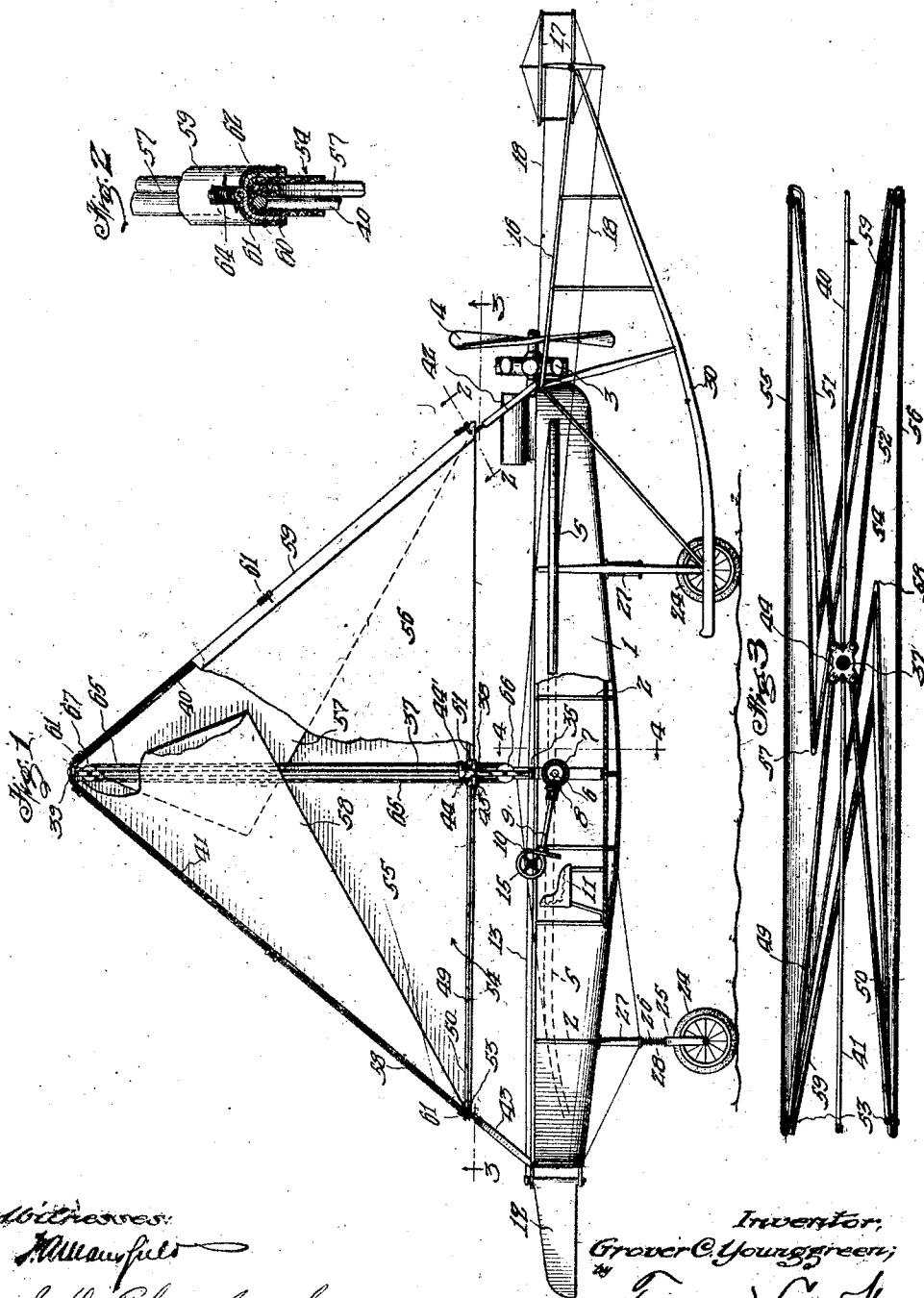


G. C. YOUNGGREEN.
SAFETY ATTACHMENT FOR AEROPLANES.
APPLICATION FILED FEB. 15, 1911.

997,354.

Patented July 11, 1911.

2 SHEETS—SHEET 1.



Witnesses:
Williamfeld
J. L. Thornburgh.

