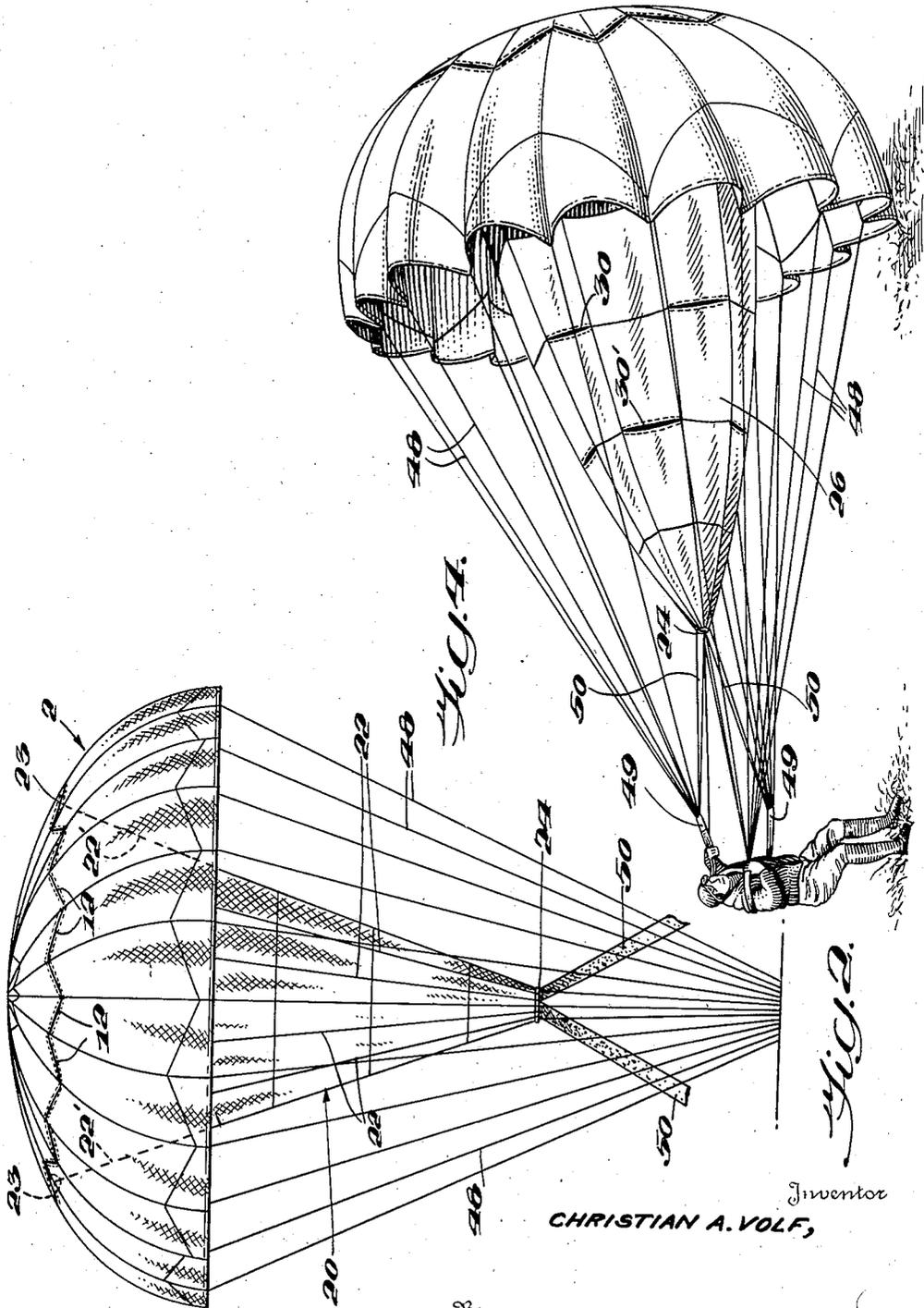
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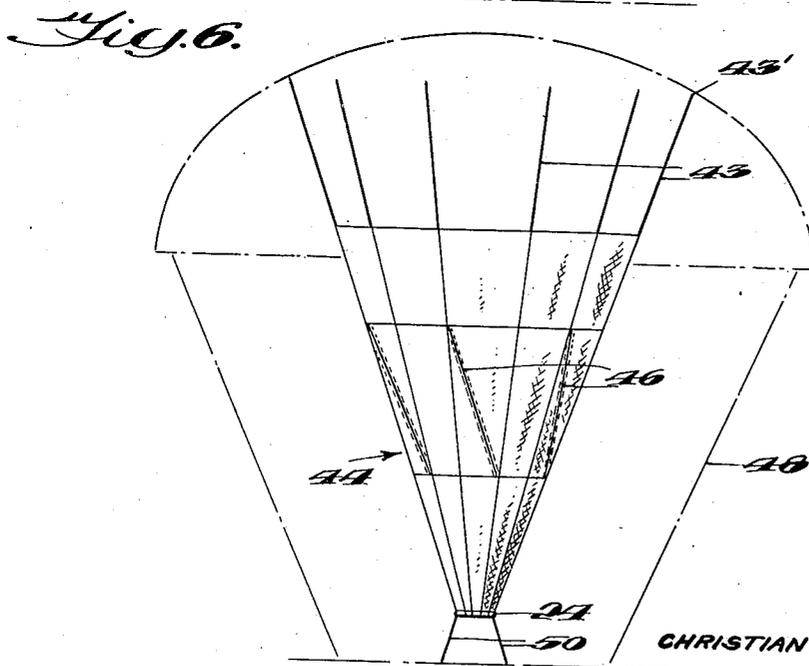
