March 19, 1929. E. DAVIS 1,705,904

AEROPLANE

Original Filed April 1, 1920 7 Sheets-Sheet 1

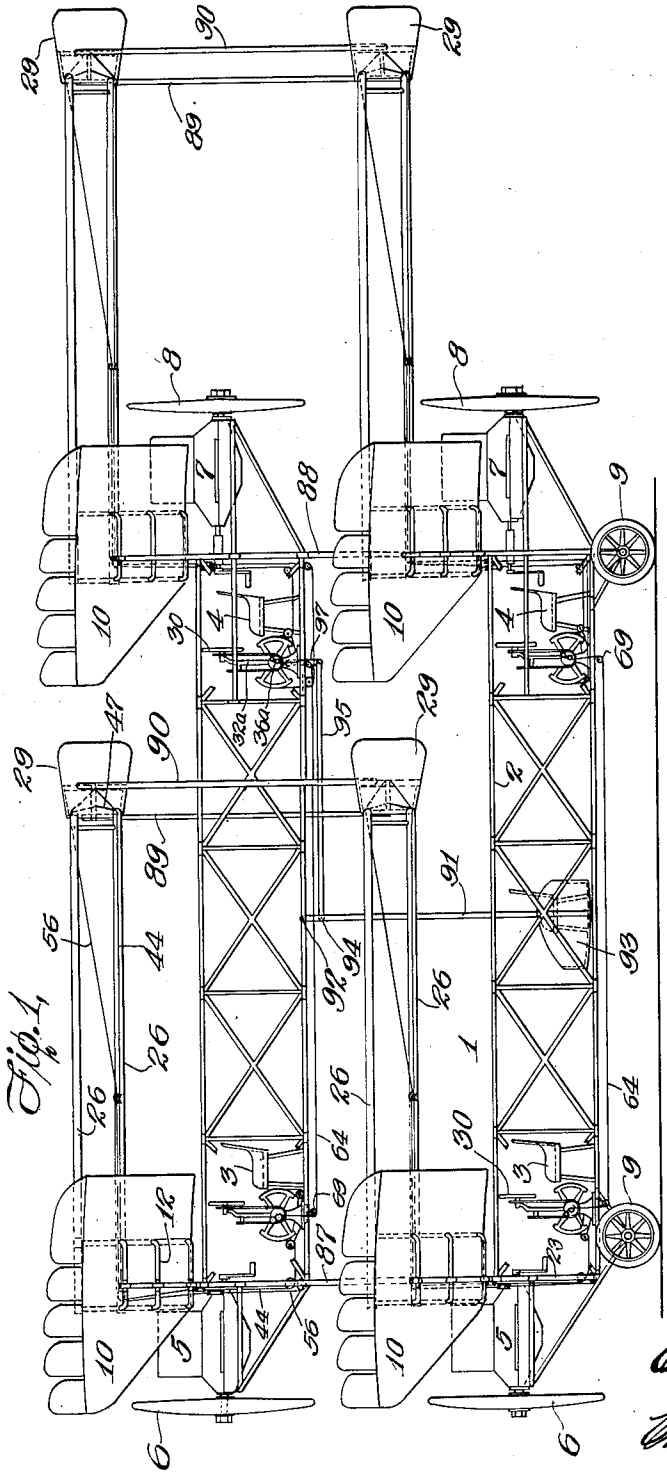


Fig. 1.

INVENTOR
Emery Davis
BY
Wilmer E. Smith
ATTORNEY

March 19, 1929. E. DAVIS 1,705,904

AEROPLANE

Original Filed April 1, 1920 7 Sheets-Sheet 2

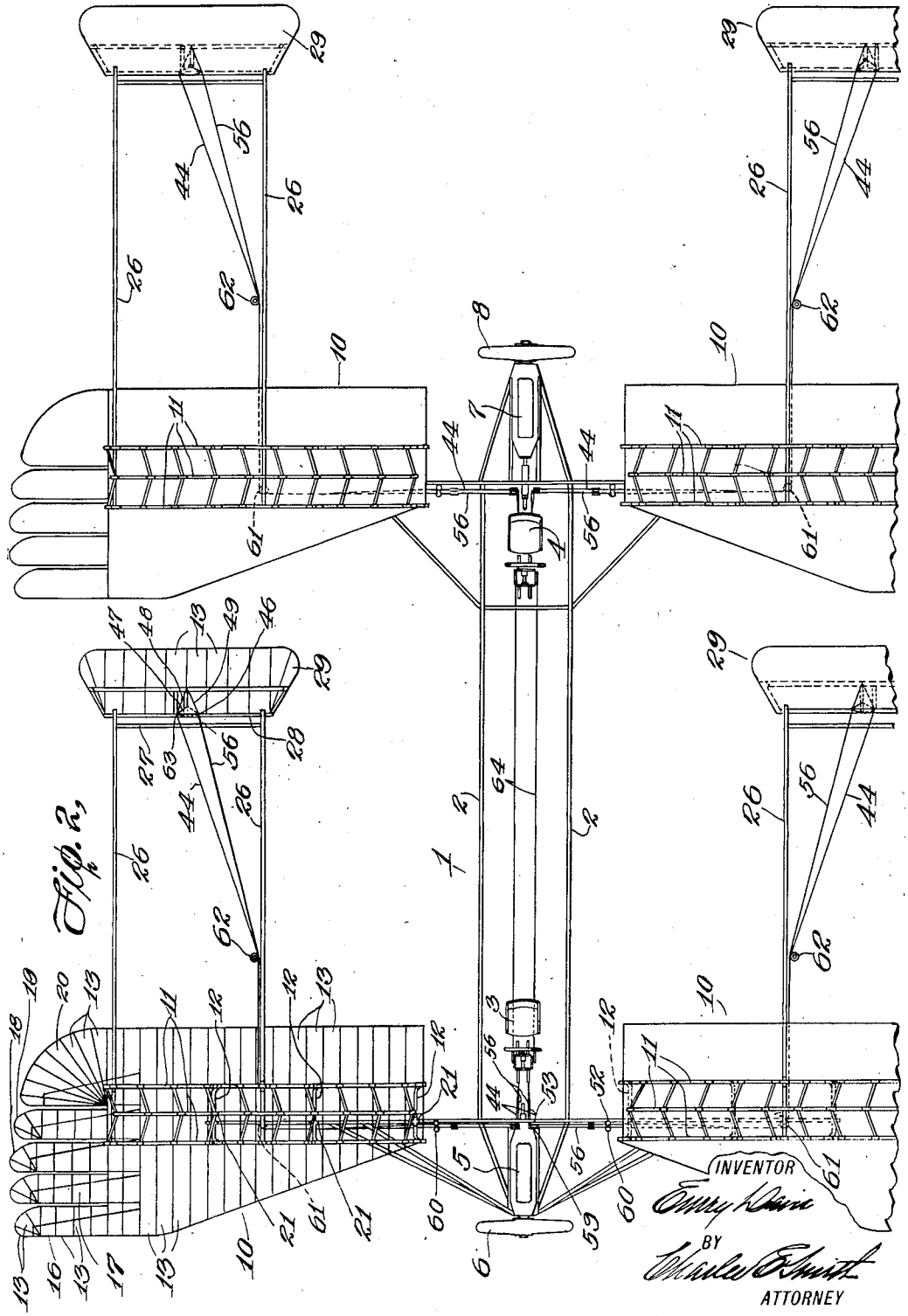


Fig. 2.

