K. LEON.

FLYING MACHINE.

APPLICATION FILED MAY 4, 1911.

999,170.

Patented July 25, 1911.

2 SHEETS—SHEET 1.

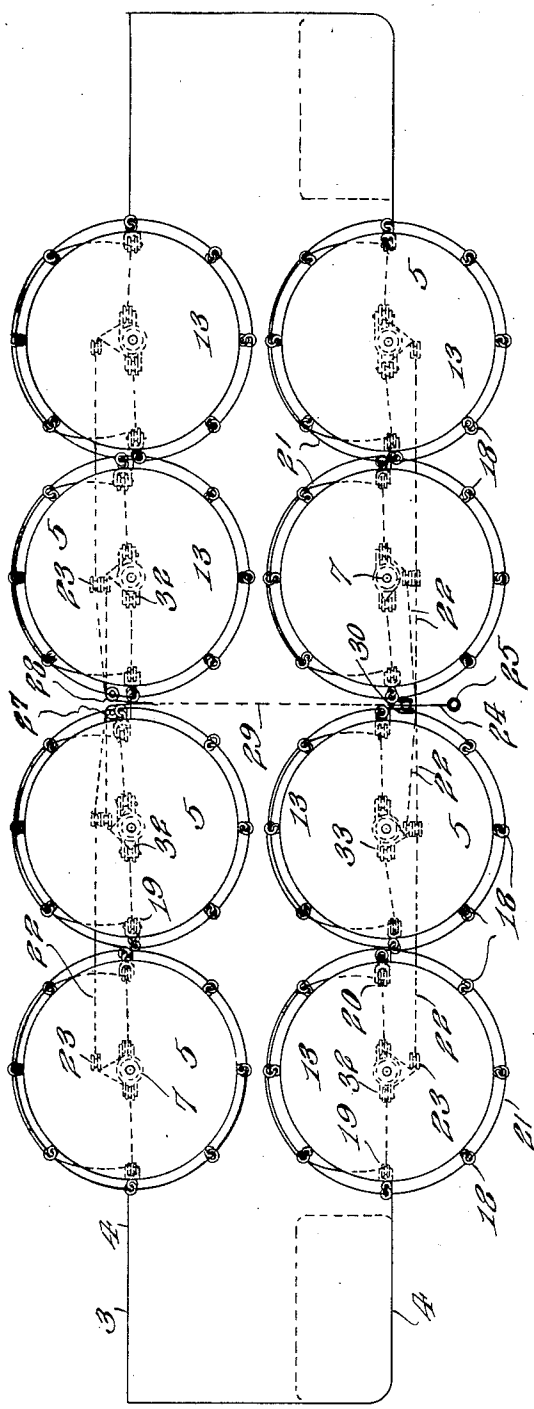

Fig. 2.

