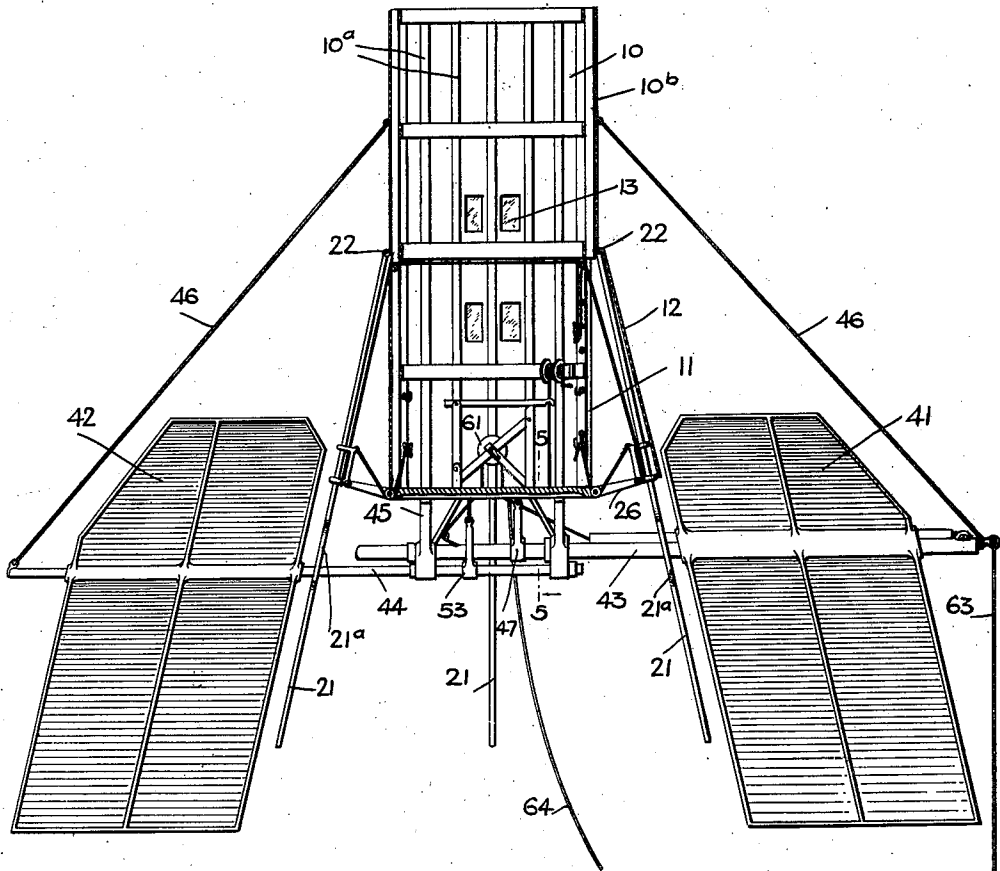


W. PHILLIPS.
FLYING MACHINE.
APPLICATION FILED APR. 18, 1912.

1,046,219.

Patented Dec. 3, 1912.
4 SHEETS—SHEET 1.



