

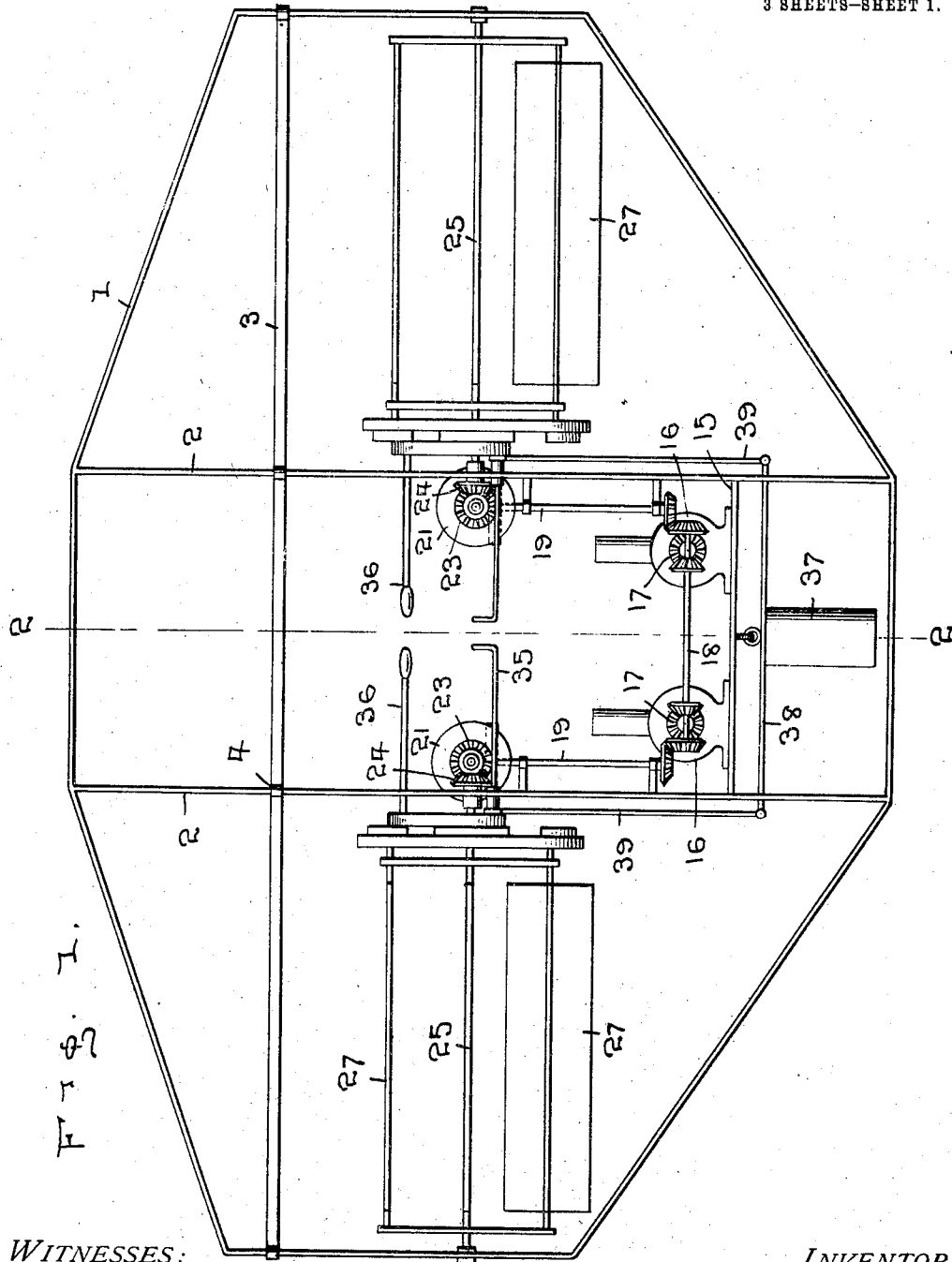
A. A. FOKKEN.
FLYING MACHINE.

APPLICATION FILED SEPT. 27, 1910.

1,021,925.

Patented Apr. 2, 1912.