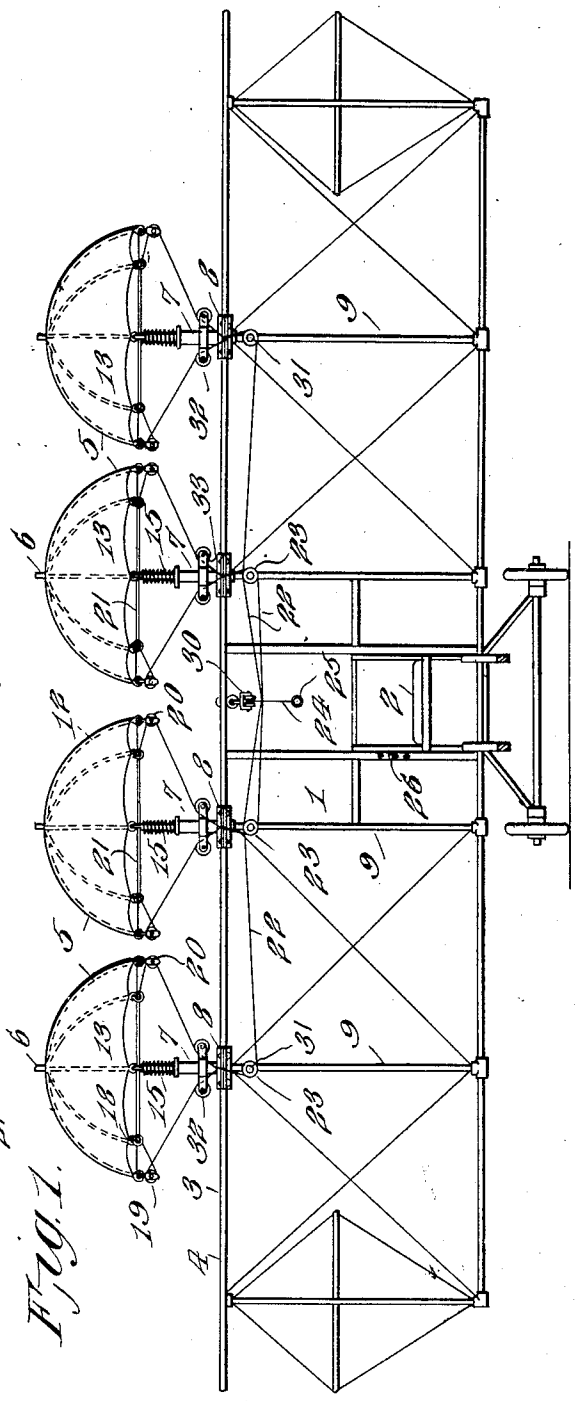

Fig. 1.

Witnesses

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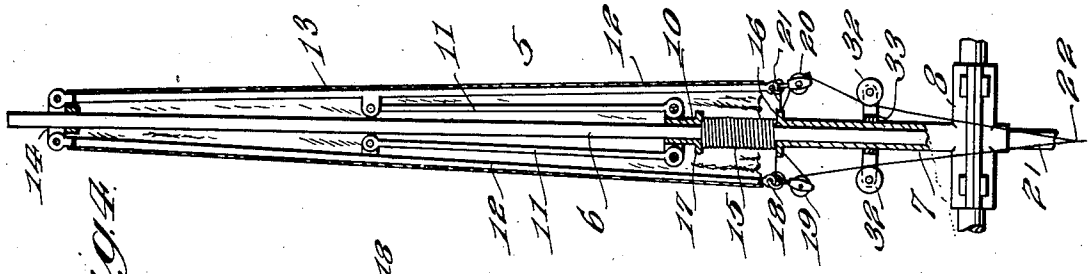

Fig. 4.

