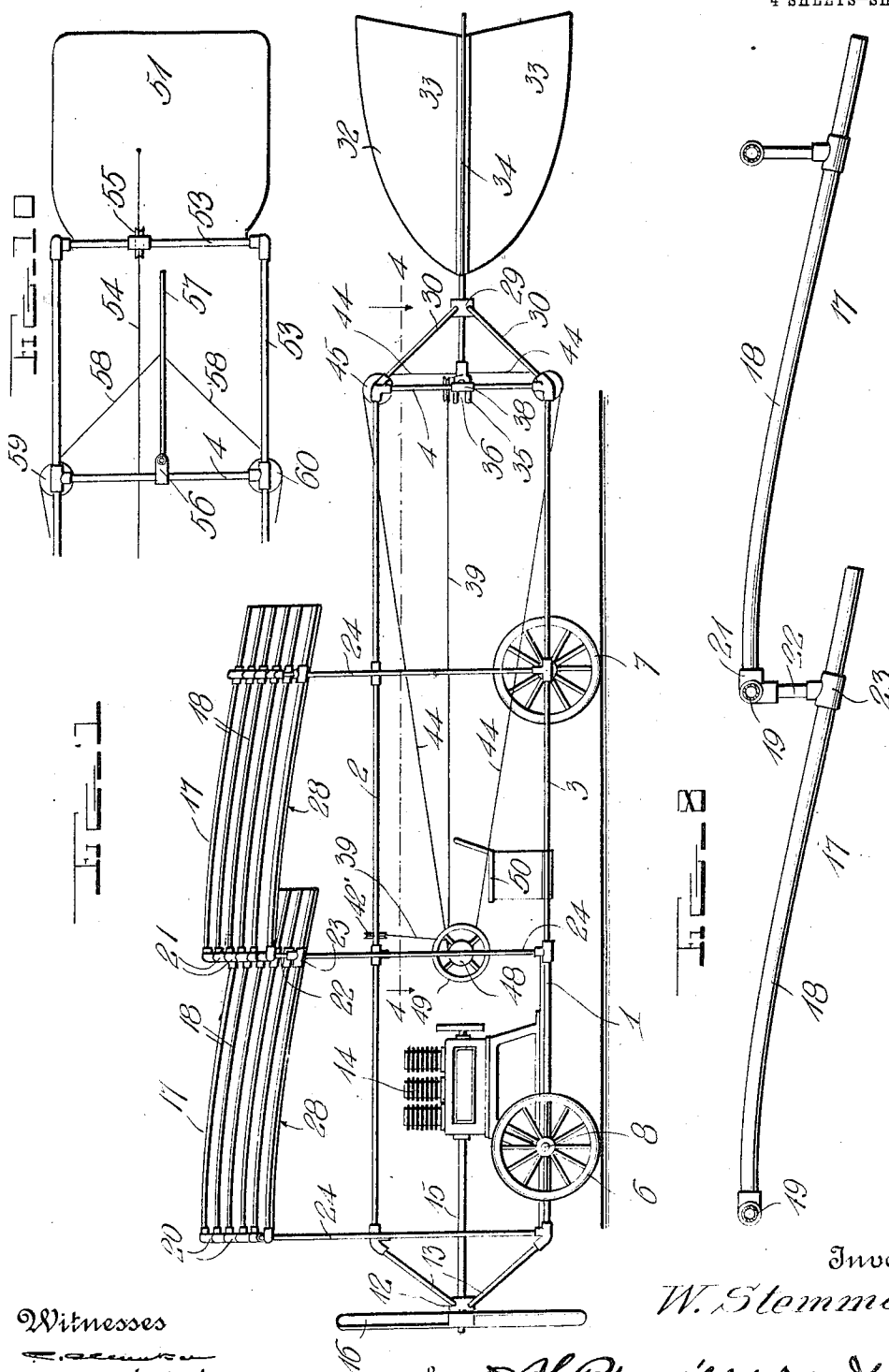


W. STEMMER.
AEROPLANE.
APPLICATION FILED SEPT. 29, 1910.

990,404.

Patented Apr. 25, 1911.