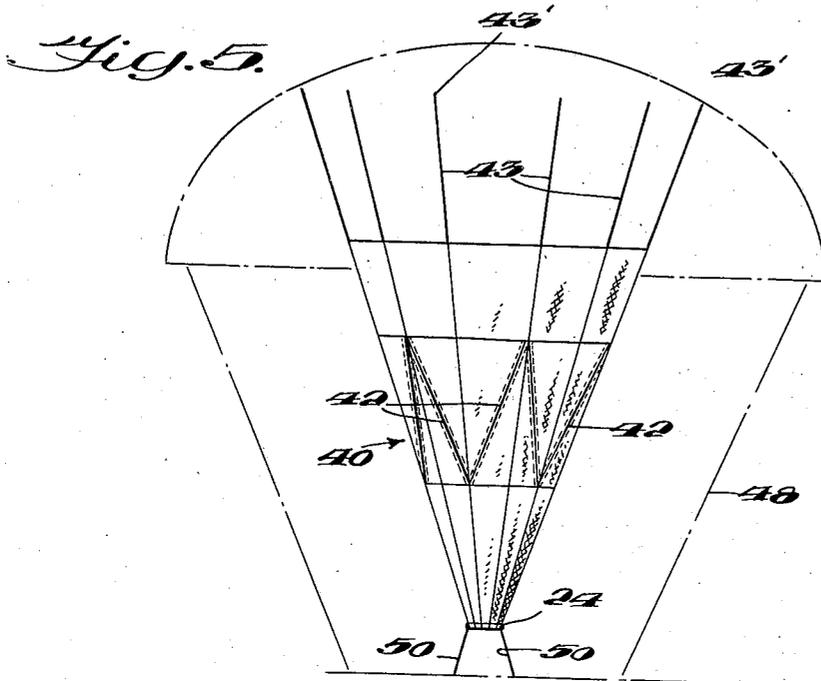
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VENTED PARACHUTE WITH CONE