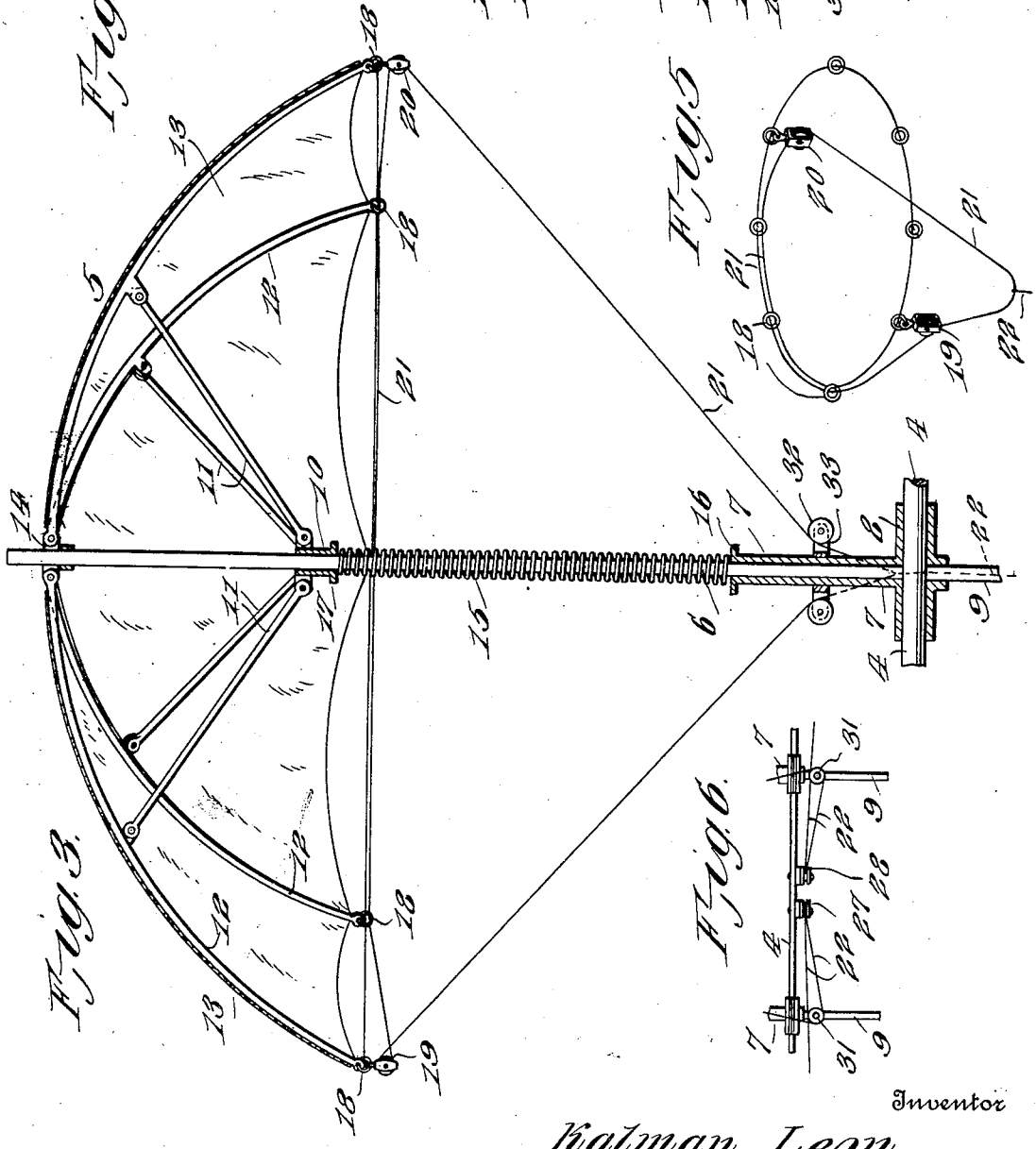

Fig. 3.

Fig. 5.

Fig. 6.

Witnesses

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UNITED STATES PATENT OFFICE.

KALMAN LEON, OF WASHINGTON, DISTRICT OF COLUMBIA.

FLYING-MACHINE.

999,170. Specification of Letters Patent. Patented July 25, 1911.

Application filed May 4, 1911. Serial No. 624,896.

To all whom it may concern:

Be it known that I, KALMAN LEON, a citizen of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Flying-Machines, of which the following is a specification.

This invention relates to flying machines, and particularly to safety attachments therefor, the object of the invention being to provide a novel construction and arrangement of parachutes suitably positioned upon the machine for effectually supporting the same and insuring the slow descent and safe landing of the machine when said parachutes are thrown into action.

A further object of the invention is to provide parachutes which are normally held collapsed so as to diminish their resistance to the propulsion of the machine, and which are adapted to be released for action by the aviator and upon being released to be instantly opened or outspread for immediate supporting effect.

A still further object of the invention is to provide means whereby the parachutes are connected and adapted to be simultaneously released by the aviator in the event of danger, through the manipulation by the aviator of a single holding connection, thus enabling the aviator to take measures to avert disaster as soon as danger arises.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a front elevation of a flying machine embodying my invention, showing the parachutes outspread for use. Fig. 2 is a top plan view of the same. Fig. 3 is a vertical section through one of the outspread parachutes. Fig. 4 is a similar view of the same collapsed. Fig. 5 is a diagrammatic view showing the arrangement of the controlling cord and guides on each parachute. Fig. 6 is a fragmentary rear elevation, showing the guides for the cords controlling the rear series of parachutes.

In the illustrated exemplification of my invention I have shown the application thereof to the upper plane or supporting surface of a biplane machine, although it is to be understood that the invention may be applied to any other type of flying machine; that the parachute devices may be arranged as desired upon the supporting surface or surfaces and framework of the machine; and that the number and arrangement of the parachute devices may vary as circumstances may require in order to insure the safe support and descent of the machine by the parachute devices when the necessity for their use arises.

In the drawings, 1 designates the main frame of the machine, which supports the aviator's seat 2, and 3 designates the upper main plane or supporting surface, which may be in general of any conventional construction; that shown in the present instance including front and rear longitudinal frame bars or rods 4. As shown, front and rear longitudinal series of parachutes 5 are provided respectively at the front and rear of the supporting surface 3, the parachutes of each series being equal in number to and arranged opposite each other, so that the parachutes when in action will both balance and support the machine to an adequate extent to prevent it from overturning under the pressure of gusts of air and to insure its slow and safe descent to the ground.

