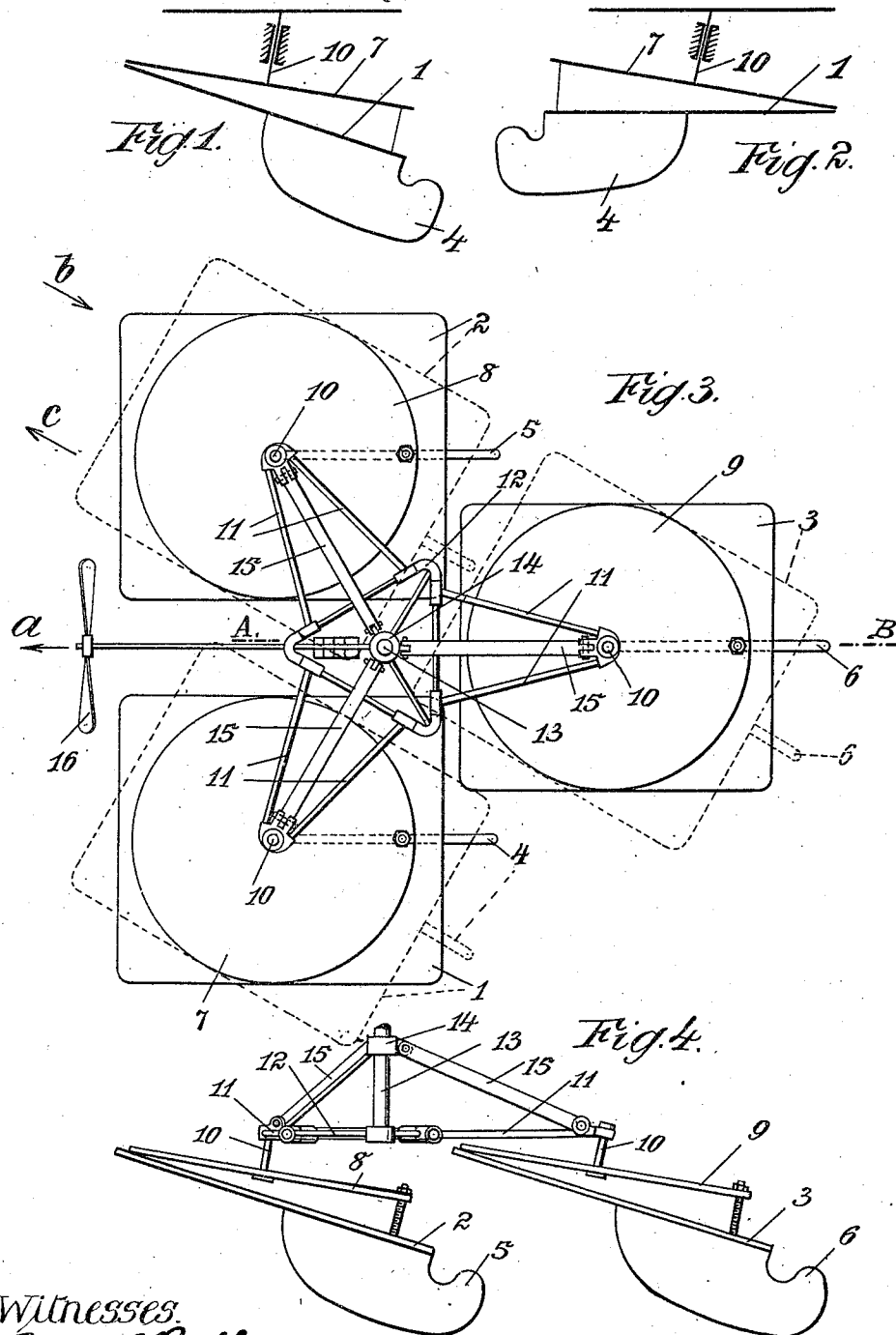


M. RAABE.
 AUTOMATIC STABILIZER FOR FLYING MACHINES.
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1,028,782.

Patented June 4, 1912.



Witnesses
 Edwin H. Beller.
 J. E. Ginst.

Inventor:
 Max Raabe
 by William H. Fisher, Attorney.

UNITED STATES PATENT OFFICE.

MAX RAABE, OF CRONBERG IN THE TAUNUS, GERMANY.

AUTOMATIC STABILIZER FOR FLYING-MACHINES.

1,028,782.

Specification of Letters Patent.

Patented June 4, 1912.

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To all whom it may concern:

Be it known that I, MAX RAABE, lieutenant a. D., a subject of the German Emperor, and resident of Cronberg in the Taunus, Germany, with the post-office address Hartmuthstrasse 3, have invented new and useful Improvements in Automatic Stabilizers for Flying-Machines, of which the following is a specification.

The present invention relates to aeroplanes, and has for its purpose to provide an aeroplane having a plurality of planes independently mounted, and adapted to be automatically adjustable through the direction of the wind currents whereby to stabilize the aeroplane during its flight.

The invention further contemplates an arrangement wherein the supporting planes may be manually positioned for the purpose of producing a parachute effect, to the end of permitting a gradual descent in the event of the aeroplane propelling means becoming disabled.