3 SHEETS—SHEET 1.



WITNESSES:

Thomas W. Riley
M. Newcomb

INVENTOR

A. A. Fokken

BY

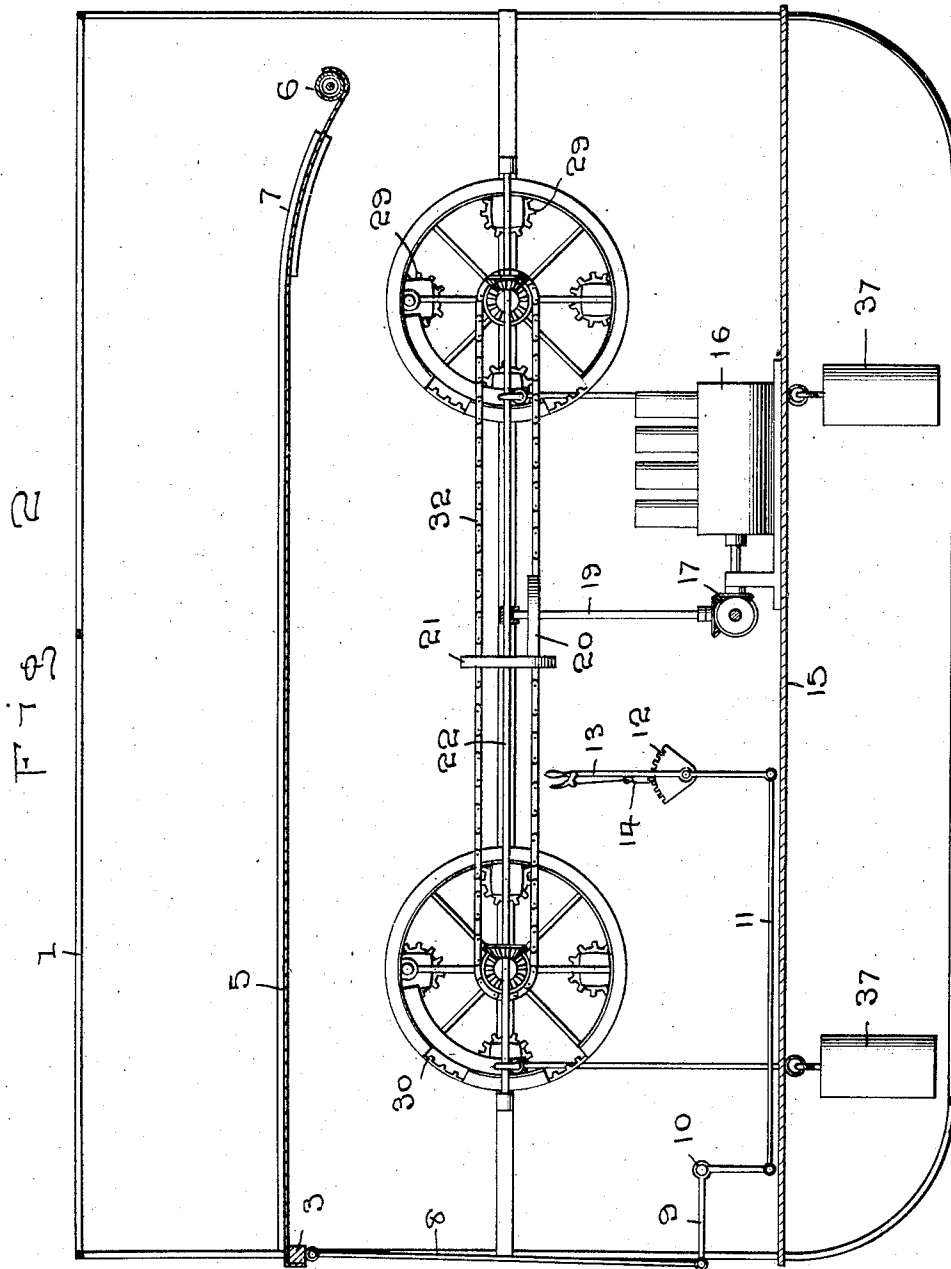
W. J. F. Fokken
Attorney

A. A. FOKKEN.
FLYING MACHINE.
APPLICATION FILED SEPT. 27, 1910.

1,021,925.