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3 Sheets-Sheet 3



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2,365,230

VENTED PARACHUTE WITH CONE

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Application May 21, 1942, Serial No. 443,961

12 Claims. (Cl. 244-142)

This invention is a parachute, consisting essentially of a canopy, and a cone supported centrally below the canopy with its apex pointing downwardly.

The canopy is provided intermediate its outer edge and apex with diagonally positioned vents, which open progressively with progressive increase of air pressure below the canopy to allow air to escape therethrough and so relieve such excess pressure.

The described vents are diagonally positioned and are in end-to-end relationship so that they form a zig-zag row extending around the canopy. Each panel may contain such a vent or, in a modification, only every other panel will contain such a vent.

A similar type of parachute is described and claimed in my copending application, Serial Number 443,960, filed May 21, 1942.

The parachute of the present invention also includes as an important feature thereof a cone positioned centrally below the canopy, this cone being similar in a general way to that shown in my application Serial Number 382,795, filed March 11, 1941.

According to this invention, the cone may be a plain type of cone, or it may be provided with air escape vents of a type resembling the air escape vents in the canopy.

In the cone, the vents may be in a continuous zig-zag formation as in the canopy; or, they may be only in alternate panels of the canopy; or they may be horizontally arranged at different levels in every other panel of the cone.

A parachute according to the present invention presents the following important advantages:

1. It does not oscillate and swing during descent.

2. It descends nearly vertically even with a fairly strong lateral wind. This feature is of great importance in landing at a designated point. The ordinary parachute will sometimes drift a mile or more laterally from the point directly below the point at which the parachutist left the airplane.

3. The parachute of the present invention will support heavier loads with a given diameter of parachute.

4. It is stronger, weight for weight, than a standard parachute, probably due to the additional load carried by the cone.

5. The shock due to sudden checking of descent upon opening of the parachute is lessened because the vents relieve excess pressure at the

instant of opening and therefore do not check the descent so suddenly.

6. The chute opens very quickly, the cone apparently acting as a pilot chute in spreading the air laterally, thereby spreading the main canopy laterally.

7. Even with loads varying between 50 and 300 pounds, the rate of descent does not vary more than 5 feet a second, even with such widely varying loads.

8. Elastic shock cords connected to the apex of the cone aid in extending the cone and flattening the center of the canopy and so aid in a quick opening of the chute.

Further advantages of construction and operation will be pointed out in connection with the description of the drawings illustrating several embodiments of the invention. In these drawings,

Fig. 1 is a plan view of a parachute in accordance with this invention.

Fig. 2 is a side view of the same.

Fig. 3 is a side view of a modification.

Fig. 4 is a perspective view showing the chute just after landing; and

Figs. 5 and 6 are diagrammatic side views showing modified forms of the cone member.

Referring now to these drawings, in which similar reference characters indicate similar parts, the canopy indicated generally at 2 comprises the usual series of triangular panels 4 defined by reinforcing cords 6 converging to a central ring 8 at the apex of the parachute. The chute is also provided at the apex with the usual central air escape hole 10.

Each panel 4 is provided with a diagonally extending air escape vent 12 bordered by reinforcing stitching 14, the cloth of the panel preferably being sewed around a reinforcing cord, not shown, secured to the main cord 6.

Considered in plan, the vents 12 are at about 45° with respect to the cords 6 and are diagonally positioned in end-to-end formation so as to provide a zig-zag row of vents extending circumferentially around the canopy.

Centrally positioned below the canopy is a cone 20 composed essentially of cloth with reinforcing cords 22 defining panels in the cone. The lower ends of the cords 22 may be secured to a ring 24 while their upper ends are continued as at 22' upwardly and secured as at 23 to the canopy.

Referring now to the modification shown in Fig. 3, only the alternate panels of the canopy are provided with diagonal air escape vents in-

licated at 12'. The intermediate panels 6' are not provided with vents.

The cone 26, Fig. 3, is also provided with vents, which in this form of the invention are in every panel in staggered relationship; that is, at different levels. One panel, indicated by the double ended arrows 28, is provided with an air escape vent 30. The next panel indicated with double ended arrows 32 is provided with an air escape vent 30' at a different and lower level. The next panel to the right of panel 32 is provided with an air escape vent 30'' at the same level as vent 30'. The panel to the left of 28 indicated by the double ended arrows 34 is provided with an air escape vent 30' at the same level as the other vent 30', and so on all the way around the cone.