Inventor,
Grover C. Younggreen;
Townsend Lyon Hackley

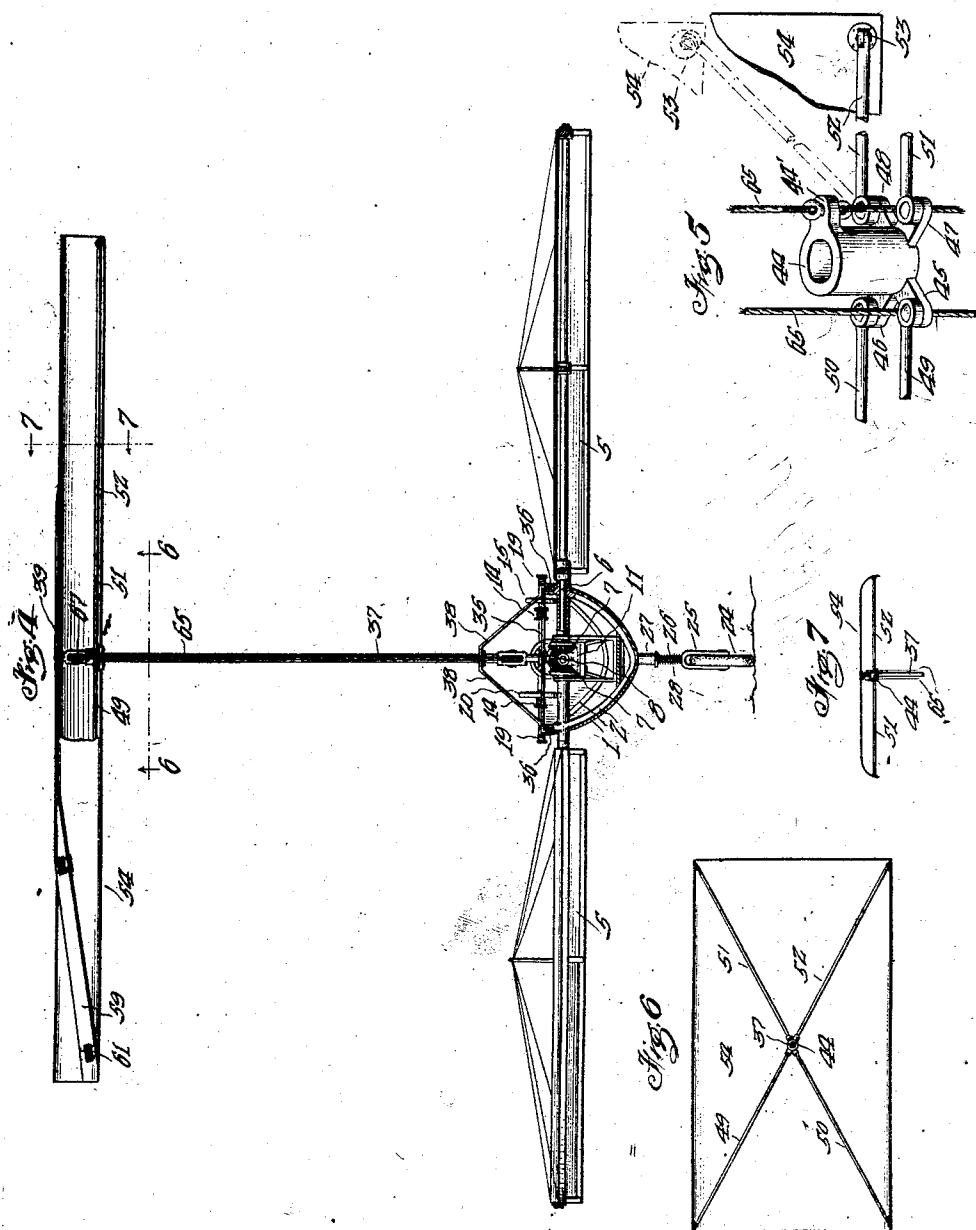
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2 SHEETS—SHEET 2.



Witnesses:
M. W. A. S. Felt
J. D. Thompson

Inventor:
Grover C. Younggreen;
by Townsend Lyon & Macaulay

his attorney.

UNITED STATES PATENT OFFICE.

GROVER C. YOUNGGREEN, OF LOS ANGELES, CALIFORNIA.

SAFETY ATTACHMENT FOR AEROPLANES.

997,354.

Specification of Letters Patent.

Patented July 11, 1911.

Application filed February 15, 1911. Serial No. 608,810.

To all whom it may concern:

Be it known that I, GROVER C. YOUNGGREEN, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Safety Attachment for Aeroplanes, of which the following is a specification.

In the aeroplane as now ordinarily constructed and used, no provision is made for descending to the ground in case of accident except that by manipulation of the planes and parts of the machine, a descent may be made by gliding. For the purpose of adding additional safety to aeroplanes in case of accident, I have constructed a safety attachment which may be fixed to the frame of the ordinary aeroplane in such a manner as not to interfere with the manipulation of the planes and controlling devices while in ordinary flight, and one of the main objects of the invention is to construct a device of the character described having the general characteristics of a parachute which may be, at the will of the operator, placed in operative position, and when in such position afford means which will prevent overturning of the aeroplane, and permit a gradual downward descent without the necessity of gliding.

