B. R. ALEXANDER.

AEROPLANE.

APPLICATION FILED JULY 12, 1910.

1,002,111. Patented Aug. 29, 1911.

Fig. 1.

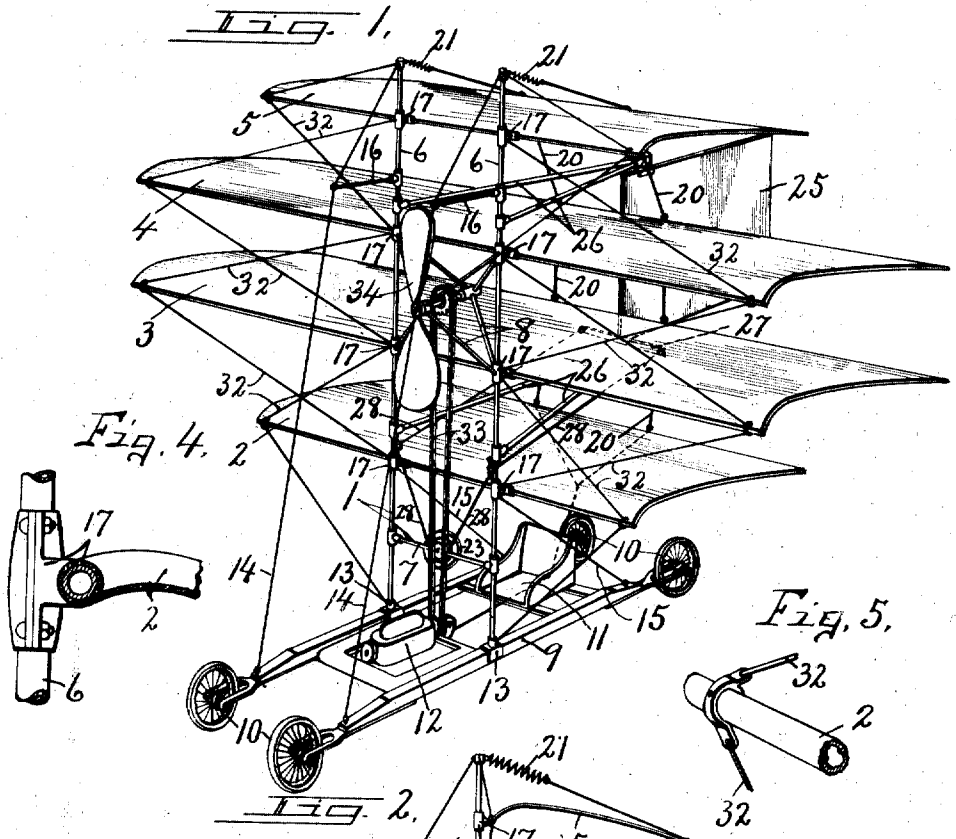
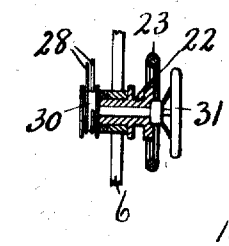


Fig. 4.

Fig. 5.

Fig. 2.

Fig. 3.



WITNESSES.

E. J. Strait

H. E. Chase

INVENTOR.

B. R. Alexander

By

Howard P. Denison

ATTORNEY.

UNITED STATES PATENT OFFICE.

BERT R. ALEXANDER, OF EAST SYRACUSE, NEW YORK.

AEROPLANE.

1,002,111. Specification of Letters Patent. **Patented Aug. 29, 1911.**

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To all whom it may concern:

Be it known that I, BERT R. ALEXANDER, of East Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Aeroplanes, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in dirigible air-ships of the aeroplane type involving the use of a plurality of, in this instance four, supporting planes hinged at their front edges, one above the other, in parallelism to a suitable upright supporting frame upon which is also mounted the propelling and steering mechanisms.

The main object is to control the vertical angle of flight and equilibrium of the machine wholly by the manipulation of the supporting planes in their entirety, through the medium of operating mechanism and connections under the control of the operator, whereby said planes may be tilted simultaneously.

When the machine is in flight the impact of the air against the surface of the planes tends to position them in parallelism with the plane of flight, but unless properly supported when at rest would gravitate to a vertical position.

A further object, therefore, is to provide yielding means for normally holding the planes in a substantially horizontal position.

Other objects and uses relating to specific parts of the machine will be brought out in the following description.

In the drawings: Figure 1 is a perspective view of a four-plane machine embodying various features of my invention. Fig. 2 is a side elevation of the same machine. Fig. 3 is a detail sectional view of the hand operated winding drums for the steering and plane-tilting. Fig. 4 is an enlarged elevation of one of the journal clips for pivotally connecting the plane to one of the upright supports, the front rib and adjacent portion of one of the planes being shown in section. Fig. 5 is a perspective view of a portion of the front rib of one of the planes showing one of the anchor rings for the adjacent stays.

This machine comprises an upright supporting frame —1—, and one or more, in this instance four, supporting planes —2—, —3—, —4— and —5— which are hinged at their front edges in parallelism, one above the other, and substantially midway between their ends to the upright frame —1—.