INVENTOR

BY

ATTORNEY

March 19, 1929. E. DAVIS 1,705,904

AEROPLANE

Original Filed April 1, 1920 7 Sheets-Sheet 3

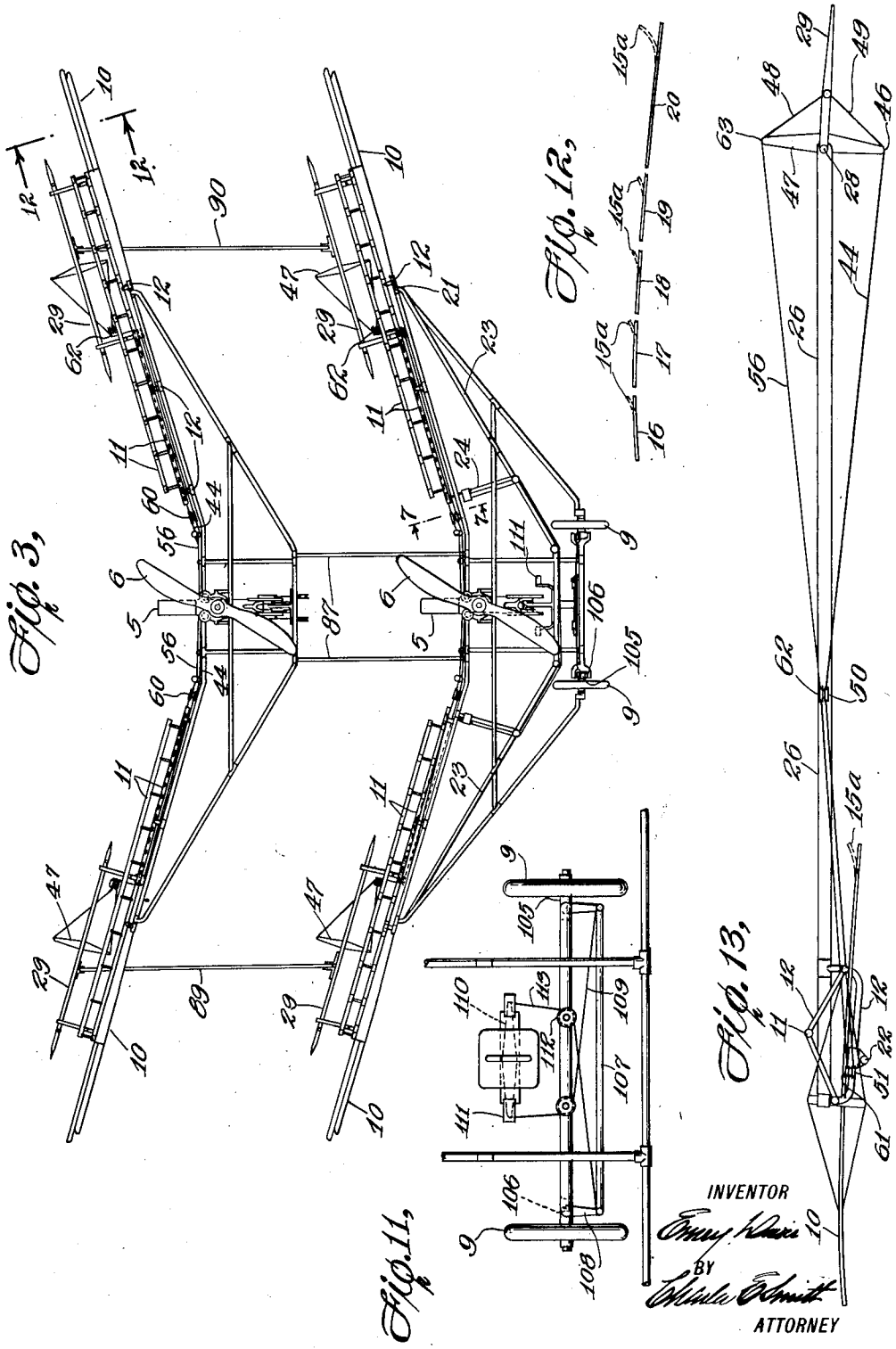


Fig. 3.

Fig. 11.

Fig. 12.

Fig. 13.

INVENTOR

BY

ATTORNEY

March 19, 1929. E. DAVIS 1,705,904

AEROPLANE

Original Filed April 1, 1920 7 Sheets-Sheet 4

Fig. 4,

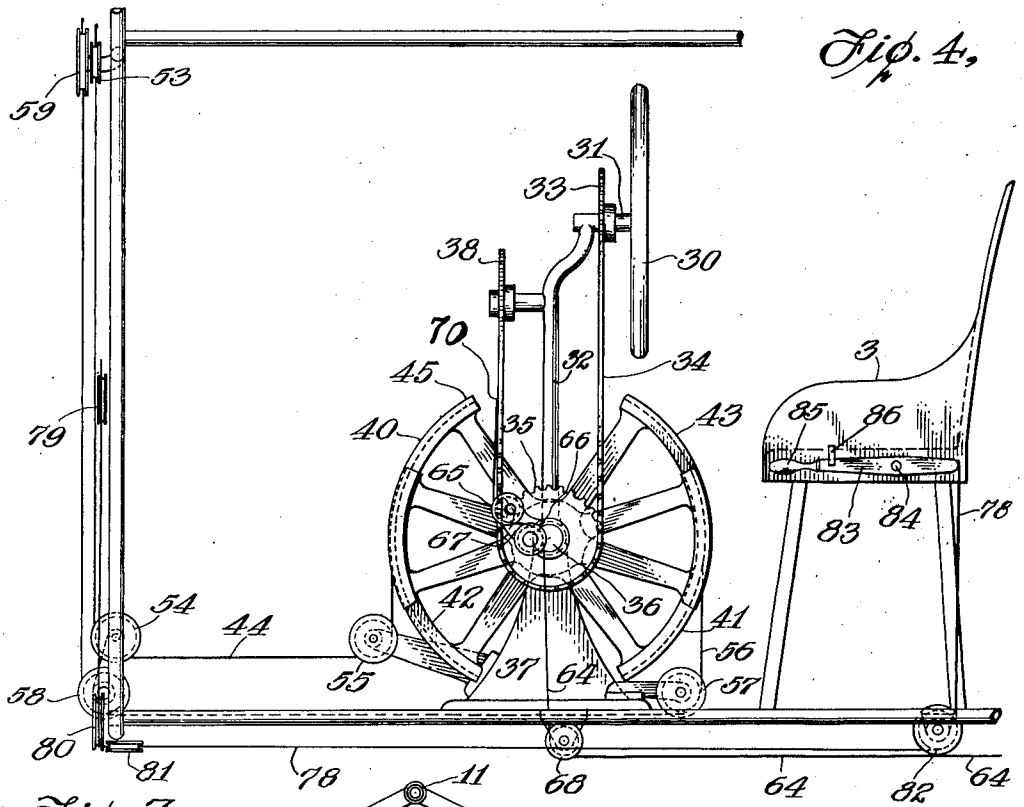
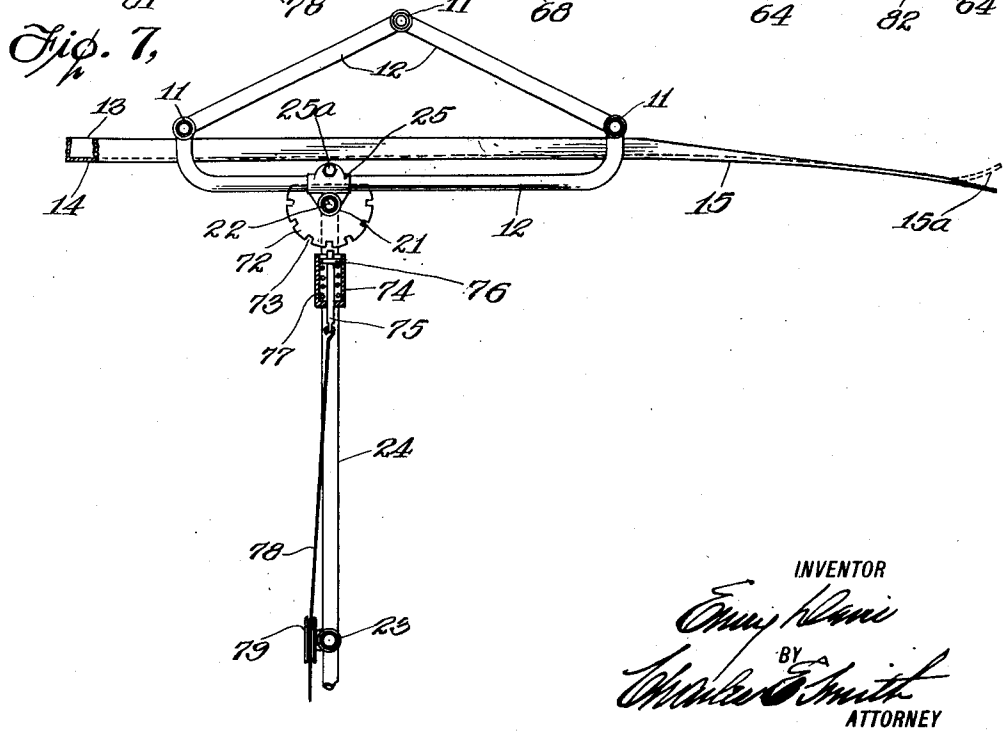