WITNESSES
Benedict J. Joffe
Geo. L. Beeler

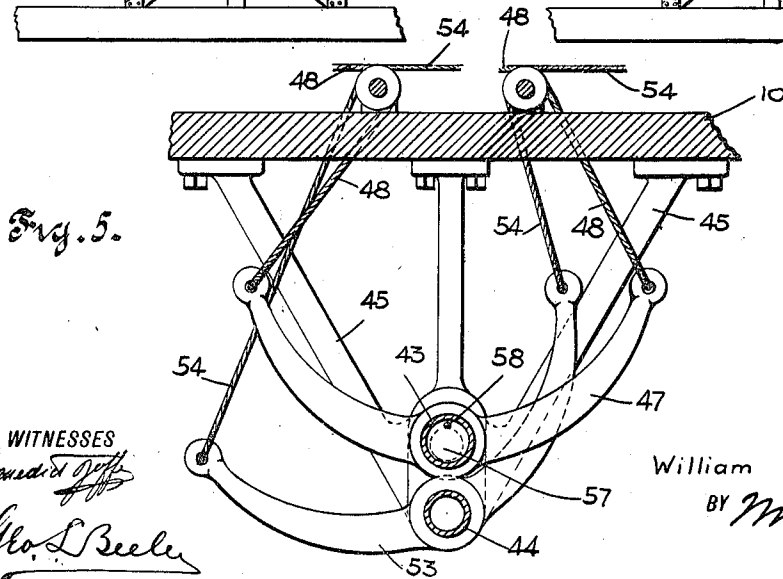
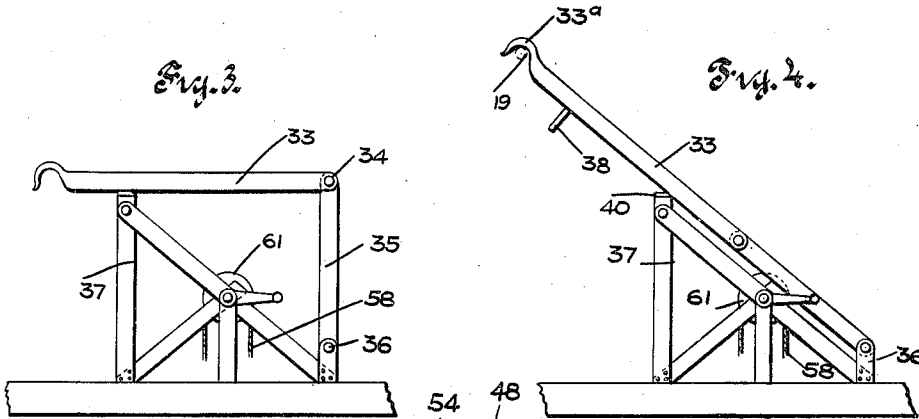
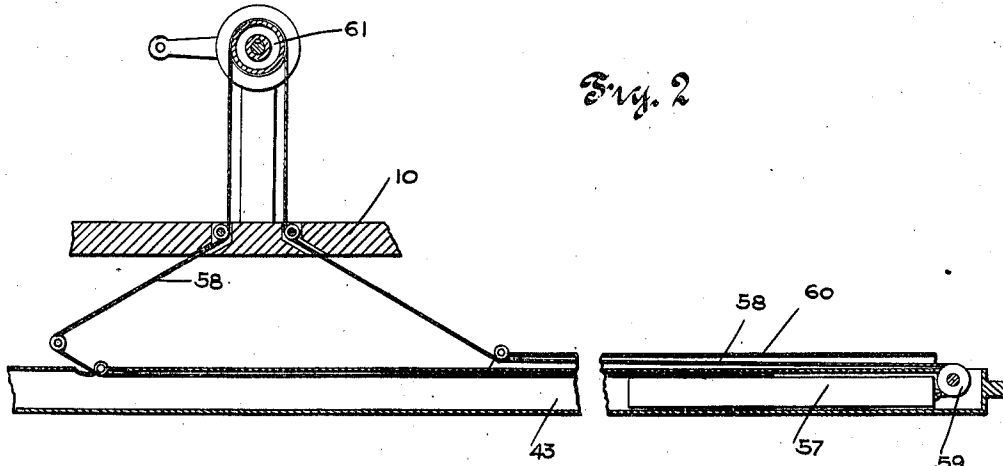
Fig. 1.

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4 SHEETS—SHEET 2.