4 SHEETS-SHEET 1.



Witnesses

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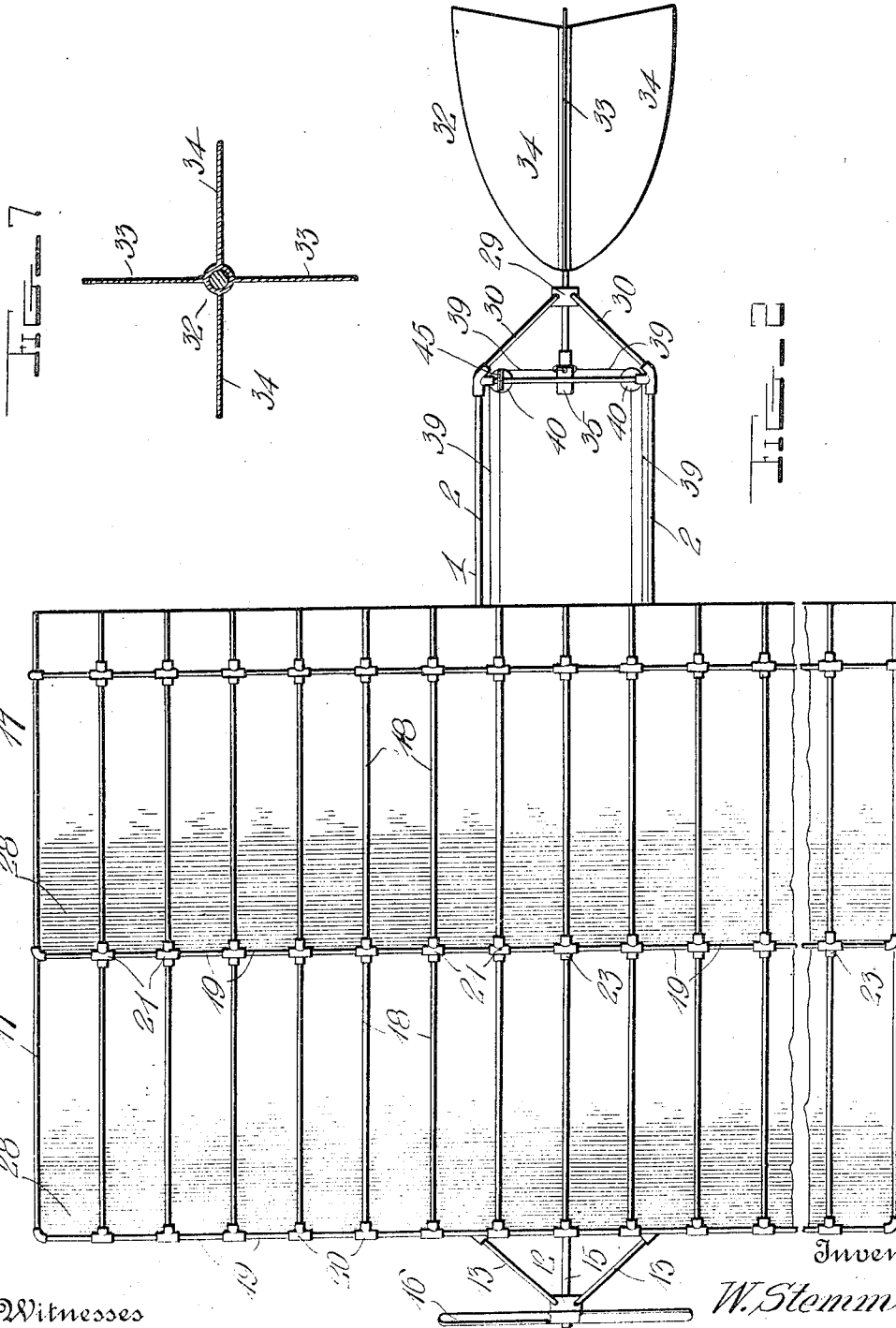
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Witnesses