Fig. 7,



INVENTOR

Emmy Davis

BY

Walter E. Smith

ATTORNEY

March 19, 1929. E. DAVIS 1,705,904

AEROPLANE

Original Filed April 1, 1920 7 Sheets-Sheet 5

Fig. 5,

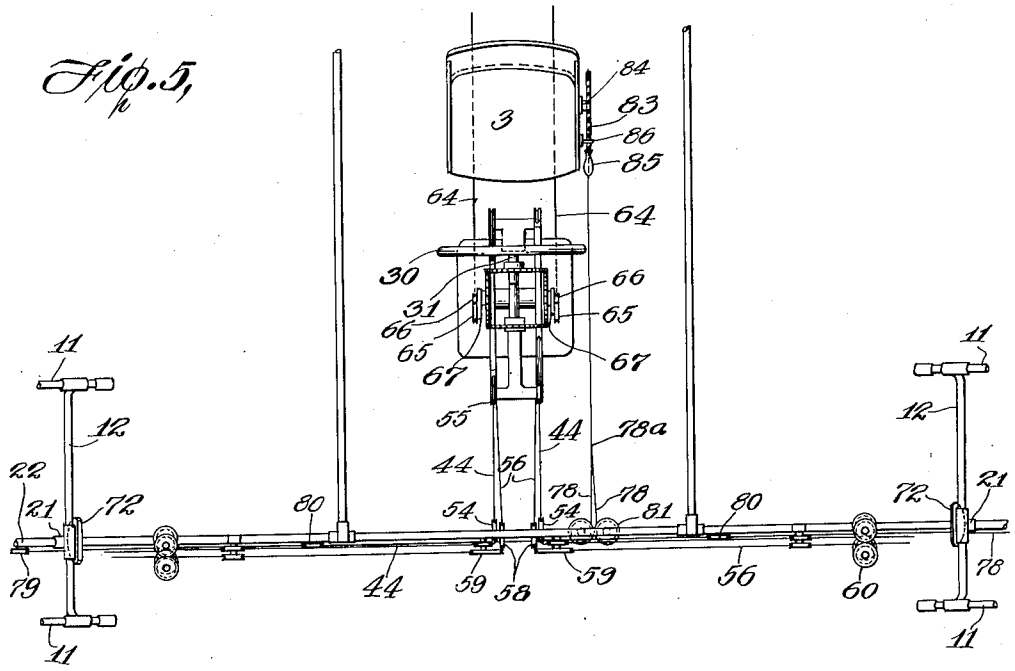
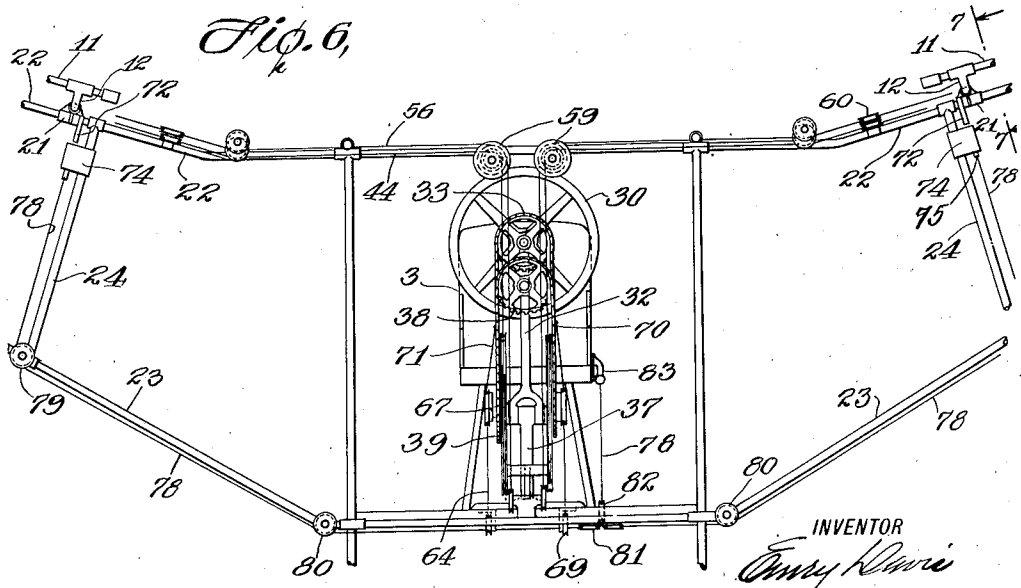