WITNESSES
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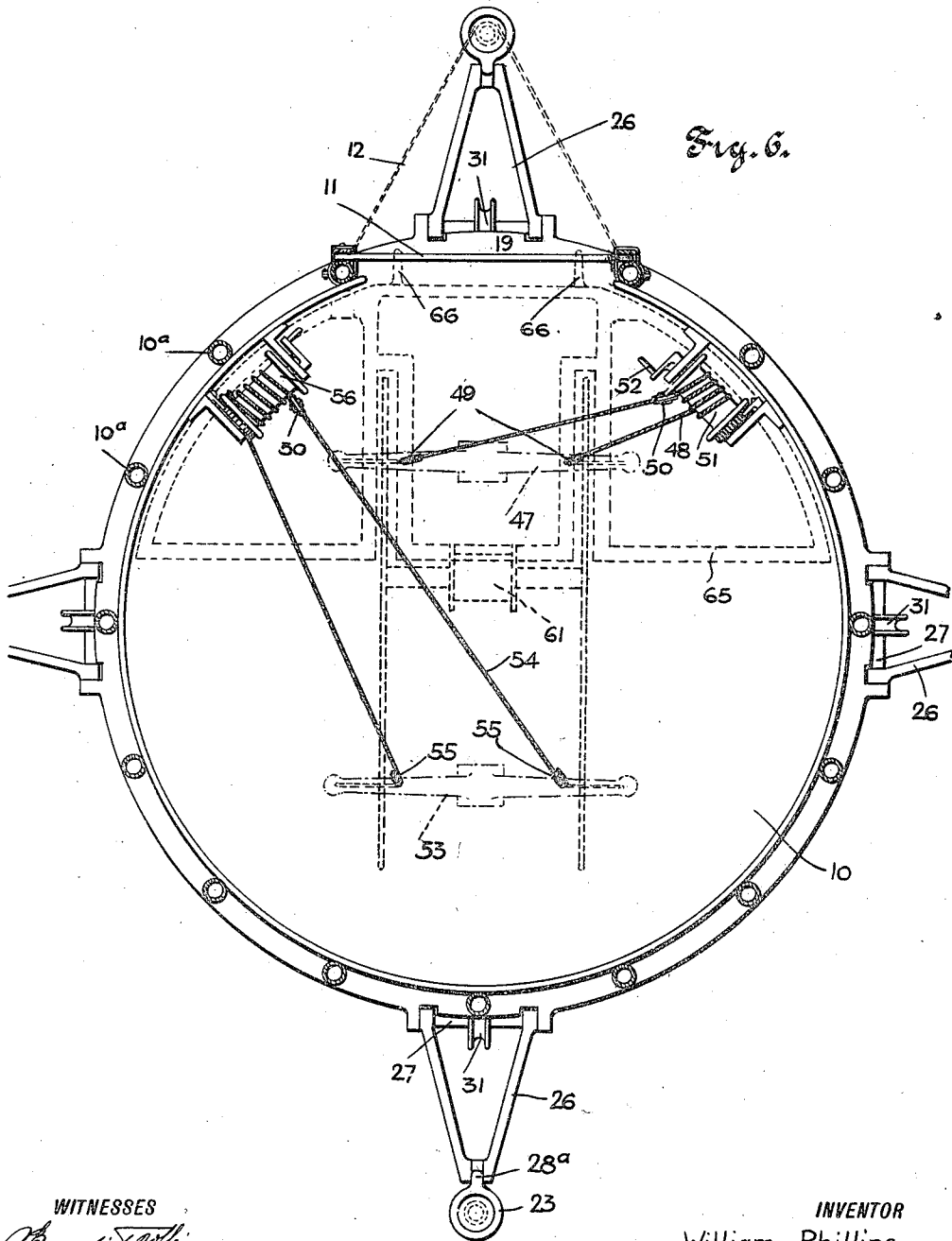
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4 SHEETS—SHEET 3.