With these and other objects in view the invention consists in the novel details of construction and combinations of parts more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals designate like parts in all the views:—Figure 1 indicates diagrammatically one of the supporting planes and its associated parts; Fig. 2 is a similar view showing the parts in a different position; Fig. 3 is a top plan view of an aeroplane constructed in accordance with the present invention; and Fig. 4 is a longitudinal sectional view thereof taken on the line A—B of Fig. 3.

Referring to the construction in detail, the aeroplane consists of three supporting planes 1, 2 and 3 carrying respectively vertically disposed vanes or rudders 4, 5 and 6. Said planes 1, 2 and 3 are disposed in triangular relation and are rigidly connected to disks or planes 7, 8 and 9, disposed above said planes and forming angles with the surfaces of the planes 1, 2 and 3. The planes or disks 7, 8 and 9 are always disposed on an incline to the horizontal, and are rotatably mounted on axles 10, which axles are attached at right angles to the planes or disks 7, 8 and 9, and are themselves supported by the frame arms 11. The arms 11 are pivotally mounted on a horizontally disposed

triangular shaped frame 12, and said frame 12 has fixedly mounted thereon a vertically disposed rod 13. A nut 14 is slidably mounted on the rod 13, and is connected with the frame arms 11 through the medium of links 15, of which there are three, *i. e.* one for each of the supporting planes 1, 2 and 3. The displacement of the nut 14 may be effected by any suitable device (not shown), and through which operation the relative angular positions of the axles 10 are changed, thereby producing corresponding inclinations to the planes 1, 2 and 3.

The aeroplane is provided with the usual propeller 16 and may otherwise be of any suitable design in its general construction, but with which the present invention is not concerned. The axles 10 allow the planes to assume any angle about the vertical; if each axle 10 is inclined, for example as shown in Figs. 1 and 2, any rotation of these axles alters the inclination of the supporting planes with respect to the horizontal. In Fig. 2 the supporting plane has been turned through half a revolution compared to Fig. 1. Fig. 1 shows the inclination of the supporting planes, when the front surface is at right angles to the direction of motion. After the half revolution the inclination of the planes is zero, that is to say the supporting planes are horizontal and they have no lifting force. The inclination gradually changes in passing from the position of Fig. 1 to that of Fig. 2. If side winds arise to turn the supporting planes in the manner described above, so that they take up the position shown in dotted lines in Fig. 3, their inclination to the horizon and consequently their lifting power has diminished. The machine can encounter a squall without danger of capsizing, but on the other hand a perfectly automatic stabilizing action takes place so as to render the machine indifferent to any gusts of wind. Also by the displacement of the nut 14 on the rod 13 such an inclination can be given to the supporting planes that the whole machine will act as a parachute. Should it be necessary from any cause to make a rapid descent the planes can be given such an inclination that the machine acts as a parachute.

If the machine is flying in the direction of the arrow *a* and meets a side wind blowing in the direction of the arrow *b*, the supporting planes turn like weathercocks under the action of the tail planes 4, 5, 6 in the

resultant direction indicated for example by the arrow *c*. The front surfaces of the supporting planes are no longer at right angles but inclined to the direction of flight, depending upon the lateral component of the wind, so that the supporting action of the planes is much greater than if their front surfaces remained at right angles to the direction of motion.

It is obvious that those skilled in the art may vary the details of construction and arrangement of parts without departing from the spirit of my invention, and therefore I do not wish to be limited to such features except as may be required by the claims.

What I claim is:—

1. In an aeroplane, the combination of a suitable frame, a plurality of separate and independent supporting planes, a vertically disposed axis on which each of said planes is mounted to rotate on said frame, and a vertically disposed vane on each of said planes adapted to effect rotation of its respective plane through the medium of air currents, substantially as described.

2. In an aeroplane, the combination of a suitable frame, a plurality of supporting planes, a member on which each of said planes is secured and at an angle relatively thereto, a vertically disposed axis for securing each of said members to said frame; and a vertically disposed vane secured to each of said planes and adapted to rotate its respective plane on its axis through the medium of air currents, substantially as described.

3. In an aeroplane, the combination of a suitable frame, a plurality of supporting planes disposed in triangular relation, a plu-

rality of disks disposed above said planes, means securing each of said planes to each of said disks at an angle relatively thereto, a vertically disposed axis connecting each of said disks with the supporting frame, members movably mounted on the frame and having connection with said vertically disposed axes, and operable to actuate the latter, and a vertically disposed vane secured to each of said planes and adapted to rotate its respective plane on its axis through the medium of air currents, substantially as described.

4. In an aeroplane, the combination of a suitable frame, a plurality of supporting planes, a disk mounted above and supporting each of said planes, bars hingedly mounted on said frame, a vertically disposed axis connected with each of said disks and secured to said bars for supporting said disks, a vertically disposed shaft mounted on the frame, a member slidably mounted on said shaft, links connecting said slidable member with the supporting axes of said disks, and operable to adjust the position of said axes, and a vertically disposed vane secured to each of said planes and adapted to rotate its respective plane on its axis through the medium of air currents, substantially as described.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this 10th day of April 1911.

MAX RAABE.

Witnesses:

LUDWIG BRÄBEL,
MATHILDE JUSTUS.