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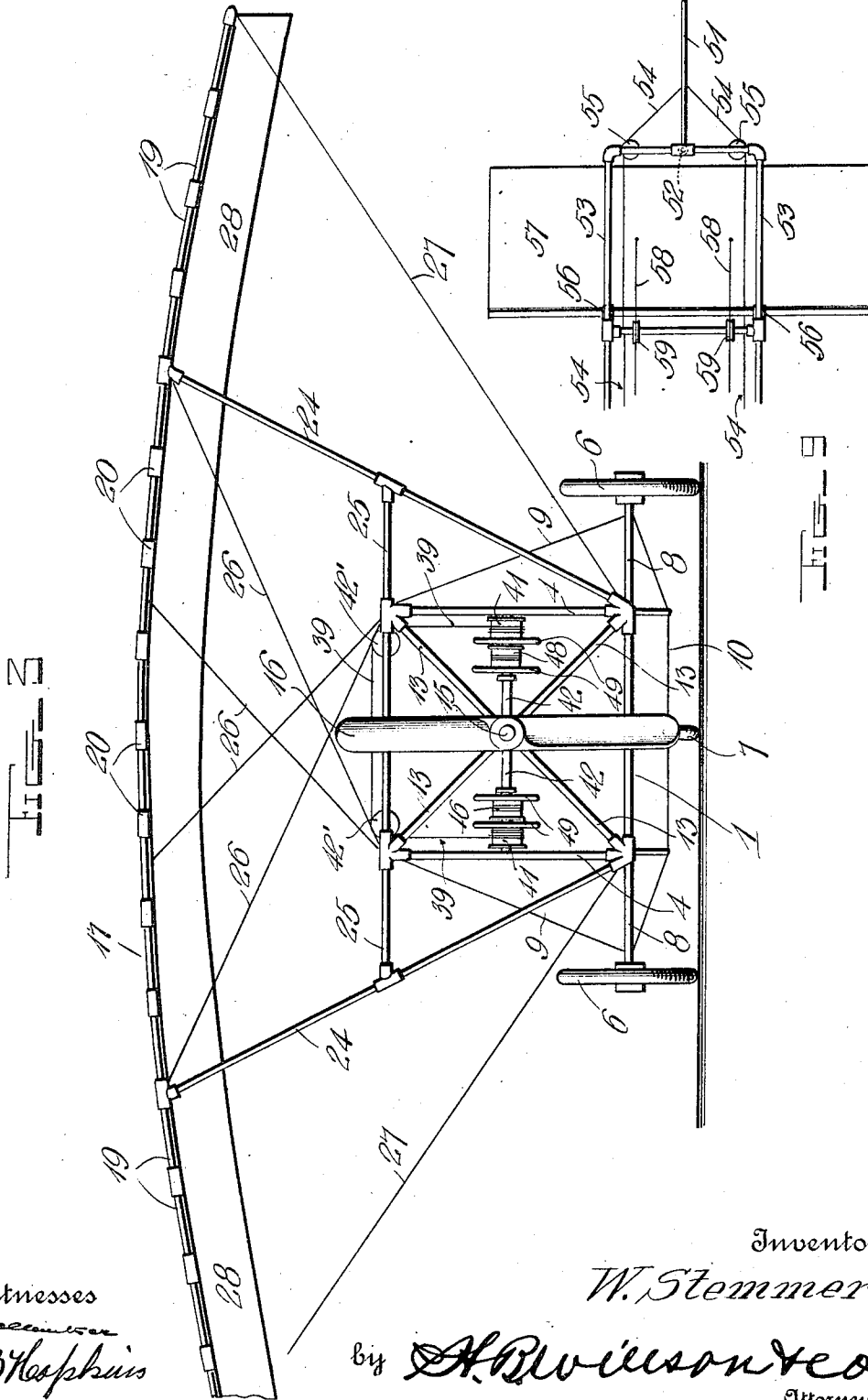
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4 SHEETS—SHEET 3.