WITNESSES
Rene de la Roche
Geo. L. Beebe

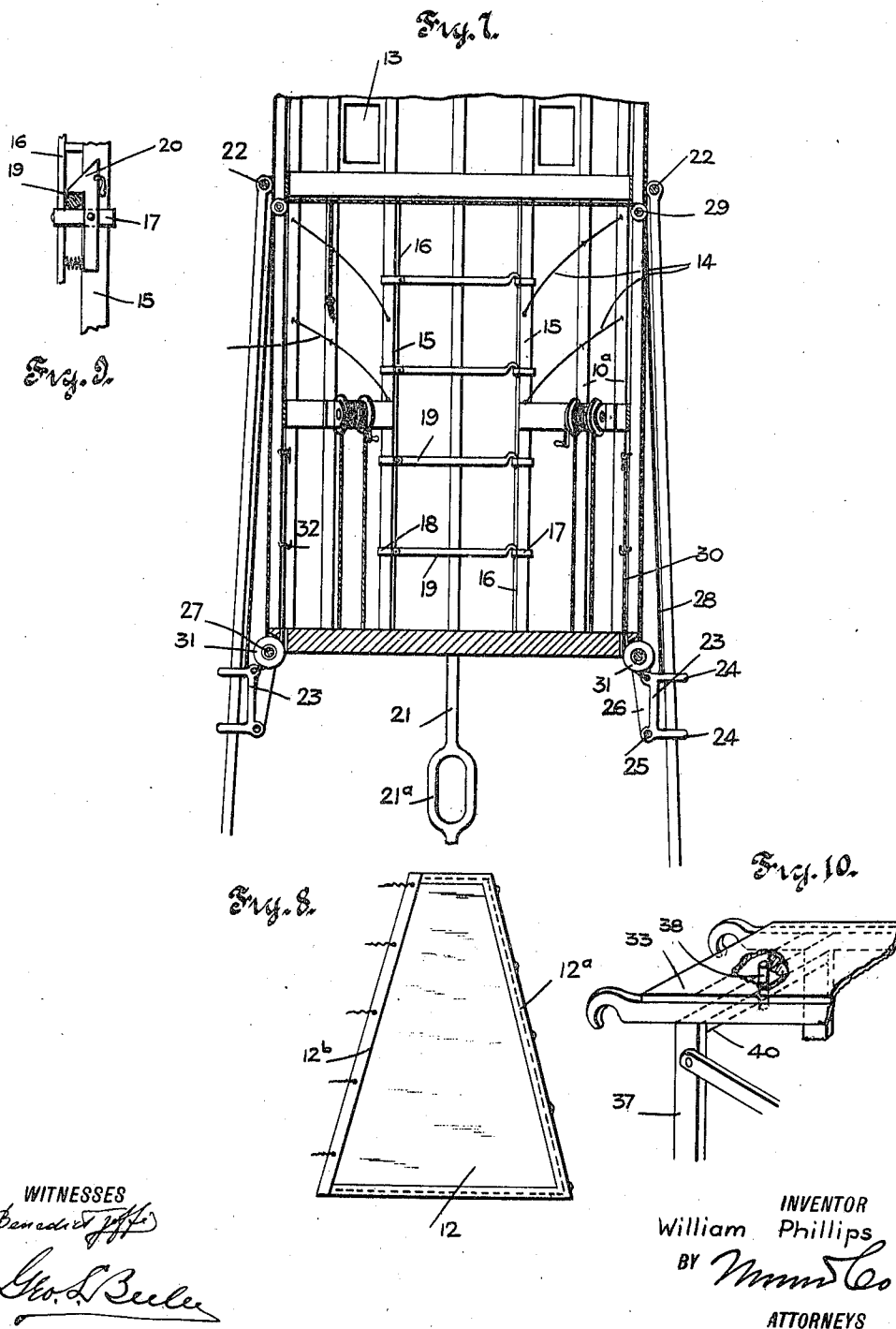
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4 SHEETS-SHEET 4.



UNITED STATES PATENT OFFICE.

WILLIAM PHILLIPS, OF CHICAGO, ILLINOIS.

FLYING-MACHINE.

1,046,219.

Specification of Letters Patent.

Patented Dec. 3, 1912.

Application filed April 18, 1912. Serial No. 691,671.

To all whom it may concern:

Be it known that I, WILLIAM PHILLIPS, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Flying-Machine, of which the following is a full, clear, and exact description.