Each parachute is of the umbrella type of construction and comprises a rod or staff 6 fitted at its lower end in a supporting sleeve or socket 7 connected by a sectional T-coupling 8 with the adjacent bar or rod 4 and stanchion 9, the sections of the coupling being bolted or otherwise united and secured in position. Fitted upon the staff 6 is a sliding sleeve or runner 10 connected by pivoted spreaders or links 11 with the ribs 12 of the parachute frame, over which ribs is stretched a body or cover 13 of fabric or other suitable material which is adapted to be opened and closed by the outward and inward movements of the ribs under the action of the spreaders, the ribs being pivotally connected at their upper ends to a notch or crown piece 14 fixed to the upper end of the staff. A coiled spring 15 surrounds the staff between flanges or abutments 16 and 17 on the sleeve 7 and runner 10 and is adapted when the parachute is folded or collapsed to be compressed and placed under tension, as shown in Fig. 4, and when said parachute is released for action to force the sliding runner upward on the staff and

thereby spread the parachute frame and cover open, as shown in Fig. 3, to permit it to fill with air for the supporting action.

The lower ends of the ribs 12 of each parachute frame are provided with guide rings or members 18, and to two of these rings at diametrically opposite sides of the parachute frame are connected guide pulleys or sheaves 19 and 20, the pulley 19 being of the double-grooved type. A looped controlling cord or wire 21 is threaded through these rings and pulleys in such a manner as to permit the ribs of the parachute frame to be drawn together or folded for the collapse of the parachute and to permit said ribs to spread outward for the opening movement of the parachute. The ends of this cord or wire 21 are coupled to a flexible connection 22 leading over or under suitable guide pulleys 23 to the main frame at a point adjacent the aviator's seat 2. From the connection 22 one end of the cord leads to the pulley 20, said cord passing over the pulley and thence extending in looped form through the rings or eyes 18, beginning with the ring at one side of the ring to which said pulley 20 is attached and finally through the latter-named ring and thence extending again through the rings at one side of the series to the pulley 19, from which the opposite end of the cord or wire depends and leads to the connection 22. The cord or wire 21 is thus roven through the guides so as to contract and expand and perform the function of a draw-loop to effect an opening and closing action of the parachute, as will be readily understood.

The flexible connections 21 leading over the guide pulleys 23 from the front series of parachutes are connected at a point above and in advance of the aviator's seat with a releasing cord, wire, rope or member 24, which is provided with a ring or loop 25 adapted to engage a latch or suitable retaining device 26 on the main frame, while the flexible connections 21 from the rear series of parachutes lead over guide pulleys 27 and 28 and are coupled to the releasing member 24 by a main flexible connection 29 extending forwardly beneath the plane or supporting surface 3 and passing at its forward end over a guide pulley 30. The construction and arrangement of the controlling connections is thus such that when the two series of parachutes are collapsed and the releasing device 24 connected with the latch device or retainer 26, all of the parachutes will be held closed against the resistance of their opening springs, the looped controlling cords being maintained in a contracted condition and the flexible connections taut, as will be readily understood. As shown, the guide pulleys 23, 27 and 28 are supported by suitable brackets 31 fastened to the frame of the plane 3 in any suitable manner, while the ends of the looped controlling cords 21 pass downward in convergent relation over guide pulleys 32 supported by brackets 33 carried by the sleeves 7, whereby such ends of the cords 21 are prevented from binding or becoming entangled and a free and easy running of the cords over and through the various guides insured.

From the foregoing description, it will be understood that under normal conditions the parachutes are held collapsed and maintained in collapsed condition by the engagement of the releasing cord with the latch device or retainer, the folded parachutes presenting a minimum amount of surface to air resistance when the machine is in flight. The parachutes may be initially folded or collapsed in any suitable manner and may be simultaneously released for action at any time by the aviator, who, from his position on the seat 2, may easily and quickly disengage the releasing device from the retainer 26, whereupon all the parachutes will be opened in an obvious manner by their springs. Hence when the motive power fails and the aviator is unable to glide to the earth, or danger from any other cause ensues, the aviator is enabled to release the parachutes instantaneously for action, insuring a safe descent to the ground under any and all conditions.