Witnesses
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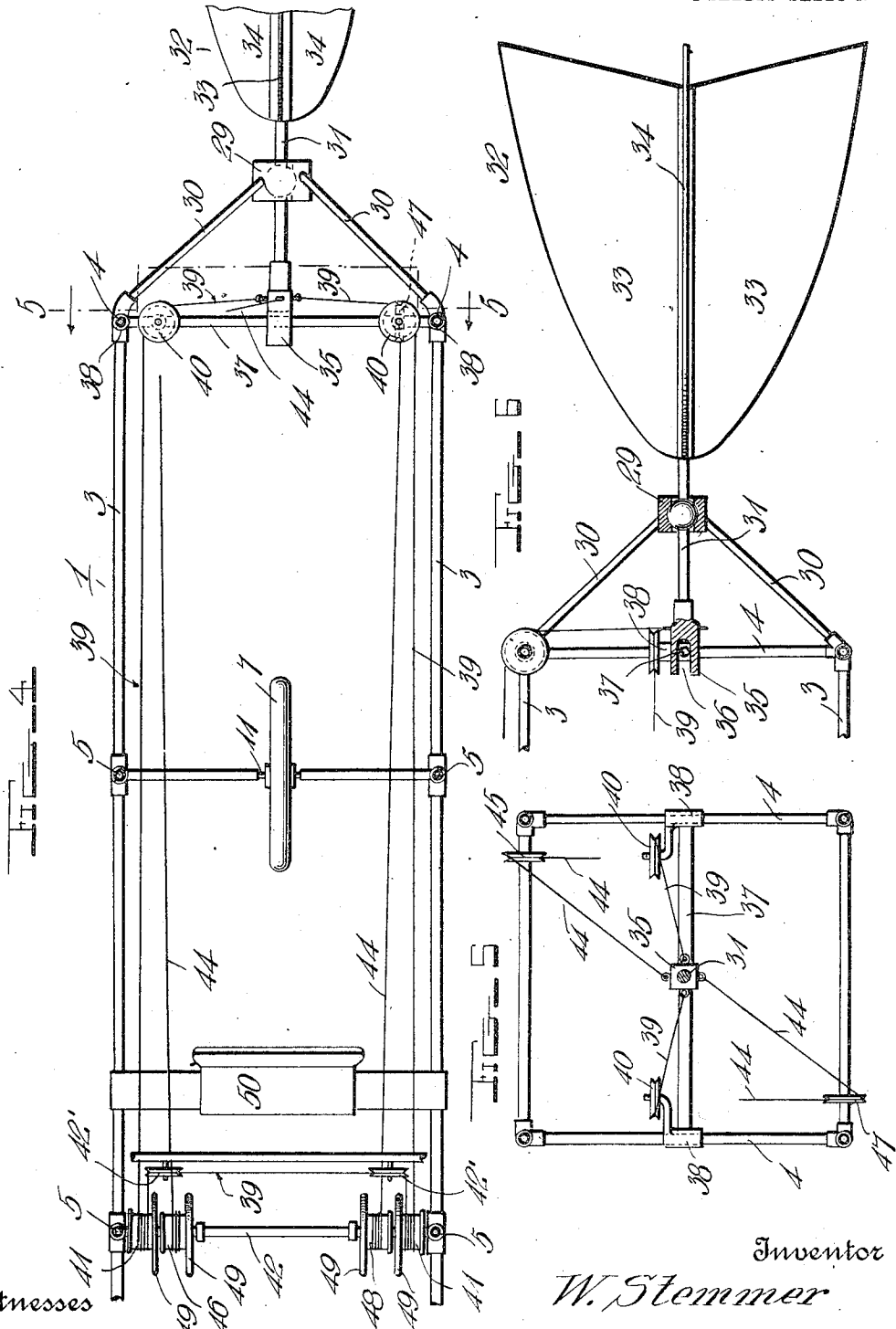
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4 SHEETS—SHEET 4.



Witnesses

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UNITED STATES PATENT OFFICE.

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AEROPLANE.

990,404.

Specification of Letters Patent.

Patented Apr. 25, 1911.

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To all whom it may concern:

Be it known that I, WILLIAM STEMMER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Aeroplanes; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in aeroplanes.

One object of the invention is to provide an aeroplane having an improved construction and arrangement of multiple lifting and supporting planes.

Another object is to provide an improved construction and arrangement of steering mechanism whereby the direction of the machine is readily controlled.

With the foregoing and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings: Figure 1 is a side view of an aeroplane constructed in accordance with the invention; Fig. 2 is a top plan view of the same; Fig. 3 is a front end view; Fig. 4 is a horizontal sectional view on the line 4-4 of Fig. 1; Fig. 5 is a vertical sectional view on the line 5-5 of Fig. 4; Fig. 6 is a vertical longitudinal section through the rear end of the machine and the rudder supporting mechanism; Fig. 7 is a detail cross sectional view through the rudder showing the construction and arrangement of the vertical and horizontal blades thereof; and, Fig. 8 is a detail sectional view through the supporting frames for the front and rear planes of the machine. Fig. 9 is a plan view of a modified form of steering mechanism. Fig. 10 is a side elevation of the same.