The frame —1— preferably consists of upright parallel bars —6— and suitable cross bars —7— and —8— connecting the upright bars and holding them at a fixed distance apart, said upright bars being of greater length than the distance from the lower to the upper plane, so that when the planes are assembled in operative position thereon, the upper ends of bars —6— extend some distance above the upper plane, while the lower ends extend some distance below the lower plane, and are rigidly connected to a working platform —9— carrying suitable supporting wheels —10— for supporting the machine on the ground when at rest or during initial flight. This platform is disposed in a horizontal position a sufficient distance below the lower plane to permit free movement of the operator when seated thereon in a suitable seat —11—, said platform also serving as a convenient support for a motor, as —12—, and other appurtenances which may be necessary in the operation of the motor and other parts of the machine. The motor —12— is preferably located in front of the upright supporting frame —1—, while the seat is located some distance to the rear thereof but within easy reaching distance from the controlling mechanism (not shown) for the engine.

The engine and seat are positioned in such relation that the weight of the engine and occupant will bring the center of gravity of the entire machine directly under the longitudinal center of the supporting planes or approximately between the seat and base of the upright frame —1—, so that a slight forward or backward movement of the occupant may change the center of gravity.

The transverse width of the platform —9— is substantially equal to that of the frame —1—, such width being considerably less than the length of the shorter planes, so as to leave by far the greater portion of all of the planes, and particularly the ends thereof free to cut and ride upon the air with a minimum degree of resistance and at the same time permitting a free manipulation of the planes in directing the angle of flight or in balancing the machine.

The upright frame —1— and its base or platform —9— are secured together at their junctions, one with the other, by suitable couplings —13—, but are additionally held

in fixed relation by front and rear stay wires —14— and —15—, the stays —14— running from the front ends of the side bars of the platform —9— upwardly over suitable truss rods —16— to the upright bars —6—, and are secured to the upper ends of said uprights above the upper plane —5—.

The rear stays —15— connect the upright bars —6— just below the lower plane —2— with the rear ends of the side bars of the platform —9—.

All of the supporting planes are of substantially the same width from front to rear, although the intermediate planes —3— and —4— which are of substantially the same length are somewhat longer than the lower and upper planes, the relative lengths being proportioned so as to more effectively maintain the equilibrium or balance of the machine in flight. These planes may be of any suitable light skeleton structure having the usual under-covering of rubberized silk or equivalent material, the front bar of each plane being preferably circular in cross section, as shown in Fig. 4, and journaled in suitable bearings —17— on the upright frame bars —6—. Each plane is therefore adapted to tilt or swing vertically and in order that they may be operated simultaneously their rear edges are connected by one or more cables —20—, having their upper ends extended over the top plane —5— and connected by springs —21— to the upper end of the upright frame bars —6—.

The lower ends of the cable —20— are preferably merged into a single cable and passed around suitable idlers on the platform —9— and then wound upon a hand operated drum —22— having a hand wheel —23— in proximity to the seat —11—.

The springs —21— and adjacent portions of the cable —20—, connecting them to the rear edge of the upper plane constitute means for normally holding the planes in their elevated or horizontal position ready for flight, and although I have described these springs as connected to the upper ends of the cables —20—, it is evident that any other yielding means may be employed for accomplishing the same result.

A vertical steering rudder —25— is pivoted near its front edge to the rear ends of suitable supporting arms or brackets —26— extending forwardly beneath and above the intermediate planes —4— and —5— respectively, and having their front ends rigidly secured to the upright frame bars —6—; said brackets —26— being positioned so as not to interfere with the free tilting movement of the planes.

Any suitable means may be employed for operating the steering rudder, but in the present instance I have shown such rudder as provided with a tiller —27— to which is connected suitable operating cables —28— which are carried forwardly and passed over idlers —29— and attached to a hand rotated drum —30—. This drum is preferably coaxial with the drum —23— and provided with a hand wheel —31— in close proximity to the hand wheel —23—, and therefore in proximity to the seat from which the operator may readily control the movement of the planes and rudder.

The opposite ends of the front edges of the planes 2, 3, 4, and 5, are connected by stay wires —32— to the upright supporting bars —6—, preferably near the couplings —17— so as to hold the ends of the planes against relative vertical movement under air pressure in flight, it being understood that all of the stay wires may be provided with the usual turn-buckles whereby they may be tightened when necessary.

The motor —12— is connected by suitable power transmitting mechanism, as a sprocket chain —33— to a propeller —34—, which, in this instance, is journaled in the cross-bar —8— substantially midway between and in front of the intermediate planes —3— and —4—.

What I claim is:

1. An aeroplane comprising an upright frame, supporting planes hinged along their front edges to the upright frame and spaced some distance apart, a cable and a rotary drum connected thereto and to the rear edges of the planes for rocking said planes simultaneously, and connections, including a spring between the rear edge of the uppermost plane and upper part of the frame, for normally holding the planes in a substantially horizontal position.

2. An aeroplane comprising an upright frame, a plurality of supporting planes hinged along their front edges to the frame and adapted to rock vertically throughout their entire lengths, a working platform secured to the lower end of the frame some distance below the lower plane, a motor and a seat, both mounted on the platform, a propeller journaled on the frame in front of the planes, and operatively connected to the motor, means connected to the rear edges of the planes for rocking them downwardly simultaneously, and additional means for restoring the planes to their normal positions, a vertical rudder, and at the rear of the planes, and means for operating the rudder.

In witness whereof I have hereunto set my hand on this 7th day of July, 1910.

BERT R. ALEXANDER.

Witnesses:

H. E. Chase,

Persis Phyllis Parks.