As before stated, the parachutes may be arranged at any desired point or points upon the supporting surface or surfaces or frame of the machine, the invention not being restricted either to any particular arrangement of the parachutes or number of them employed, or to any particular mode of mounting the parachutes, except when specifically defined in the appended claims.

Having thus described my invention, what I claim as new is:

1. The combination, with a flying machine, of a staff having a coupling member connected with the frame structure of the machine, a parachute body provided with ribs and spreaders mounted upon the staff, a runner upon the staff and connected with the spreaders, an expansion spring surrounding the staff between the runner and coupling member and adapted to be compressed and tensioned upon the closing of the parachute body and to react and expand to spread said body open, a holding and releasing device, and a connection between said holding and releasing device and the parachute body, whereby said body may be closed or collapsed and released to permit the same to open and fill.

2. The combination, in a flying machine, of vertical and horizontal frame members, a T-coupling uniting said frame members, a staff fixed to said coupling, a parachute body mounted on the staff and including ribs

and spreaders, a runner upon the staff and connected with the spreaders, an expansion spring surrounding the staff between the runner and coupling member and adapted to be compressed and tensioned upon the closing of the parachute body and to react and expand to spread said body open, a holding and releasing device, and a connection between said holding and releasing device and the parachute body, whereby said body may be closed or collapsed and released to permit the same to open and fill.

3. A safety attachment for flying machines comprising a staff, a coupling member thereon adapted for attachment to the machine, a parachute body including ribs pivotally attached at their upper ends to the staff, a runner upon the staff, spreaders pivotally connecting the ribs and runner and adapted to fold parallel with the staff, a coiled spring surrounding the staff to operate upon the runner, guides upon the ribs, a draw-loop roven through the guides whereby the parachute body may be held collapsed and released to permit it to spread open and fill, and means for controlling said loop.

4. A safety attachment for flying machines comprising an automatically opening parachute, guides upon the body of the parachute, a draw-loop roven through said guides, guides for the ends of the loop, and a controlling device connected with the ends of the loop.

5. The combination, with a flying machine, of a series of normally collapsed, automatically-opening parachutes, guides on the body of each parachute, a draw-loop roven through the guides on each parachute for permitting it to spread and fill, a holding and releasing device, and connections between said device and the ends of the draw-loops of the several parachutes of the series, whereby the loops may be permitted to simultaneously expand and release the series of parachutes for simultaneous opening movement.

6. A safety attachment for flying machines comprising a collapsible, automatically openable parachute, guides upon the body of the parachute, a draw-loop roven through the guides for holding said parachute collapsed and permitting it to spread open and fill, and means for controlling said loop.

7. The combination, with a flying machine, of a parachute comprising a staff, a parachute body mounted on the staff for opening and closing movements, said body being provided with guides, a flexible connection threaded through the guides and adapted for expansion and contraction to permit opening and closing movements of the body, a retainer on the machine, and a releasing device coupled to said flexible connection and adapted to be engaged with and disengaged from said retainer.

8. The combination, with a flying machine, of a parachute comprising a staff, a parachute body mounted on the staff for opening and closing movements, said body including ribs and spreaders, guides upon the ribs, a flexible connection threaded through the guides and adapted for expansion and contraction to permit opening and closing movements of the body, a retainer on the machine, and a releasing device coupled to said flexible connection and adapted to be engaged with and disengaged from said retainer.

9. A safety attachment for flying machines comprising a staff, a spring-opened parachute body carried by the staff, guides upon the frame of the parachute body, a draw-loop roven through the guides, and means for controlling said loop.

10. A safety attachment for flying machines comprising a staff, a sleeve upon the lower end of the staff carrying a coupling member, a parachute body including ribs pivoted to the staff, a runner upon the staff, a coiled spring surrounding the staff between the sleeve and runner, guides upon the ribs, a draw-string running through said guides, guides upon the sleeve for the extremities of the string, and a controlling device connected with said string extremities.

In testimony whereof I affix my signature in presence of two witnesses.

KALMAN LEON.

Witnesses:
C. C. HINES,
BENNETT S. JONES.