Fig. 6,



INVENTOR

Emery Davis

BY

Wales & Smith

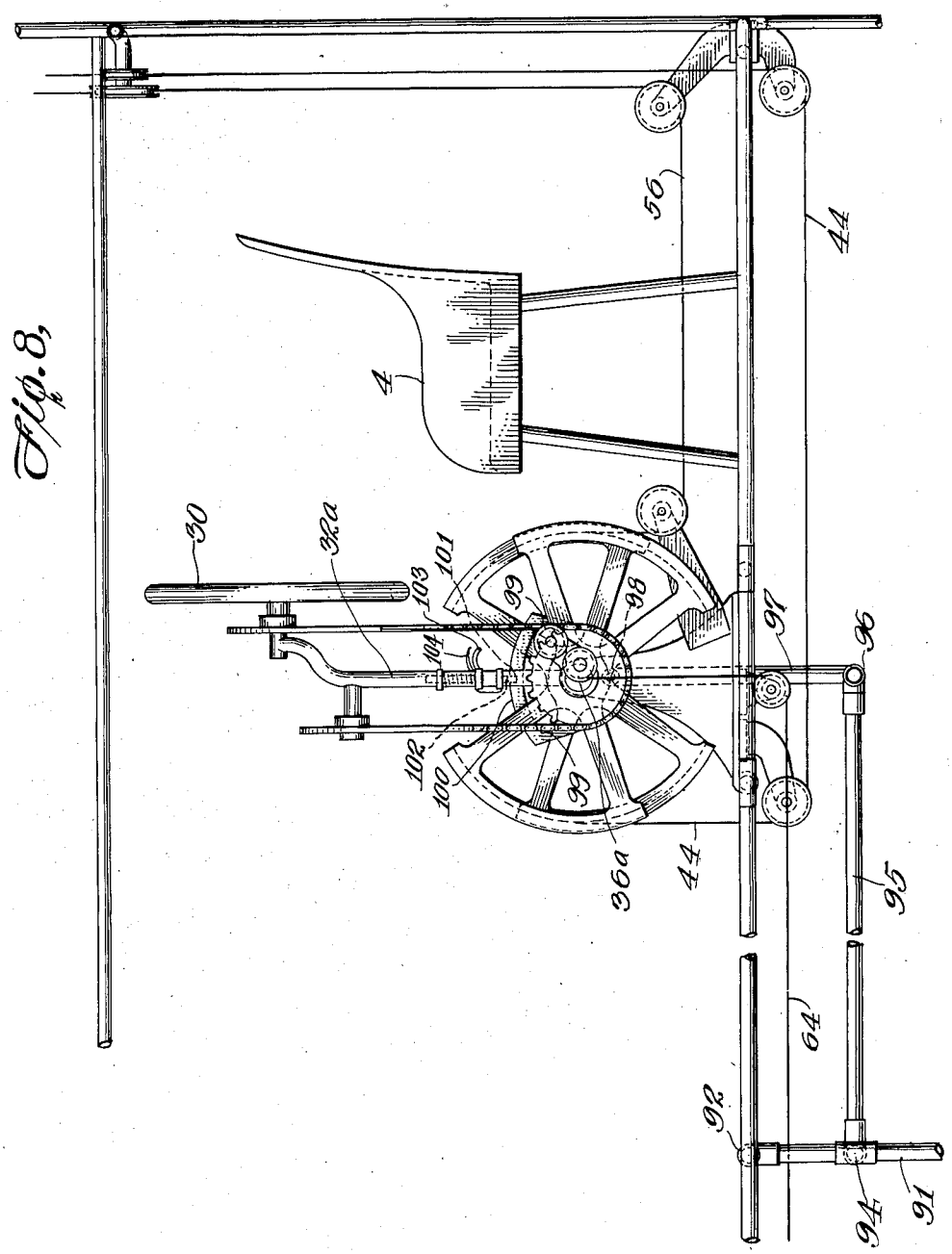
ATTORNEY

March 19, 1929. E. DAVIS 1,705,904

AEROPLANE

Original Filed April 1, 1920 7 Sheets-Sheet 6

Fig. 8.



INVENTOR

Emmy Davis

BY

Charles E. Smith

ATTORNEY

March 19, 1929. E. DAVIS 1,705,904

AEROPLANE

Original Filed April 1, 1920 7 Sheets-Sheet 7

Fig. 9.

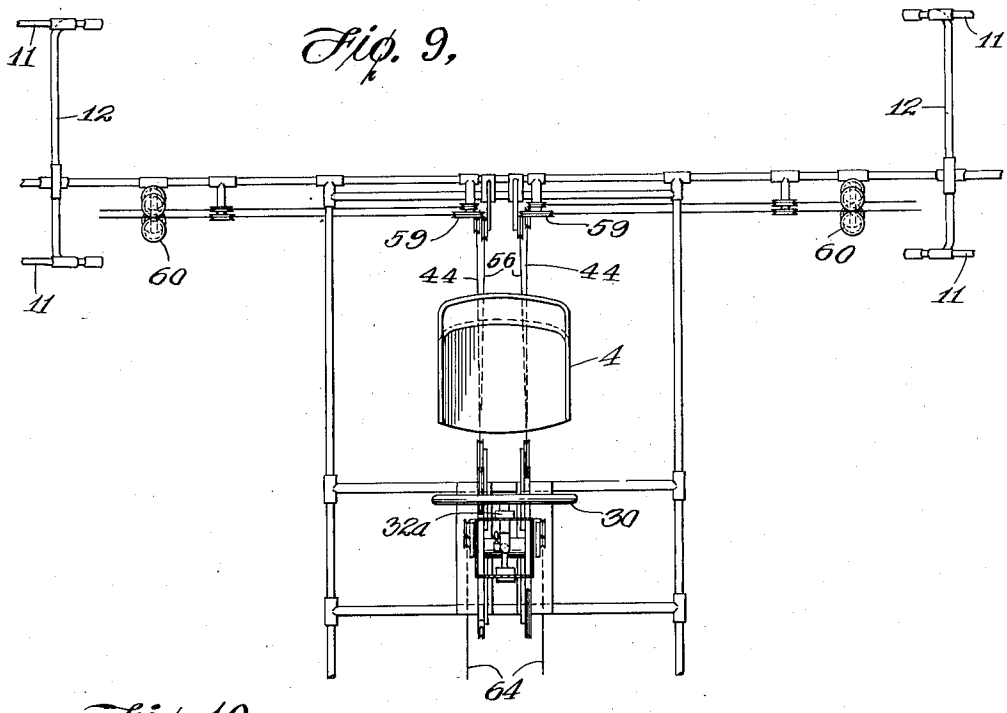
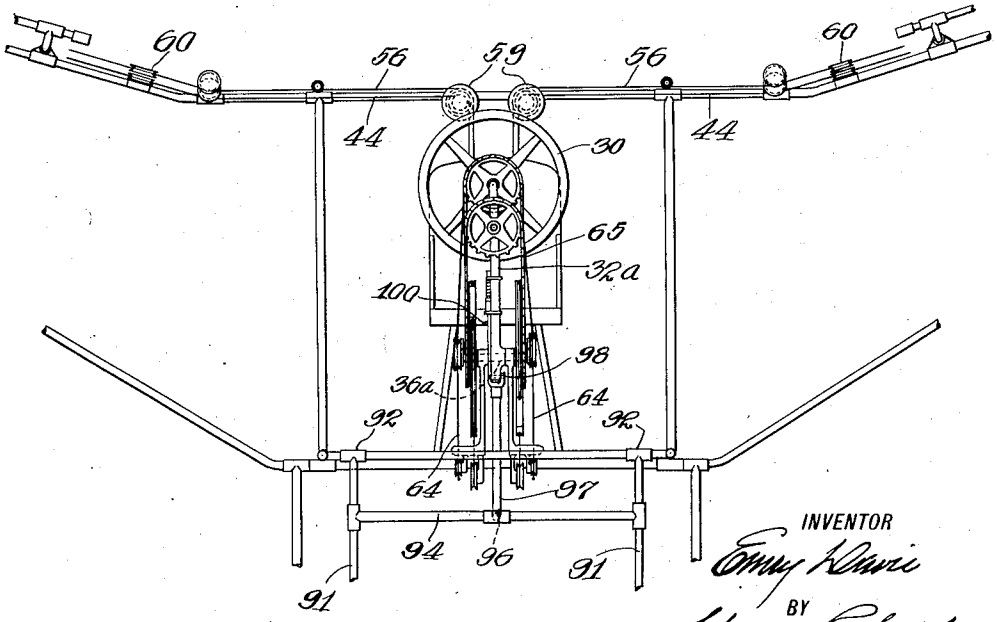