This invention relates to flying machines of the helicopter type, and the purpose of the present invention is to improve upon the machine of this type covered by Letters Patent of the United States issued to me on June 11, 1907, No. 856,910, such improvements relating to certain details hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a vertical central section, indicating my improvements substantially in the position which they will assume after the machine has left the earth; Fig. 2 is a vertical longitudinal section of the balancing means; Fig. 3 is a side elevation of the aviator's seat in the position it will assume when the machine is ascending or descending; Fig. 4 is a view of the same in the position it will be placed when the machine is vertical; Fig. 5 is a vertical transverse section on the line 5—5 of Fig. 1; Fig. 6 is a transverse section through the car body, showing the bottom ring and associated parts in plan, other parts being omitted; Fig. 7 is a vertical view from the inside of the car body looking forward; Fig. 8 is a detail of the apron described below; Fig. 9 is a detail of the door fastening means; and Fig. 10 is a perspective detail of the seat.

Referring particularly to the drawings, I have indicated somewhat diagrammatically at 10 a car body of substantially cylindrical form and arranged vertically as in my previous patent, the motor and propelling devices, however, being omitted from the top of the body since they comprise no part of my present improvements. The body 10 may be constructed of any suitable light and strong materials, but embodying a series of vertical ribs 10^a upon which is fastened fabric or other covering 10^b in any suitable

manner. The said body is substantially inclosed on the sides as indicated, but is provided in the front with an entrance opening 11, adapted to be closed by an apron 12, and may also be provided with any desired number, or location, of peep holes or windows 13. Any suitable number and arrangement of stays or braces 14 may be used in connection with the structure of the car body to reinforce it. The principal of such stays extend from the door opening upwardly and to the right and left, they being connected at one end to the door posts 15 and also connected to the vertical strips 10^a.

Adjacent each door post 15 is a door strip 16, and a series of clips or clamps 17 are arranged along the door post on one side and serve to secure said post to the adjacent strip, as shown in Fig. 9. To the opposite door post are hinged or pivotally connected, as at 18, a vertical series of bars 19 adapted to be detachably connected by hooks to the aforesaid clamps 17 and locked thereon by means of spring operated dogs 20 when the door opening is closed. These bars 19 are substantially horizontal in all conditions of the machine for a purpose which will appear later.

I have designed a peculiar arrangement and construction of supporting legs for the machine, such legs being indicated at 21 and pivotally secured to the body 10 on horizontal pivots 22 at points well upward toward the top of said body, said legs being adapted to swing radially of the body. Any suitable means may be employed for manipulating the legs, causing them to swing outward or inward on said pivots 22. The means I have shown, however, comprises a set of sleeves 23, each having a pair of spaced rings 24 embracing a leg and adapted to slide therealong when the leg swings on its pivot. To each of said sleeves is pivotally connected, at its lower end at 25, a brace 26 whose other end is pivoted at 27 adjacent the bottom of the car body. The construction and arrangement are such that when the sleeve 23 is drawn upward along the leg, the brace 26 connected to the sleeve will be swung outward and upward from

the position indicated in Fig. 7 to that indicated in Fig. 1, causing the leg to be swung outward away from the car body and will there be held rigidly braced by the brace 26 in position to support the machine in a suitable manner. A cord or rope 28 is connected to the sleeve 23 at 28^a and extends thence upward on the outside of the body 10 to and over a direction pulley 29 to the inside of the car body in position to be manipulated by the aviator. A set of hooks or cleats may be conveniently arranged on the inside of the car body for securing the inner ends of the ropes 28 as the aviator may require. To break the bracing effect of the brace 26 so as to lower the legs when the machine is in full operation, I connect to the upper end of each sleeve an auxiliary cable 30 which is extended thence over a direction pulley 31 preferably co-axial with the pivot 27 at the bottom of the car body and which extends thence up into the car body near the bottom thereof within easy reach of the aviator and is adapted to be secured, as desired, upon any of a series of hooks or cleats 32.