In the modification shown in Fig. 5, the cone indicated generally at 40 may be provided with diagonal air escape vents 42 arranged in end-to-end, zig-zag relationship extending circumferentially around the cone. Shroud lines 43 in the surface of the cone extend up in a straight line and are attached to the canopy at 43'.

In the modification shown in Fig. 3, every other panel of the cone 44 is provided with a diagonal vent 46; the intervening panels being plain in analogy to the vent arrangement in the canopy of Fig. 3.

Shroud lines 48 from the edge of the canopy are secured as at 49, to a harness for the parachutist. Heavy elastic cables or straps 50, attached at their upper ends to the ring 24 at the apex of the cone, have their lower ends attached at 49 to the harness. This arrangement is particularly useful in opening the chute; the elastic straps 50, when contracted, as in descending, pull out the cone, and it directs air upwardly and outwardly below the canopy and aids in opening the chute; the cone lines 22, 43 tension first and flatten the center of the chute and so aid in opening the chute.

The various arrangements may be combined in different ways, depending primarily upon how great a load the parachute is intended to carry.

The following combinations may evidently be made, in accordance with particular conditions:

1. Canopy with diagonal vents in every panel with a plain cone.
2. Canopy with diagonal vents in every other panel with a plain cone.
3. Canopy with diagonal vents in every panel with a cone having vents in every panel.
4. Canopy with diagonal vents in every other panel with a cone having vents in every panel.
5. Canopy with diagonal vents in every panel with a cone having diagonal vents in every panel.
6. Canopy with diagonal vents in every other panel with a cone having diagonal vents in every panel.
7. Canopy with diagonal vents in every other panel in combination with a cone having diagonal vents in every other panel.

In use, the vents in the canopy will open progressively, in proportion to the amount of excess pressure existing below the canopy, thereby relieving the parachute of strain upon the development of such excess pressure as would be met with when the parachute opens. These vents also aid in more prompt collapsing of the parachute just after landing so that the chutist is not dragged along the ground.

The purpose of the cone is primarily to direct air upwardly and outwardly toward the underside of the parachute, whereupon it changes di-

rection and escapes through the central opening 10. The velocity of this described body of air is quite high and it is believed that actually more air passes through the opening 10 with the use of applicant's cone than when a cone is not used. At any rate, the use of the cone substantially increases the load carrying ability of a canopy of a given size.

Probably the most useful function of the cone is to cause the parachute to descend nearly vertically. Actual tests conducted simultaneously with dummy loads launched from an airplane at the same instant, one load being attached to a standard parachute while another equal load was attached to a parachute of the present invention, the test taking place in a strong lateral wind, it was found that the parachute of the present invention landed nearly vertically below the point of launching, while the other parachute landed more than a mile from where the parachute of the present invention landed.

When the parachute of the present invention is descending in a lateral wind, the cone is deflected by such lateral wind and this deflection seems to cause a flow of air currents in and around the parachute that tend to counteract lateral drift.

While the invention has been described in some detail, it should be understood that the invention is not limited to the details herein described, and may be carried out in other ways.

I claim as my invention:

1. A parachute, comprising a canopy composed of a plurality of panels, certain of which are provided with vents which open automatically to relieve excess air pressure existing below the canopy, an air deflecting cone positioned centrally below the canopy, with its apex downwardly, and shroud lines connecting the canopy and cone to the load.

2. A parachute, comprising a canopy composed of a plurality of panels, certain of which are provided with diagonally extending vents extending diagonally from one reinforcing cord to the next adjacent reinforcing cord, which open automatically to relieve excess air pressure existing below the canopy, and an air deflecting cone positioned centrally below the canopy, with its apex downwardly, and shroud lines connecting the canopy and cone to the load.

3. A parachute, comprising a canopy composed of a plurality of panels, each provided with a diagonally extending vent which opens automatically to relieve excess air pressure existing below the canopy, said vents being arranged end to end, thereby forming a zig-zag row extending around the canopy, an air deflecting cone positioned centrally below the canopy, with its apex downwardly, and shroud lines connecting the canopy and cone to the load.