Fig. 10.



INVENTOR

Emmy Davis

BY

Charles E. Smith

ATTORNEY

Patented Mar. 19, 1929. 1,705,904

UNITED STATES PATENT OFFICE.

EMRY DAVIS, OF CLEARWATER, FLORIDA.

AEROPLANE.

Refile for abandoned application Serial No. 370,560, filed April 1, 1920. This application filed April 7, 1927. Serial No. 181,881.

This invention relates to aeroplanes and particularly to apparatus of this class employing main plane sections disposed at opposite sides of the body or fuselage of the machine, and composed of a number of dependent aeroplane units or sections coupled together to form a unit apparatus, and the object of the invention is to provide an apparatus of the class employed which by reason of its construction will increase the safety and efficiency thereof; a further object being to provide an aeroplane which may, at will, be increased or reduced in size with respect to an increase or decrease of passengers and power of the machine; a further object being to provide means for controlling the operation of the aeroplane and its several units from one or more positions on the apparatus; a further object being to provide efficient automatically operating means for maintaining the equilibrium of the machine; and a still further object being to provide means for effecting corresponding and differential mechanisms of the different plane units employed in a multiplane machine, and with these and other objects in view the invention consists in an aeroplane of the class and for the purpose specified, which is simple in construction and operation and efficient in use, and which is constructed as hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:—

Fig. 1 is a side elevation of a multiplex aeroplane or multiplex machine comprising two duplex machines.

Fig. 2 is a fragmentary plan view of one of these units, the canvas covering of one of the planes being omitted.

Fig. 3 is a front elevation of the multiplex machine.

Fig. 4 is a detail fragmentary side elevation, on a larger scale and showing the steering mechanism at one of the pilot seats.

Fig. 5 is a plan view of the same.

Fig. 6 is a front elevation of the parts shown in Figures 4 and 5.

Fig. 7 is a fragmentary detail sectional view, taken on the line 7—7 of Fig. 3 and looking in the direction of the arrow at said line.

Fig. 8 is a detail side view of the steering device and certain of the controlling devices at another pilot's seat.

Fig. 9 is a top plan view of the same.

Fig. 10 is a front elevation of the parts shown in Figs. 8 and 9.

Fig. 11 is a detail fragmentary plan view, showing the steering mechanism for the front wheels of the machine.

Fig. 12 is a diagrammatic view of one of the planes and corresponding to a section taken on the line 12—12 of Fig. 3 and looking in the direction of the arrows at said line.

Fig. 13 is a diagrammatic side elevation of one of the planes and its "rudder" or steering plane, and showing the manner of mounting and connecting the same.

The aeroplane, shown for the purpose of illustrating one method of carrying my invention into effect, is composed of a plurality of similar units, and to facilitate matters I will first describe the parts of one unit and later set out the means or connected units to produce what I term a multiplex aeroplane.

The fuselage or passenger carrying body portion of the machine may be of any suitable construction and is designated, as a whole, by the numeral 1. This body or its framework is composed of light steel tubing or other suitable material having parallel sides 2, and a bottom suitably connected and braced. Each body, in the construction shown, is provided with two pilot seats 3 and 4 arranged fore and aft of the machine.

An engine 5 is carried at the front end for driving a propeller 6, and an engine 7 at the rear end for driving a propeller 8. Wheels 9 are also provided for supporting the lowermost body, shown in the accompanying drawing, on the ground or other surface to permit of the starting as well as the landing of the aeroplane. The front wheels of the aeroplane may be steered in a manner later described.

Each unit part of the aeroplane, which may be termed a duplex unit, comprises two main supporting planes arranged on opposite sides of the fuselage or body at the front and rear thereof, and each of these planes are alike, except that they are oppositely arranged, and the description of one will suffice for all.

Each plane or wing is designated, as a whole, by the reference numeral 10 and comprises a rigid frame which is substantially

triangular in cross sectional form (note Fig. 7). Each frame is made up with three longitudinally extending members 11 of light tubing or other similar material united at intervals by cross rods, trusses or connections 12. Extending transversely across each of these frames and constituting part thereof is a series of sheet metal ribs 13, preferably U-shaped in cross section throughout the major portion of their length to form integral webs 14, which prevent the ribs 13 from bending (note Figs. 2 and 7). At the rear ends of the ribs 13, the webs taper downwardly as indicated at 15, leaving flat resilient ends 15ª, which when the ribs 13 are composed of spring steel will be highly flexible as indicated in the drawing.

The tip of each plane is formed of five comparatively small feather sections 16, 17, 18, 19 and 20, each being formed in substantially the same manner with the ribs 13 and having flexible or resilient ends. The framework of each plane or wing including its feathers is covered with canvas or other suitable material as is usually the custom.

Each plane or wing extends upwardly and outwardly from the fuselage at an inclination, as seen in Fig. 3 of the drawing, and a number of the cross rods 12 are provided with coupling sleeves 21 by means of which the plane is connected to and mounted to turn freely or rotate on a supporting arm 22 (note Figs. 6 and 7), said arm being composed of steel tubing and is supported and braced to the fuselage by struts or members 23 and 24 respectively. Each arm 22, therefore, constitutes a pivot bearing that extends transversely of the machine and on which the plane is mounted and free to oscillate.

As seen in Fig. 7 of the drawing, the sleeve 21 is provided with a sleeve-like clamp 25 extending at right angles thereto and adapted to receive a rod 12 of the associated plane frame and permitting said rod to be adjusted longitudinally of the sleeve, thus providing for a fore and aft adjustment of each of the planes 10 with reference to its pivot 22, so that the desired balance or equilibrium between the parts of the plane in front and back of its pivotal center may be obtained. Suitable means such as bolts 25ª (Fig. 7) may be employed to secure the clamps 25 on the rods 12 in different positions of adjustment. Fixedly connected to and extending rearwardly from the frame of each plane 10 are two parallel rods 26 formed of tubing or other suitable material, the rear ends of said rods being united by a cross bar 27 and a pivot rod 28 turns in bearings in the outer ends of the rods 26. The rod 28 extends transversely of the machine at about the same inclination as and parallel with the associated pivot arm 22, and constitutes a pivotal support for the frame of a "rudder" steering or guide plane, designated as a whole by the reference numeral 29.