The apron 12 above alluded to is connected along the edge 12^a to one door strip 16 and is so arranged as to extend over the front leg 21 and to be attached as by lacing or otherwise at its other edge 12^b to the opposite door strip 16, whereby the aviator will be protected from the head wind while in operation. The apron is made of sufficient fullness to permit the front leg to be carried in extended position during the flight for the purpose of providing a better control of the machine, and it may be desirable in certain instances for the aviator to rest his feet outward within the apron and upon the front brace 26.

The seat 33 may consist of any suitable device shown as being pivotally connected at 34 to a supporting member 35, which is likewise pivoted at 36 near the bottom of the car body. The forward end of the seat is adapted to rest upon an upright 37 when the machine is in a vertical position, as for instance, when standing still or when ascending or descending, and by virtue of the pivotal connections 34 and 36 the position of the seat is adapted to be changed as indicated in Fig. 4 so as to cause the extreme front end of the seat at 33^a to engage over one of the bars 19 of the door, whereby the seat may be held in a substantially horizontal position when the machine is sailing through the air with the body inclined. A pin 38 is connected to the bottom of the seat and is adapted to cooperate as by a hole 39 in a cross bar 40 of the support 37, for the purpose of increasing the stability of the seat when arranged substantially parallel to the bottom of the car body.

My improved form of steering devices

comprises a plurality of rudders 41 and 42, the rudder 41 being at the front of the machine and the other rudder 42 at the rear. These rudders are mounted for oscillation on rock shafts 43 and 44 respectively, said shafts being journaled in comparatively close parallel relation below the bottom of the car body in brackets 45. The outer ends of the rock shafts may be supported by guy-wires 46 of any suitable number and connected to the upper part of the car body as may be found best suited for the purpose, but yet so as not to interfere with the oscillation of the shafts to which the rudders are rigidly connected. A yoke 47 rigidly connected to the shaft 43 has connected to its opposite arms the opposite ends of a cable 48. The intermediate portion of the cable 48 is extended up through the bottom of the car body over direction pulleys 49 and extends along the floor of the car body to and around pulleys 50 and thence to and around a drum 51 having a crank 52 for manipulation by the aviator's right hand. The arrangement of the drum and cable is such that a rotation of the drum in either direction will cause a corresponding oscillation of the rock shaft 43 and position of the rudder 41. Likewise the shaft 44 has rigidly connected to it a yoke 53 to the opposite ends of which are connected the ends of a cable 54 extending over direction pulleys 55 and thence to and around a drum 56 at the aviator's left hand, substantially as before described in connection with the steering mechanism for the front rudder. Any suitable locking or ratchet mechanism may be used in connection with the drums 51 and 56 for the purpose of holding them stationary.

The front rudder shaft 43 as shown in detail in Fig. 2 is made larger than the rudder shaft 44 and on its interior is provided a shiftable weight 57 for the purpose of balancing or stabilizing the machine when in the air. The weight 57 has connected at its front end a cable 58 which extends over a direction pulley 59 adjacent the front end of the shaft 43 and extends thence rearwardly within a compartment 60 of the shaft and upward through the floor of the car body to and around a drum 61 conveniently arranged beneath the seat 33 and journaled in a portion of the seat supporting structure. The other end of the cable 58 is extended downward and thence over suitable guides into the tubular shaft 43 and connected to the weight 57 at or near its center, whereby when the drum 61 is rotated in one direction the weight may be shifted rearwardly to or beyond the center of the car, and when the drum 61 is rotated in the opposite direction the weight will be shifted outward toward the front end of the shaft 43. This arrangement of the shifting mech-

anism for the balancing weight will not interfere with the above described oscillation of the rudder shaft.

By extending the rudder shafts 43 and 44 through loops or rings 21^a of the front and rear legs 21, the stability of the structure will be increased. While the rudders are shown as extending downward below the lower ends of the legs, it will be understood that the aviator will tilt the rudders sufficiently on making a landing to withdraw them from contact with the earth and with the legs in proper extended position they will receive and support the weight of the machine.