Patented Apr. 2, 1912.

3 SHEETS—SHEET 2.



WITNESSES:

Thomas W. Riley
M. Newcomb

INVENTOR

A. A. Fokken

BY

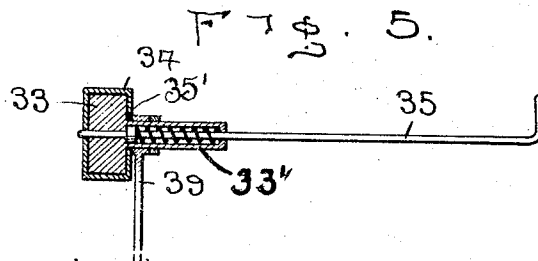
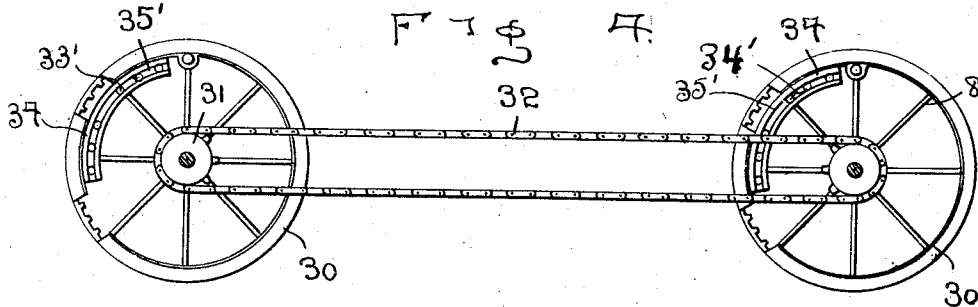
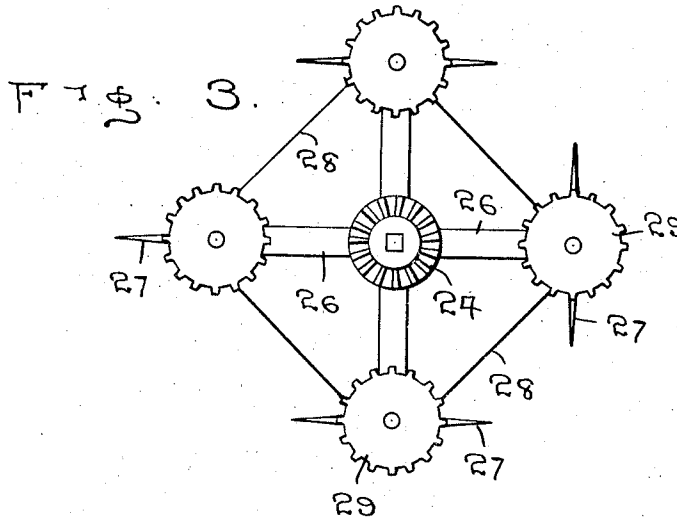
W. J. Fitzgerald & Co.
Attorneys

A. A. FOKKEN.
FLYING MACHINE.
APPLICATION FILED SEPT. 27, 1910.

1,021,925.

Patented Apr. 2, 1912.

3 SHEETS-SHEET 3.



WITNESSES:

Thos. W. Riley
M. Newcomb

INVENTOR

A. A. Fokken

BY

W. J. FitzGerald & Co.
Attorneys

UNITED STATES PATENT OFFICE.

ADELBERT A. FOKKEN, OF RAYMOND, SOUTH DAKOTA.

FLYING-MACHINE.

1,021,925.

Specification of Letters Patent.

Patented Apr. 2, 1912.

Application filed September 27, 1910. Serial No. 584,074.

To all whom it may concern:

Be it known that I, ADELBERT A. FOKKEN, a citizen of the United States, residing at Raymond, in the county of Clark and State of South Dakota, have invented certain new and useful Improvements in Flying-Machines; and I do hereby 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.

My invention relates to flying machines and my object is to provide a flying machine which will possess the advantages of both the aeroplane and the helicopter types.

A further object is to provide means for automatically balancing the machine.

A further object is to provide means for controlling the amount of supporting surface of the aeroplane.

A further object is to provide means for varying the inclination of the aeroplane.