The steering planes 29 are controlled from the pilot's seat 3 by a steering mechanism best seen in Figs. 4, 5 and 6 of the drawing, said mechanism comprising a vertically disposed steering wheel 30 fixed to a shaft 31 which turns in a bearing in an upright arm or steering post 32. The shaft 31 carries a sprocket wheel 33 and sprocket gears 35 and 39 are mounted to turn freely on the end portions of a spindle 36 fixed to the arm 32 and seated in a bearing in a supporting base 37 and an idler sprocket 38 is rotatably mounted on the arm or steering post 32. An endless sprocket chain 34 passes around the wheels 33 and 38 and the sprocket gears 35 and 39, in the manner seen in Figs. 4 and 6 of the drawing, to transmit the rotative motion of the steering wheel to the gears 35 and 39 and to the parts controlled thereby.

The gear 35 has oppositely disposed sectors or sheaves 40 and 41 movable therewith, and the gear 39 has corresponding sectors or sheaves 42 and 43. These sectors are connected to the front steering planes 29 on opposite sides of the fuselage by cables which give complete control of said planes without interfering with the freedom of the supporting planes 10 to turn on their own pivots 22. Thus, a cable 44 is secured at one end, as at 45 in Fig. 4, to the sector 40 and the opposite end attached to the lower end 46 of a cross arm 47 secured to the frame of the forward left-hand steering plane 29 (note Fig. 13). The arm 47 is braced by struts or trusses 48 and 49.

The cable 44 in extending from the sector 40 to the cross arm 47 passes over the guide pulley 50, Fig. 13, supported on the rod 26, over pulleys 51 (Fig. 13), 52, 53, (Fig. 2), 54 and 55 (Fig. 4), it being observed that the pulleys 51 and 52 are arranged substantially coincident with the associated supporting rod 22 so that a length of the cable extends close to this rod, and that portion of the cable which extends rearwardly of the pulley 51 may turn with the associated plane 10 without interference with the cable.

In a like manner a cable 56 extends from the sector 41 over pulleys 57, 58, 59 (Fig. 4), 60 (Fig. 3), 61 and 62 (Fig. 13), the positions of the last five of which correspond respectively to the pulleys 54, 53, 52, 51 and 50 previously described. The cable 56 passes from the pulley 62 to the upper end of the arm 47 where it is secured at 63.

The front right-hand steering plane is connected by cables through the sectors 42 and 43 in the same manner as the left-hand steering plane is connected to its sectors 40 and 41, and the same references are employed to distinguish corresponding parts at opposite sides of the machines.

By duplicating the mechanism described at the rear of the machine, I provide what may be regarded as a duplex machine, providing for two pilots, one to occupy the seat 3 and another the seat 4. The steering mechanism in front of the pilot seat 4 is essentially the same as that previously described, as are also the cable connections to the steering planes, etc., except that the cables pass up to the steering planes in the rear of the pilot seat instead of in front thereof, and the corresponding parts of the two constructions are designated by like reference numerals, thus further description of the planes mounted at the rear of the machine and the manner of controlling them from the seat 4 is deemed unnecessary.

I also preferably employ means for coupling the steering mechanisms of the seats 3 and 4 so that the operation of the steering planes at the front and rear of the apparatus, may be controlled from either one of the seats 3 and 4. This result is accomplished by a cable 64 (see Fig. 4) secured at one end to the endless sprocket chain 34 passing down under a pulley 65 and over another pulley 66. These pulleys are mounted on a bracket arm 67 secured to one end of the associated spindle 36, which it will be remembered is fixed to the steering post 32 and turns in the bearing 37, when the wheel is rocked back and forth. The passage of the cable 64 over said pulley, as stated, brings the same substantially to the axis of the spindle 36 thus the swinging movement of the wheel 30 has no effect on said cable, except to turn the upper part thereof around the axis which is substantially coincident with the axis of the spindle 36, thus the cable will not move lengthwise during the forward and back movement of the wheel. From the pulley 66 the cable 64 passes around a pulley 68, over a pulley 69 (Figs. 1 and 6) and around pulleys of the steering mechanism which correspond to the pulleys 65 and 66 hereinbefore described, and then passes to a point of connection with its chain to the rear of the associated gear 35, as indicated at 70 in Fig. 6. The front end of the cable 64 is connected with the forward chain 34 in front of the gear 35 and intermediate said gear, and the gear 38, whereas the rear end of said cable is connected to the rear chain 34 in the rear of the gear 35 and between it and the gear 38. In like manner, a cable 71 is connected at its forward end to the front chain 34 and at its rear end to the rear chain 34 of the rear steering mechanism, and the effect of these connections is to produce a corresponding rotative movement of both fore and aft steering wheels when either is turned, and to effect a simultaneous and corresponding movement of the steering planes of both sets for steering the machine to the right or left.

For landing or other purposes, I have provided means for securing each plane 10 against pivotal movement, and as seen in Fig. 7 each frame which carries a plane 10 has fixed thereto, a toothed sector 72 having notches 73, and the center or axis of the arc of this sector corresponds with the pivotal axis of the associated frame of the plane 10. A housing 74 secured to the brace 24 receives a bolt 75 formed with a shoulder or flange 76 against which one end of a coiled spring 77 bears, the opposite end of the spring bearing against the bottom of the housing, thus tending to force the bolt into one of the notches 73, and when the bolt 75 is within one of the notches 73, the sector and frame which carry it are locked to a part of the body or fuselage, and the plane 10 is retained against oscillation. It will also be understood that the sector and bolt permits of the locking of the plane against movement in any angular relation assumed thereby, when the aeroplane is in operation.

In order that the bolt 75 may be controlled at will by a pilot, I connect a cable 78 with the bolt and pass the cable over pulleys 78, 80, 81 and 82 and secure the opposite end of the cable to a lever 83 pivoted at 84 to one side of the pilot's seat 3. The lever is provided with a handle 85 and a suitable catch 86 on the seat 3 and engages the lever to retain the same in position against the tension of the spring 76 to retain the pulley 75 in inoperative position as shown in Fig. 7.

It will be understood that each forward plane 10 is provided with a similar latch and corresponding cables, bearing the reference numeral 78, and extending over similar pulleys and merge into a single cable as indicated at 78^a in Fig. 5, and from this point the lever 83 of the cable passes as a single strand or member, so that the handle simultaneously controls both bolts of the two front planes and if desired similar bolts may be controlled from each pilot's seat to lock all of the planes in the same manner.

Thus far I have described what may be referred to as a duplex plane, comprising two units of two planes each, one pair of planes arranged forward of the other, and these units are provided with a suitable body or fuselage. It will be observed that I have further combined these separate units by superposing a second complete duplex plane above that already described, and which corresponds in all essential particulars with that previously described thus forming a multiplane, including eight planes 10 and their associated steering planes 29 and two fuselage or body portions and four engines and four pilots' seats, and like reference numerals are applied to each of the upper and lower duplex units.