In the embodiment of the invention I provide a car 1, which is in the form of an open rectangular oblong frame preferably formed of light metal tubes joined together at the necessary points by suitable couplings and braced by suitable bracing rods as shown. The frame is here shown as consisting of upper and lower side tubes 2 and 3 which are connected together at the oppo-

site ends of the frame by vertically disposed end tubes 4 and by intermediate vertically disposed tubes 5 which are arranged at suitable points between the opposite ends of the frame as shown. The frame 1 is provided with a front pair of supporting wheels 6 and a single rear supporting wheel 7. The wheels 6 are mounted on stub axles 8 which project laterally from the frame and are secured at their inner ends to the lower side tubes 3 thereof in any suitable manner. The shafts or axles 8 are braced by inclined brace rods 9 connected to the outer ends thereof and to the upper ends of the car frame by a trussed brace rod 10 connected at its opposite ends to the outer ends of the shafts 8 and passing below the car frame as shown. The rear supporting wheel 7 is revolvably mounted upon a shaft or axle 11 arranged through the lower portion of the car frame and secured at its opposite ends in the lower side tubes of the frame as shown.

At the forward end of the machine and preferably opposite the center of the car frame is a forward propeller shaft bearing 12, said bearing being supported and held in position by converging forwardly projecting bars 13 secured to the front end of the car frame as shown. Revolvably mounted in the bearing 12 and connected at its inner end to any suitable motor 14 is a propeller shaft 15 on the outer end of which is fixedly mounted a suitable propeller 16.

Arranged above the car frame 1 are a series of superimposed plane supporting frames 17 of which there may be any desired number, said frames overlapping each other at their ends as shown. In the present instance the machine is shown as being provided with two frames 17 each of which comprises a series of parallel longitudinally disposed rods or tubes 18 which are preferably curved downwardly at their rear ends and are spaced a suitable distance apart and connected together at their forward ends by short connecting tubes 19. The connecting tubes 19 of the front frame are secured to the longitudinal tubes 18 by a T-coupling 20, while the connecting tubes 19 of the rear frame are secured to the forward ends of the tubes 18 of said rear frame by fourway couplings 21. With the lower branches of the fourway couplings 21 are engaged short connecting tubes 22 the lower ends of which are engaged with T-

couplings 23 arranged in the rear ends of the longitudinal tubes 18 of the front plane frame whereby the rear portion of said frame is supported and spaced a suitable distance below the forward end of the rear frame. The frames 17 are connected to the car frame and supported in position above the same by inclined supporting tubes 24 which are secured at their lower ends to the lower side tubes 3 of the car frame and at their upper ends are connected to certain of the couplings of the front and rear plane frames as shown. The inclined supporting tubes 24 are connected to the upper side tubes of the car frame by laterally projecting connecting tubes 25 as shown. The plane frames 17 are braced by a series of inclined brace rods 26 secured at their lower ends to the upper side tubes of the car frame and at their upper ends to the tubes or couplings of the plane frames 17 at suitable points as shown. The extreme side ends of the frames 17 are further braced by inclined rods 27 which are secured at their upper ends to said outer ends of the plane frames and at their lower ends to the opposite lower side tubes of the car frame as shown. To the under side of the frames 17 is secured in any suitable manner a sheeting of fabric 28 which forms the planes.

At the lower end of the car frame and preferably in a line with the center thereof is arranged a rudder supporting mechanism comprising a universal joint or bearing 29 which is supported and held in position by laterally converging supporting tubes 30 the inner ends of which are connected to the opposite upper and lower corners of the rear end of the car frame as shown. To the universal joint is secured the shaft or stem 31 of the rudder 32, said shaft projecting forwardly and rearwardly from the joint or bearing 29 as shown. The rudder 32 which is secured to the rear end of the shaft 31 comprises upper and lower vertically disposed blades 33 which are adapted to control the lateral or sidewise movement of the machine and to keep the latter in a straight course. In addition to the vertical blades 32 the rudder also comprises oppositely projecting horizontal blades 34 which are adapted to control the upward and downward flight of the machine.

On the forwardly projecting end of the rudder shaft 31 is secured an operating head 35 which has formed in its outer end a horizontally disposed notch or recess 36 whereby said head is slidably engaged with a horizontally disposed tubular rudder shifting bar 37, the outer ends of which are secured to vertically disposed guide sleeves 38 which are slidably mounted on the vertical corner tubes 4 of the rear end of the car frame as shown. By loosely engaging the notched or recessed end of the head 35 with

the bar 37, said head will be free to slide laterally thereon in the arc of a circle when actuated to swing the rudder to the right or left and by securing the bar 37 to the slidably mounted sleeves 38, said bar when raised and lowered will rock the rudder shaft 31 thereby tilting the rudder in the desired direction for directing the machine upwardly or downwardly as desired.