Another object of the invention is to produce a safety attachment for aeroplanes which is adapted to be readily fixed to different styles of the ordinary type of aeroplane.

Another object of the present invention is to produce a device of the character described of simple and economical construction and of easy operation.

Other objects and advantages will appear hereinafter from the following description.

Referring to the drawings which are for illustrative purposes only: Figure 1 is a side elevation of an aeroplane partly in section, showing attached thereto my device illustrating an embodiment of my invention. Fig. 2 is a fragmental sectional view on line x^2-x^2 Fig. 1, looking in the direction of the arrows. Fig. 3 is an inverted sectional plan view of the device shown in Fig. 1 taken on line x^3-x^3 Fig. 1, the parachute body being shown partly opened out. Fig. 4 is a sectional view taken on line x^4-x^4 Fig. 1, showing the attachment in operative or extended position as used in making a descent. Fig. 5 is a perspective view of a portion of the operating mechanism for the attachment.

Fig. 6 is a sectional view on a reduced scale on line x^6-x^6 Fig. 4, looking in the direction of the arrows. Fig. 7 is a reduced sectional view taken on line x^7-x^7 Fig. 4.

The aeroplane which may be of any desired construction is shown in the present instance comprising a canoe-shaped body 1 formed of canvas, built upon a frame 2, the frame 2 affording a support for the motor 3, and propeller 4 which in the present instance is placed at the forward end of the body 1. Laterally extending side planes 5 are provided, mounted on shafts 6, which are adapted to be moved into different angular positions by means of a controlling mechanism comprising beveled gear wheels 7 on the inner end of each shaft 6 which mesh with a beveled pinion 8 on a post 9 provided with a hand-wheel 10 directly in front of the operator's seat 11. The aeroplane is also provided with a rudder 12 at the rear end thereof, controlled by cable 13 secured to a drum 14, operated by means of a hand-wheel 15. At the forward end of the aeroplane, supported on a framework 16, is an elevating plane 17 operated by means of a cable 18 secured to a drum 19, which in turn is controlled by means of a hand-wheel 20.

The aeroplane is provided with supporting wheels 24 mounted in yokes 25 which have an extension 26 slidably mounted in a hollow rod 27. Springs 28 are interposed between the end of the hollow rod 27 and the yoke 25 to act as cushions and reduce the shock of contact with the ground when the aeroplane alights. Runners 30 are also provided, secured to the forward end of the frame of the aeroplane in any suitable manner to assist in protecting the aeroplane during the operation of alighting.

For the purpose of mounting the safety attachment to an aeroplane of the form above described, a cross-bar 35 is used, having its ends secured in any suitable manner to the side pieces 36 of the frame 2 of the aeroplane. Mounted on the cross-bar 35 is a mast or standard 37, in the present instance round in cross-section, and braced by means of brackets or arms 38 which are secured to the cross-bar 35. The upper portion of the standard 37 is provided with a circular flange 39 to which is secured the upper ends of rods 40 and 41. The rod 40 extends from the flange 39 to the forward end of the aeroplane body 1 and is secured thereto by means of a bracket 42. The rod

41 extends to the rear end of the aeroplane body 1 and is secured thereto by means of a bracket 43 similar to bracket 42. Mounted to slide vertically on standard 37 is a sleeve 5 44 provided at its lower end with ears 45, 46, 47, 48 to which are pivoted rods 49, 50, 51 and 52 respectively. The rods 49, 50, 51 and 52 are each pivotally attached at their outer ends, as shown at 53, to a corner of a 10 rectangular sheet 54 of canvas or other suitable material comprising the parachute body or member. When the parachute member is in inoperative position as shown in Fig. 1, of the drawing, rods 49 and 51 lie parallel and 15 close to the rods 50 and 52, the sheet 54 being supported at its central portion by means of the flange 39 on the standard 37 to which it is attached in any suitable manner, and the fullness or body of the sheet is folded between the side portions 55 and 56 (see Fig. 3) into two folds or flaps 57 and 58, the fold 20 57 lying between the side 55 of the sheet and the standard 37 and the fold 58 lying between the side 56 of the sheet and the standard 37. When in the folded position just 25 described, the parts lie as shown in Fig. 2 and are prevented from opening out by the force of the wind by means of two reinforcing strips of canvas 59 which extend along 30 one line of each fold or flap 57 and 58 and which are secured to the canvas as illustrated at 60. Each strip 59 is provided at intervals with hinges 61 which are placed between the strip 59 and the canvas sheet 54. 35 One leaf 62 of each spring is secured to the sheet 54 and strip 59, the leaf 63 being secured only to the strip 59 and extending over the fold in the canvas, in which position it is held by means of a spring 64. Means are 40 provided for raising the parachute member 54 into extended position (as shown in Fig. 4 of the drawing) which consist of an endless cable 65 which operates over sheaves 66 and 67 mounted in eyes formed in enlarged 45 portions at the lower and upper end respectively of the standard 37. The ends of the cable 65 are secured to an ear 44' on the upper portion of the sleeve 44.