If desired, an anchor 62 may be secured at any convenient distance from the front end of the shaft 43 by a cable 63 and for the purpose of releasing the anchor I attach to its crown a cord 64 which may extend upward through the bottom of the car body within reach of the aviator.

Under certain conditions it may be found desirable or essential to employ an adjustable foot rest or false bottom indicated at 65. This element will be arranged at the front portion of the car bottom and is adapted to be supported by hooks 66 upon one of the lower cross bars 19 when the machine is sailing through the air in an inclined position, and the seat is adjusted to the position indicated in Fig. 4.

It is to be understood that the details of the construction will be varied to a large extent as to materials or relative sizes and proportions without departing from the spirit of the invention hereinafter claimed.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. The combination with a flying machine body, of a set of supporting legs therefor pivoted at their upper ends to the car body, and supporting means for the legs, each comprising a sleeve slidable along its leg and a brace pivoted to said sleeve and to the bottom of the car body.

2. In a flying machine, the combination of an upright car body, a set of supporting legs pivoted thereto at its upper portion and adapted to swing outwardly therefrom radially, operating means for said legs comprising a sleeve slidable along each leg, a brace connected to the lower end of the sleeve and pivoted to the bottom of the car body, and means operative from the inside of the car body for sliding each sleeve along its leg and thereby causing the associated brace to assume different positions of adjustment.

3. The combination with a flying machine car body and a set of legs pivoted thereto near its upper end, of operating means for said legs comprising a sleeve slidable along each leg, a brace pivoted to said sleeve at

one end and to the car body at its other end, and a pair of cables attached to the sleeve and extending thence in opposite directions around direction pulleys to the interior of the car body, substantially as set forth.

4. In a flying machine, the combination with a car body, of steering mechanism therefor comprising a pair of rock shafts journaled in close parallel relation below the car body, a rudder rigidly connected to each rock shaft, and means connected to said shafts and extending upward through the bottom of the car body within easy reach of the aviator for operating the rock shafts.

5. In a flying machine, the combination with a car body, of steering mechanism therefor comprising a rock shaft journaled below and parallel to the bottom of the car body and extending forwardly thereof, a rudder rigidly connected to said rock shaft, a yoke connected to the rock shaft and having laterally extending arms below the car body, a cable connected to said arms and extended through the bottom of the car body, and hand operated means within the car body for operating said cable in either direction.

6. In a flying machine, the combination of a car body, a balancing device therefor comprising a hollow shaft, a weight slidable within said shaft, means connected to said weight for shifting it in either direction, a rudder connected to said shaft, and means to rotate the shaft independently of said weight shifting mechanism.

7. In a seat for a flying machine, the combination of a support on the flying machine car body floor, a member pivoted to the rear of said support, a seat proper pivoted to said pivoted member and adapted to rest upon the front portion of said support or to be elevated at an angle to the car body floor, and means to support the seat proper in such inclined position.

8. The combination of a car body having a front door opening, a series of horizontal bars adapted to substantially close said opening, and a seat pivotally connected to the car bottom at its rear end and adapted to be supported on one of said horizontal bars at its front end.

9. The combination of a flying machine car body, a seat support therein including a cross bar, a seat proper adapted to rest upon said cross bar, means cooperating between said seat and the cross bar to positively prevent lateral displacement of the seat, and means pivotally connecting the rear end of the seat with the seat supporting mechanism.

10. In a flying machine, the combination of a car body, a rock shaft extending forwardly thereof and journaled below the same, a rudder rigidly connected to said

shaft, means to oscillate the rock shaft and rudder, an anchor suspended from the front end of the shaft below the rudder, and a line connected to the crown of the anchor and
5 extending to the rear of the rudder through the bottom of the car, for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM PHILLIPS.

Witnesses:

PHILIP GEO. ODGERS,
EDGAR N. PHILLIPS.