In order to swing the rudder laterally in one direction or the other I provide an operating cable 39 the opposite ends of which are secured to opposite sides of the head 35. The cable, after being connected with the head extends laterally in opposite directions and passes around guide pulleys 40 arranged in the opposite rear corners of the car frame and from said pulleys the cable 39 extends forwardly along opposite sides of the car frame and around winding drums 41 which are revolubly mounted on a suitable shaft 42 arranged near the forward end of the car frame, and from said drums the cable 39 passes upwardly and over guide pulleys 42' which are revolubly mounted in the upper portion of the car frame above the drums 41 as shown. The drums 41 are provided with suitable hand wheels 43 whereby said drums are operated to wind the cable in one direction or the other, thus actuating the head 35 and rudder shaft 31 to swing the rudder laterally in the desired direction.

In order to raise and lower the bar 37 and thus actuate the head 35 to tilt the rudder in the desired direction, I provide operating cables 44 one of which is connected at its rear end to the upper side of the bar 37 and the other to the lower side of said bar. One of the cables 44 extends upwardly from the bar 37 and passes around an upper guide pulley 45 revolubly mounted in the upper portion of the rear end of the car frame and from thence, extends forwardly and is connected to and adapted to be wound upon a drum 46 mounted on the shaft 42. The opposite lower cable 44 extends from the bar 37 and passes around a lower guide pulley 47 which is revolubly mounted in the lower portion of the rear end of the car frame. The cable 44 after passing around the guide pulley 47 extends forwardly and is connected to and adapted to be wound on a drum 48 which is revolubly mounted on the shaft 42 as shown. The cables 44 engage the drums 46 and 48 on opposite sides and are wound thereon in opposite directions whereby when one of the drums is revolved the bar 37 will be raised and the rudder thus swung downwardly and when the opposite drum is revolved the bar 37 will be moved downwardly, thus tilting the rudder upwardly. The drums 46 and 48 are provided with suitable operating wheels 49, whereby the same may be readily turned in the desired direction. Arranged

at a suitable position in the car frame and supported in any suitable manner is a driver's seat 50.

In Figs. 9 and 10 of the drawings is shown a modified construction and arrangement of the steering mechanism comprising a vertically disposed rudder blade 51 which is pivotally mounted on a tubular post 52 of an extension 53 arranged on the rear end of the main frame of the machine. To the opposite side of the blade 51 are connected the outer ends of operating cables 54 which extend laterally and forwardly around guide pulleys 55 revolvably mounted in suitable bearings in the opposite rear corners of the extension 53. The cables 54 after passing around the pulleys 55 extend to and are connected with the winding drums in the forward portion of the machine.

Arranged in the extension 53 of the frame and pivotally connected at its forward edge to bearing brackets secured to the vertical corner tubes 4 of the main frame is a horizontally disposed steering blade 57, said blade projecting at its opposite ends a considerable distance beyond the opposite sides of the extension 53 as shown in Fig. 9 of the drawings. To the upper and lower sides of the blade 57 are connected upper and lower pairs of operating cables 58 which extend rearwardly over upper and lower pairs of guide pulleys 59 and 60 and from thence extend to their winding drums in the forward portion of the machine.

By means of the rudder blades 51 and 57, which are operated by the cables connected thereto, the machine may be directed upwardly or downwardly or steered laterally in either direction.

From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion

and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention as defined in the appended claims.

Having thus described my invention, what I claim is:

1. An aeroplane comprising a car frame, a plurality of supporting planes arranged above and connected to said frame, said planes comprising frames consisting of a series of parallel longitudinally disposed members connected together at their forward and rear their rear ends by a series of short connecting members, the connecting members of the forward ends of one of said frame sections being connected with the rear connecting members of the adjacent forward frame whereby the forward end of one frame overlaps and is secured in spaced relation to the rear end of the other frame, and a cover fabric secured to said planes.

2. An aeroplane comprising a car frame, a plurality of supporting planes arranged above and connected to said car frame, said supporting planes comprising frames consisting of a series of parallel longitudinally disposed tubes connected together at their forward and rear their rear ends by a series of short connecting tubes, the connecting tubes of the forward ends of one of said frame sections being connected with the rear connecting tubes of the next forward frame, whereby the forward end of one frame overlaps and is secured in spaced relation to the rear end of the next frame and a sheeting or covering fabric secured to the under side of said planes.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM STEMMER.

Witnesses:

WILSON T. YOUNG,
MARCELLA DIEMER.