The frames of the two duplex units are detachably, though rigidly, united by four upright stanchions, two of such stanchions 87

connecting the frames at the forward parts thereof and two stanchions 88 connecting the frames at the rear ends thereof, it being understood that any suitable additional means may be employed to connect the two machines to give the required strength and stability thereto.

In order that corresponding planes of the two duplex machines may be moved in unison, I connect the rear ends of the frames of corresponding upper and lower planes 10 by rods 89, the ends of which are pivoted to the frames of said planes. In like manner, corresponding upper and lower steering planes 29 are united by rods 90 thus maintaining the planes of the two duplex machines in parallelism at all times and enables an operator on either machine to control the steering and supporting planes of the other machine without any connection between the steering gears of the two machines other than the rods referred to.

In addition to the construction thus far described, I may also employ means for automatically controlling the rear planes, but this means need not necessarily be employed, efficient control of the machine being afforded without it. However, from an inspection of Fig. 1, it will be seen that the automatically operated means referred to, comprises a pendulum consisting of parallel depending rods 91 pivoted at their upper ends, as at 92, to the upper body or fuselage and carrying a weight at the lower end thereof. The weighted end of the pendulum may, for example, be in the nature of a basket or container 93 connected to the rods 91 to swing therewith fore and aft of the machine, the pendulum being fixed against swinging movement in any other direction. The basket may form a seat for one or more persons, or the pendulum may constitute a container for gasoline, supplies or freight. A cross bar 94 (see Fig. 10) rigidly unites the pendulum rods 91 near the upper ends thereof and has pivotally connected thereto about midway of its length a horizontally disposed link or rod 95. The opposite end of this link is pivoted at 96 to the lower end of a lever 97, pivoted at 98 to an arm which depends from the steering post 32^a of the upper rear steering wheel, as best shown in Fig. 8. The lever 97 has a yoke 99 formed integral therewith, one arm of the yoke extending in front of the pivot or spindle 36^a of the steering post 32^a and the other arm of the yoke extends to the rear of said spindle (note Fig. 8). The upper ends of the arms of the yoke 99 are connected by a segmental bar 100 provided with a centrally located notch 101 in the upper edge thereof. A spring-pressed bolt or lock 102 is carried by the post 32^a of the steering wheel and is provided with a finger piece 103 by which it may be lifted against the force of its spring to disengage the bolt from the notch 101. A locking latch 104 is provided which automatically engages and holds the bolt in the elevated position when it is lifted to release it from the notch 101.

It will be understood that with this construction an oscillation of the pendulum, when the lock 102 is released, has no effect on the steering gear, the same being wholly under the control of the operator. This is due to the fact that an oscillation of the pendulum merely results in turning the lever 97 with the yoke 99, the bar 100 forming part thereof, around the pivot 98 without effecting the steering gear. When, however, the bolt 102 engages the notch 104, the lever 97 is locked to the steering post and a movement of said lever will cause it and the post to receive a pivotal movement around the axis of the spindle 36^a, and the pendulum action will be transmitted to the steering mechanism to automatically raise or lower all of the steering planes at the rear of the machine to automatically maintain the rear end of the machine on a level with the front end thereof.

I also preferably employ means for steering the front wheels 9 of the apparatus. Referring particularly to Figs. 3 and 11, it will be seen that each of the front wheels 9 is mounted on a short spindle 105 pivoted at 106 to turn on a vertical axis. The two spindles are connected to turn together by a cross rod 107 pivoted at its ends to forwardly extending arms 108 on said spindles. One end of a cable 109 is connected to one of said arms 108, the opposite end of the cable being connected to one end of a cross head 110, pivoted midway in the length thereof and provided at its ends with foot pieces 111. The cable in passing through the arm 108 to the cross head passes over a pulley 112. A second cable 113 is connected in a like manner to the other arm 108 and to the opposite end of the cross head providing simple means by which the operator in the forward lower-most seat of the machine may control, by the use of his feet, the guidance of a machine when traveling over the ground.

As herein set out any desired number of separate duplex machines may be readily connected to constitute a multi-plane or multiplex aeroplane, each duplex machine being complete in itself and constituting an aeroplane which may be operated separately, or in combination with other units connected therewith. In the present instance, these units are shown mounted one above another but it will be apparent that any suitable or desirable arrangement may be employed.

In the operation it will be understood that each pair of steering planes is under the control of one pilot, or one or two pilots may control all of the steering of a duplex machine. The effect of tilting the rear ends of the pairs of steering planes upwardly in unison will cause the rear end portion of the

planes carrying such steering planes, to move downwardly around the axis of the arms 22, causing the front end of such planes to move upwardly thus causing an upward flight of the machine with the fuselage in substantially horizontal position. A reversal of this movement or operation of all the units alike will cause the machine to move downwardly.

The steering of the machine to the right or left is effected by deflecting the steering planes at one side of the machine downwardly, and the steering planes at the opposite sides upwardly. This has a tendency to tilt the machine and effect the movement of the machine in either right or left direction.

The first named operation of the machine, above referred to, is accomplished by forward and backward bodily movements of the steering wheel, while the second named operation is accomplished by the rotation of the wheel which will be apparent. In both of the above described operations, the movement of the steering wheel is transmitted to the steering planes through the several cables employed which are mounted and coupled in the manner hereinbefore set out. It will also be understood that a machine may be operated in a combined operation of the steering wheel, that is to say, the combined forward or backward and rotary movements elevate the machine and turn at the same time, or to lower the machine or aeroplane and turn in either direction at the same time, and by virtue of the construction described the possibility of soaring of the entire machine without the use of motor power, or with the use of comparatively little motor power may be accomplished, and in all operations of the machine, the feathers having flexible end portions aid in the soaring or other operation of the machine.

As previously stated, one or more units may separately or collectively actuate the machine, and the machine may be used for instruction purposes, a student pilot operating from one driving seat and a master or experienced pilot controlling machine operation for correcting faulty operations of the student pilot at will, thus rendering the apparatus practical for all purposes for which the same is intended. It will also be apparent that my invention is not necessarily limited to the use of any particular number of motors or other power plants, nor am I necessarily limited to the specific combination or arrangement of units herein shown and described nor to the manner of coupling said units together, and still further my invention is not necessarily limited to the specific structure of the plane units herein set out, and various other changes in and modifications of the construction herein shown and described may be made, within the scope of the appended claims, without departing from the spirit of my invention or sacrificing its advantages.

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

1. An aeroplane comprising a plurality of connected units, each constituting in itself a complete independently operable aeroplane, the units being arranged one above another and each unit constituting a duplex aeroplane having two sets of pivoted planes arranged fore and aft of the machine, and connections between the corresponding planes which are arranged one above another on the different units so that the planes may turn on their pivots in unison.

2. An aeroplane comprising a plurality of connected units, each constituting in itself a complete independently operable aeroplane, the units being arranged one above another and each unit constituting a duplex aeroplane having two sets of pivoted planes arranged fore and aft of the machine, connections between the corresponding planes which are arranged one above another on the different units so that the planes may turn on their pivots in unison, and operative connections between said planes on the same unit.