A further object is to provide lifting and propelling means of the feathering-blade paddle-wheel type, and, a further object is to provide manually operated means for controlling the operation of the feathering mechanism.

With the above and other objects in view, this invention consists in the construction, combination and arrangement of parts hereinafter described and shown in the accompanying drawings, which are made a part of this application.

In the drawings Figure 1 is a front elevation of the machine. Fig. 2 is a side elevation in part section. Fig. 3 is a detail end elevation of a propelling unit. Fig. 4 is a detail side elevation of the means for controlling the feathering of the blades, and, Fig. 5 is a detail view in part section of a portion of the automatic balancing mechanism.

Referring to the drawings in which similar reference numerals designate like parts in all views, 1 is the frame of the machine which is preferably constructed of metal tubing in the shape of a flattened octagon with braces 2 extending vertically there-through and joining the upper and lower sides. Extending transversely through the front of the frame is a bar 3, which is secured to the vertical frame members by sleeves 4 so as to permit of its being elevated or lowered. To this bar is secured the front edge of an aeroplane 5, which is constructed

of canvas or the like. The rear end of this plane is carried by a roller 6, which is preferably spring operated so as to retain the plane under strain or tension at all times and allow for the same being partly or wholly furled by simply releasing its front end from the bar 3. The rearward portion of the plane extends between guides 7, which are carried by the frame, the purpose of these guides being to give to the plane the proper curvature.

In order to provide for varying the inclination of the plane a link 8 connects the bar 3 to the bell-crank lever 9, pivotally mounted in the frame at 10. The other arm of the bell-crank lever is connected with a hand-lever 13 by means of a link 11, and in order to retain the hand-lever in a fixed position, I have provided a segmental rack 12 of the usual form and a pawl 13 carried by the lever to engage the same.

Supported by the central bars of the frame is a floor 15 upon which are mounted motors 16, of any description but preferably of the internal combustion type. By means of a clutch, not shown, these motors are connected to bevel gears 17 which drive like gears on a shaft 18. Said shaft may be provided with a differential gearing somewhere between these ends to compensate for the difference in speed of the motors, but as this gearing is an incidental refinement, I have not considered it necessary to show the same. The ends of the shaft 18 are provided with bevel gears which mesh with like gears on the shafts 19, which are carried in suitable bearings supported by the frame. On the upper ends of these shafts are slidably mounted frictional drums 20. Coöperating with these drums are suitable disks 21, slidably mounted on horizontal longitudinally extending shafts 22. The disks 21 are held in frictional engagement with the drums 20 by springs, or other suitable means, not shown. Carried by these shafts are beveled gears 23, which mesh with like gears 24 on the shafts 25 of the blade wheels, the latter being carried by suitable journal boxes mounted directly on the frame. These wheels consist of the shafts 25, arms 26 secured thereto and blades 27, pivotally mounted on the arms, the latter being preferably braced at their outer extremities by wires or the like. On the end of each blade shaft is a spur gear 29 adapted to mesh with the teeth of a partially cut annular

gear wheel 30, which is rotatably mounted on the shaft 25. These latter parts constitute the feathering mechanism, and it will be seen that by properly disposing the cut portions of the gear so that their angular relation will be correct, the paddle wheels 29 will be made to assume a direction parallel with the general motion of the machine during part of their revolution and during the remainder will be turned so as to exert a lifting or propelling effort. Sprocket wheels 31 are attached to the outside faces of the wheels 30 and a chain 32 connects the sprocket wheels of the front and rear feathering mechanism on each side so that the movement of one will necessitate a like adjustment of the other.

In order to control the time or part of the revolution in which the feathering of the blade occurs, collars 34, having holes 34' in one side thereof and a longitudinal slot 35' in the opposite side are attached to the wheels 30. Slidably mounted within the collars 34 and extending through the slots 35' therein are the segments 33 having the hollow extensions 33' through which extend the spring actuated rods 35 which are adapted to register with the holes 34' in the collar 34 when the wheel 30 is turned for adjustment, and thereby lock said wheel against accidental rotation. Rigidly secured to the wheel 30 near the periphery thereof are the hand levers 36, for the purpose of manually adjusting the wheels 30.