4. A parachute, comprising a canopy composed of a plurality of panels, certain of which are provided with vents which open automatically to relieve excess air pressure existing below the canopy, an air deflecting cone positioned centrally below the canopy, with its apex downwardly, and shroud lines connecting the canopy and cone to the load, the large end of the cone being open and its sides being provided with vents which open automatically to relieve excess air pressure existing on either side thereof.

5. A parachute, comprising a canopy composed of a plurality of panels, certain of which are provided with diagonally extending vents

which open automatically to relieve excess air pressure existing below the canopy, and an air deflecting cone positioned centrally below the canopy, with its apex downwardly, and shroud lines connecting the canopy and cone to the load, the large end of the cone being open and its sides being provided with vents which open automatically to relieve excess air pressure existing on either side thereof.

6. A parachute, comprising a canopy composed of a plurality of panels, each provided with a diagonally extending vent which opens automatically to relieve excess air pressure existing below the canopy, said vents being arranged end to end, thereby forming a zig-zag row extending around the canopy, an air deflecting cone positioned centrally below the canopy, with its apex downwardly, and shroud lines connecting the canopy and cone to the load, the large end of the cone being open and its sides being provided with vents which open automatically to relieve excess air pressure existing on either side thereof.

7. A parachute, comprising a canopy composed of a plurality of panels, certain of which are provided with vents which open automatically to relieve excess air pressure existing below the canopy, an air deflecting cone positioned centrally below the canopy, with its apex downwardly, and shroud lines connecting the canopy and cone to the load, the large end of the cone being open and its sides being provided with diagonally extending vents which open automatically to relieve excess air pressure existing on either side thereof.

8. A parachute, comprising a canopy composed of a plurality of panels, certain of which are provided with diagonally extending vents which open automatically to relieve excess air pressure existing below the canopy, and an air deflecting cone positioned centrally below the canopy, with its apex downwardly, and shroud lines connecting the canopy and cone to the load, the large end of the cone being open and its sides being provided with diagonally extending vents which open automatically to relieve excess air pressure existing on either side thereof.

9. A parachute, comprising a canopy composed of a plurality of panels, each provided with a diagonally extending vent which opens automatically to relieve excess air pressure existing below the canopy, said vents being arranged end to end, thereby forming a zig-zag row extending around the canopy, an air deflecting cone posi-

tioned centrally below the canopy, with its apex downwardly, and shroud lines connecting the canopy and cone to the load, the large end of the cone being open and its sides being provided with diagonally extending vents arranged in end to end formation, thereby forming a zig-zag row extending around the cone, said vents opening automatically to relieve excess air pressure existing on either side of the cone.

10. A parachute comprising a canopy, an air deflecting cone positioned centrally below the canopy with its apex downwardly and with its base at approximately the same level as the outer periphery of the canopy, the apex of the cone being closed except for a small reinforcing ring at such apex for attachment thereto of load cables, and shroud lines extending at the same angle as the sides of the cone from the base of the cone to the underside of the canopy, whereby all the air engaged by the cone is directed upwardly and outwardly toward the underside of the canopy.

11. A parachute comprising a canopy, said canopy being provided with vents which open automatically upon increase of air pressure, an air deflecting cone positioned centrally below the canopy with its apex downwardly and with its base at approximately the same level as the outer periphery of the canopy, the apex of the cone being closed except for a small reinforcing ring at such apex for attachment thereto of load cables, and shroud lines extending at the same angle as the sides of the cone from the base of the cone to the underside of the canopy, whereby all the air engaged by the cone is directed upwardly and outwardly toward the underside of the canopy.

12. A parachute comprising a canopy, an air deflecting cone positioned centrally below the canopy with its apex downwardly and with its base at approximately the same level as the outer periphery of the canopy, said cone being provided with vents therein which open automatically for relieving excess air pressure on either side thereof, the apex of the cone being closed except for a small reinforcing ring at such apex for attachment thereto of load cables, and shroud lines extending at the same angle as the sides of the cone from the base of the cone to the underside of the canopy, whereby all the air engaged by the cone is directed upwardly and outwardly toward the underside of the canopy.

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