With the device in the position shown in 50 Fig. 1, being the position in which the device is carried during flight, a minimum amount of resistance to the air is attained as the sides 55 and 56 of the sheet 54 are practically flat and the folds in the sheet 55 are protected by the canvas strips 59. Should accident happen so that the aeroplane is crippled, the safety device is operated by pulling downwardly on the run of 55 the cable next to the operator, which raises the sleeve 44 on the standard 37 thereby raising the arms 49, 50, 51 and 52, which during the raising operation also swing outwardly opening out the folds in the sheet, until the sleeve 44 strikes the flange 39 at the upper 60 end of the mast, at which point the sheet 54

is stretched into the position indicated in Figs. 6 and 7, the arms 49, 50, 51 and 52 extending diagonally from the mast to the corners of the sheet as indicated in Fig. 6. 70 When in this position the sheet 54 acts as a parachute, the air being pocketed on the under side of the sheet, thereby permitting a gradual descent of the aeroplane to the ground.

What I claim is:—

1. In combination with an aeroplane, a mast, a sheet of fabric having its central portion supported on said mast, means for holding said fabric folded into substantially a flat vertical triangular form with one side 80 of the triangle at the bottom, the plane of said folded triangular fabric lying fore and aft and for raising the corners of said fabric to unfold the same, and holding the corners in definite position to produce a substantially horizontal sheet of fabric capable of acting as a parachute when unfolded, the said fabric when folded in triangular form in a vertical plane acting to promote lateral 85 stability.

2. In combination with an aeroplane, a mast, a sleeve on said mast, laterally movable arms pivoted to said sleeve, a sheet of fabric having its central portion supported on said mast and having its corners secured 95 to the ends of said arms forming two flat side portions, the ends of said sheet being adapted to form folds in said sheet between the side portions when in closed position, and means for raising said sleeve to place 100 the sheet in extended position.

3. In combination with an aeroplane, a mast, a sleeve vertically movable on said mast, laterally movable arms pivoted to said sleeve, a sheet of fabric having its central 105 portion supported on said mast and having its corners secured to the outer ends of said arms forming flat side portions, the ends of said sheet being adapted to form folds in said sheet between the flat side portions 110 when in closed position, a pair of flaps secured to said sheet, each flap extending over the adjacent folded portion of the sheet, means for yieldingly holding said flaps over the folded portions, and means for raising 115 and lowering said sleeve.

4. In combination with an aeroplane, a mast, a sleeve vertically movable on said mast, laterally movable arms pivoted to said sleeve, a sheet of fabric having its central 120 portion supported on said mast and having its corners secured to the outer ends of said arms forming flat side portions, the ends of said sheet being adapted to form folds in said sheet between the flat side portions 125 when in closed position, a pair of flaps secured to said sheet, each flap extending over the adjacent folded portion of the sheet, means for yieldingly holding said flaps over the folded portions, said means consisting 130

of a plurality of hinges each having one leaf secured to said sheet, springs on each hinge, and means for raising and lowering said sleeve to place the sheet in extended position.

5 5. In combination with an aeroplane, a mast, rods extending from the top of said mast to the front and rear of said aeroplane respectively, a sleeve vertically movable on
10 said mast, laterally movable arms pivoted to said sleeve, a sheet of fabric having its central portion secured to said mast and its corners secured to the outer ends of said arms forming flat side portions, the ends of
15 said sheet being adapted to form folds in said sheet between the flat side portions and supported on said rods when in closed position, a pair of flaps secured to said sheet,
20 each flap extending over the folded portion, means for yieldingly holding said flaps over the folds in the sheet, and means for raising and lowering said sleeve.

25 6. In combination with an aeroplane, a mast, rods extending from the top of said mast to the front and rear of said aeroplane

respectively, a sleeve vertically movable on said mast, laterally movable arms pivoted to said sleeve, a sheet of fabric having its central portion secured to said mast and its corners secured to the outer ends of said corners, forming flat side portions, the ends of said sheet being adapted to form folds in said sheet between the flat side portions supported on said rods when in closed position, a pair of flaps secured to said sheet, each
35 flap extending over the folded portion, means for yieldingly holding said flaps over the folds in the sheet, and means for raising and lowering said sleeve, said means consisting of a sheave at the top and bottom of said
40 mast, and a cable having its ends secured to said sleeve operable over said sheaves.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 16th day of January, 1911.

GROVER C. YOUNGGREEN.

In presence of—

FRANK L. A. GRAHAM,
P. H. SHELTON.