In order to maintain the transverse equilibrium of the machine, pendulums 37 are pivotally mounted beneath the floor, each of these pendulums having attached to the top thereof a transverse lever 38. The links 39 are pivoted at their lower ends to the lever 38 and at their upper ends over the extension 33' of the segment. It will be seen that the tilting of the machine will cause these pendulums to swing about their pivots, thus raising one of the links 39 and lowering the opposite one and by this action the segments 33 and rods 35 are moved and therewith the wheels 30 are turned and the propeller blades 27 on the lower side are automatically adjusted to exert the greatest lifting force, thereby restoring the machine to an even keel. After the aeroplane has been thus restored to its equilibrium the pendulums 37 swing back to their normal position as shown in Fig. 1 and the wheels 30 are caused to move back to their normal position and the blades 27 are caused to move back to their original position.

In the operation of the machine the aeroplane 5 is first allowed to roll upon the roller 6, the motors 16 are then started, the hand-levers 36 are set to obtain the greatest lifting effect from the blades and by applying sufficient power the latter will then cause

the machine to raise itself vertically. When a sufficient elevation has been attained, the aeroplane 5 is extended by means of some suitable system of pulleys and cords, not shown, and by means of the lever 13 it is adjusted to the correct inclination. The hand-levers 36 are then set to obtain a greater propelling effect from the blades. By drawing out the rods 35 the collar may be properly positioned by moving the hand lever 36 after which the rod 35 is released and entering the holes in the collar 34 locks the wheels 30 in the desired adjusted position. If there should be a tendency of one side of the machine to drop, the pendulum 37 will effect further automatic adjustment of the segment's position until an even keel is maintained.

The longitudinal balance of the machine is manually maintained by the movement of the lever 13, which serves through its connecting links to elevate or depress the front portion of the plane 5.

In order to turn the machine, it is only necessary to rotate the propellers of one side faster than those of the other. The result will be to elevate one set and at the same time swing each around, said tilted position, being the normal one for turning, is not effected by the pendulums 37, which because of centrifugal force, will still remain at right angles to the plane of the floor. This increase of speed of one side over the other is effected by sliding the drums 20 upon their shafts by some suitable system of levers, not shown.

It will thus be seen that I have provided a flying machine, which is in many respects automatic in its control and balance, which is capable of gliding safely to the ground in case of accident to the machinery, and which is also capable of maintaining itself in the air in case of accident to the supporting planes.

What I claim is:

1. In a flying machine, including a frame, an aeroplane, and a motor driven propelling means, the combination with a roller horizontally disposed in a transverse plane and adapted to serve as a securing means for one end of the plane, of a horizontal bar slidably mounted on the vertical frame members and adapted to serve as securing means for the other end of the plane, means for adjusting said bar vertically and means for rolling said plane upon said roller.

2. In a flying machine, the combination with a plurality of feathering-blade propeller wheels disposed on either side of the longitudinal center of the machine, of means for manually controlling the feathering of said blades, means for locking said feathering blades in adjusted position and additional means for automatically controlling the feathering of said blades.

3. In a flying machine, the combination
with a plurality of feathering-blade pro-
pelling wheels alined on either side of the
longitudinal center of the machine, spur-
5 gears carried on the shafts of the blades,
wheels having segments of their peripheries
toothed mounted on the shafts of said pro-
pellers and adapted to control the feather-
ing of the blades thereof, and segments car-
10 ried by said wheels having holes there-
through, of a collar surrounding each seg-
ment, a hand-lever secured to the collar,
pins passing through holes in the segments
and adapted to pass into registering holes
15 in the collars, means for releasing said pins
from engagement with the collar and means
for automatically controlling the position
of the segments to maintain the balance of
the machine.

20 4. In a flying machine the combination

with a plurality of feathering-blade pro-
peller wheels disposed on either side of the
longitudinal center of the machine, of
means for manually controlling the feather-
ing of said blades, means for locking said 25
feathering-blades in adjusted position,
means for automatically controlling the
feathering of said blades, and means con-
necting the propellers upon one side so
that the automatic adjustment of the 30
feathering control will be effected simul-
taneously in all the propellers on said side.

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

ADELBERT A. FOKKEN.

Witnesses:

C. E. HERSOM,

W. M. DANFORTH.