3. An aeroplane comprising a pair of steering planes, a steering wheel mounted to turn on its own axis and also to receive a bodily movement, intermediate connections between said steering wheel and said planes whereby they will be moved simultaneously in the same direction by a bodily movement of said wheel and will be simultaneously moved in opposite directions when the wheel is turned on its own axis, a second pair of steering planes similarly controlled by a second steering wheel, intermediate connections between said wheels and by which a turning movement of one wheel is effective to produce a corresponding movement of the other wheel, two additional sets of steering planes, and intermediate connections between corresponding steering planes so that they move in unison.

4. A machine of the class described comprising two or more aeroplane units having front and rear supporting planes disposed at opposite sides of the body of the aeroplane, and each of said supporting planes being supported on pivot means to move freely relatively to each other.

5. A machine of the class described comprising two or more aeroplane units having front rear supporting planes, disposed at opposite sides of the body of the aeroplane, each of said supporting planes being supported on pivot means to move freely relatively to each other, and means for adjustably supporting said pivot means.

6. A machine of the class described comprising two or more aeroplane units having front and rear supporting planes disposed at

opposite sides of the body of the aeroplane, each of said supporting planes being supported on pivot means to move freely relatively to each other, and manually operated means for locking each of said planes against movement at will.

7. A machine of the class described comprising two or more aeroplane units having front and rear supporting planes disposed at opposite sides of the body of the aeroplane, each of said supporting planes being supported on pivot means to move freely relatively to each other, manually operated means for locking each of said planes against movement at will, and a steering plane supported by each of said first named planes.

8. A machine of the class described comprising two or more aeroplane units having front and rear supporting planes disposed at opposite sides of the body of the aeroplane, each of said supporting planes being supported on pivot means to move freely relatively to each other, manually operated means for locking each of said planes against movement at will, a steering plane supported by each of said first named planes, and manually controlled means for operating the steering planes to control said supporting planes.

9. A machine of the class described comprising two or more aeroplane units having front and rear supporting planes disposed at opposite sides of the body of the aeroplane, each of said supporting planes being supported on pivot means to move freely relatively to each other, manually operated means for locking each of said planes against movement at will, a steering plane supported by each of said first named planes, manually controlled means for operating the steering planes to control said supporting planes, said last named means involving independent controls for the separate steering planes.

10. A machine of the class described comprising two or more aeroplane units having front and rear supporting planes disposed at opposite sides of the body of the aeroplane, each of said supporting planes being supported on pivot means to move freely relatively to each other, manually operated means for locking each of said planes against movement at will, a steering plane supported by each of said first named planes, manually controlled means for operating the steering planes to control said supporting planes, said last named means involving independent controls for the separate steering planes, and means for coupling all of said controls whereby all steering planes may be actuated from a single control.

11. A machine of the class described comprising two or more aeroplane units having front and rear supporting planes disposed at opposite sides of the body of the aeroplane, each of said supporting planes being supported on pivot means to move freely relatively to each other, and the rear and outer side edges of said planes being capable of automatic flexing in the operation of the aeroplane.

12. An aeroplane comprising a multiplane structure, consisting of two duplex units each unit having front and rear aeroplane bodies provided with independent power plants.

13. An aeroplane comprising a multiplane structure, consisting of two duplex units, each unit having front and rear aeroplane bodies provided with independent power plants, and said bodies being joined in a common fuselage.

14. An aeroplane comprising a multiplane structure, consisting of two duplex units, each unit having front and rear aeroplane bodies provided with independent power plants, said bodies being joined in a common fuselage, said units being arranged one above the other in spaced relation, and means for coupling said units together.

15. An aeroplane comprising a body portion, main supporting planes movably supported at opposite sides of said body portion and adapted to change the angle of incidence with respect thereto, frames rigidly supported on said planes and extending rearwardly of the central portion thereof, steering planes pivoted to the rear end of said frames and means under the control of the operator for changing the angle of incidence of each of said steering planes irrespective of the angular position of the supporting planes, means under the control of the operator for locking the supporting planes and said frames against relative movement to said body portion, and said supporting planes and steering planes being inclined upwardly with respect to the longitudinal plane of said body portion.

16. An aeroplane comprising a body portion, main supporting planes movably supported at opposite sides of said body portion and adapted to change the angle of incidence with respect thereto, frames rigidly supported on said planes and extending rearwardly of the central portion thereof, steering planes pivoted to the rear ends of said frames and means under the control of the operator for changing the angle of incidence of each of said steering planes irrespective of the angular position of the supporting planes, means under the control of the operator for locking the supporting planes and said frames against relative movement to said body portion, said supporting planes and steering planes being inclined upwardly with respect to the longitudinal plane of said body portion, and brace members extending laterally from opposite sides of the body portion to said main supporting planes and the frames thereof for bracing the same.

17. An aeroplane comprising a body portion, main supporting planes movably supported at opposite sides of said body portion

and adapted to change the angle of incidence with respect thereto, frames rigidly supported on said planes and extending rearwardly of the central portion theerof, steering planes pivoted to the rear ends of said frames and means under the control of the operator for changing the angle of incidence of each of said steering planes irrespective of the angular position of the supporting planes. means under the control of the operator for locking the supporting planes and said frames against relative movement to said body portion, said supporting planes and steering planes being inclined upwardly with respect to the longitudinal plane of said body portion, and said main planes being adjustable forwardly and backwardly with respect to said body portion on their pivotal supports.

18. An aeroplane comprising a body portion, main supporting planes movably supported at opposite sides of said body portion and adapted to change the angle of incidence with respect thereto, frames rigidly supported on said planes and extending rearwardly of the central portion thereof, steering planes pivoted to the rear ends of said frames and means under the control of the operator for changing the angle of incidence of each of said steering planes irrespective of the angular position of the supporting planes, means under the control of the operator for locking the supporting planes and said frames against relative movement to said body portion, said supporting planes and steering planes being inclined upwardly with respect to the longitudinal plane of said body portion, and said planes having rear and side edge portions capable of automatically flexing in the operation of the machine.

19. In an aeroplane of the class described, a fuselage body, plane units each consisting of supporting and steering planes disposed at opposite sides and front and rear end portions of said body, each unit being independently movable with respect to the body to maintain said body in substantially horizontal position when the aeroplane is in flight and in the operation of ascending and descending.

20. In an aeroplane of the class described, a fuselage body, plane units each consisting of supporting and steering planes disposed at opposite sides and front and rear end portions of said body, each unit being independently movable with respect to the body to maintain said body in substantially horizontal position when the aeroplane is in flight and in the operation of ascending and descending, and the steering planes of said units being manually and automatically controlled to automatically control the operation of said supporting planes.

21. In an aeroplane of the class described, a fuselage body, plane units each consisting of supporting and steering planes disposed at opposite sides and front and rear end portions of said body, each unit being independently movable with respect to the body to maintain said body in substantially horizontal position when the aeroplane is in flight and in the operation of ascending and descending, the steering planes of said units being manually and automatically controlled to automatically control the operation of said supporting planes, and said steering planes being mounted on frames rigidly coupled with the supporting planes.

In testimony that I claim the foregoing as my invention I have signed my name this 2nd day of April, 1927.

EMRY DAVIS.