C. A. HAMILTON.

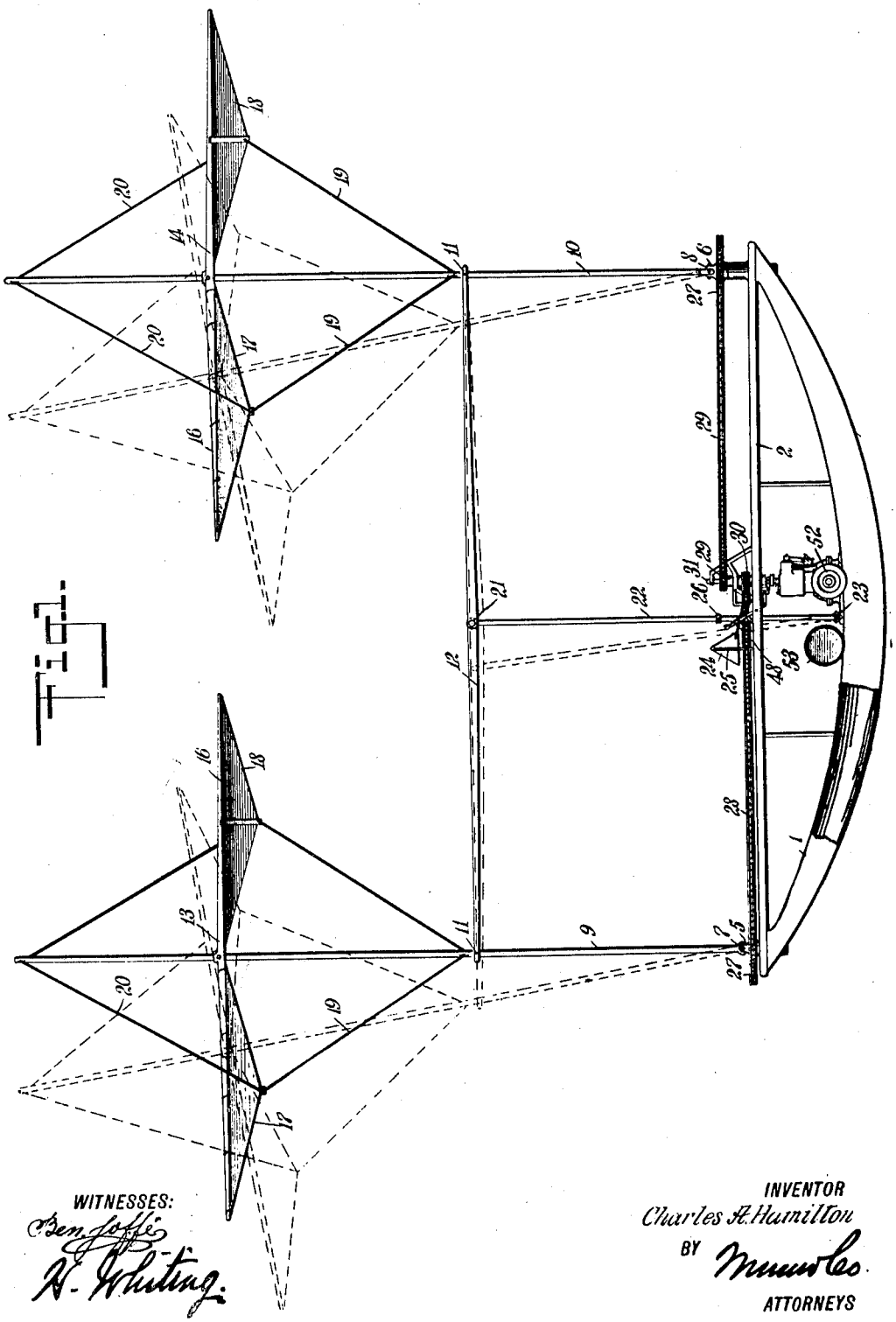
FLYING MACHINE.

APPLICATION FILED JAN. 6, 1910.

1,035,583.

Patented Aug. 13, 1912.

3 SHEETS—SHEET 1.



WITNESSES:

Ben. Joffe

A. Whiting.

INVENTOR

Charles A. Hamilton

BY Munn & Co.

ATTORNEYS

C. A. HAMILTON.

FLYING MACHINE.

APPLICATION FILED JAN. 6, 1910.

1,035,583.

Patented Aug. 13, 1912.

3 SHEETS—SHEET 2.

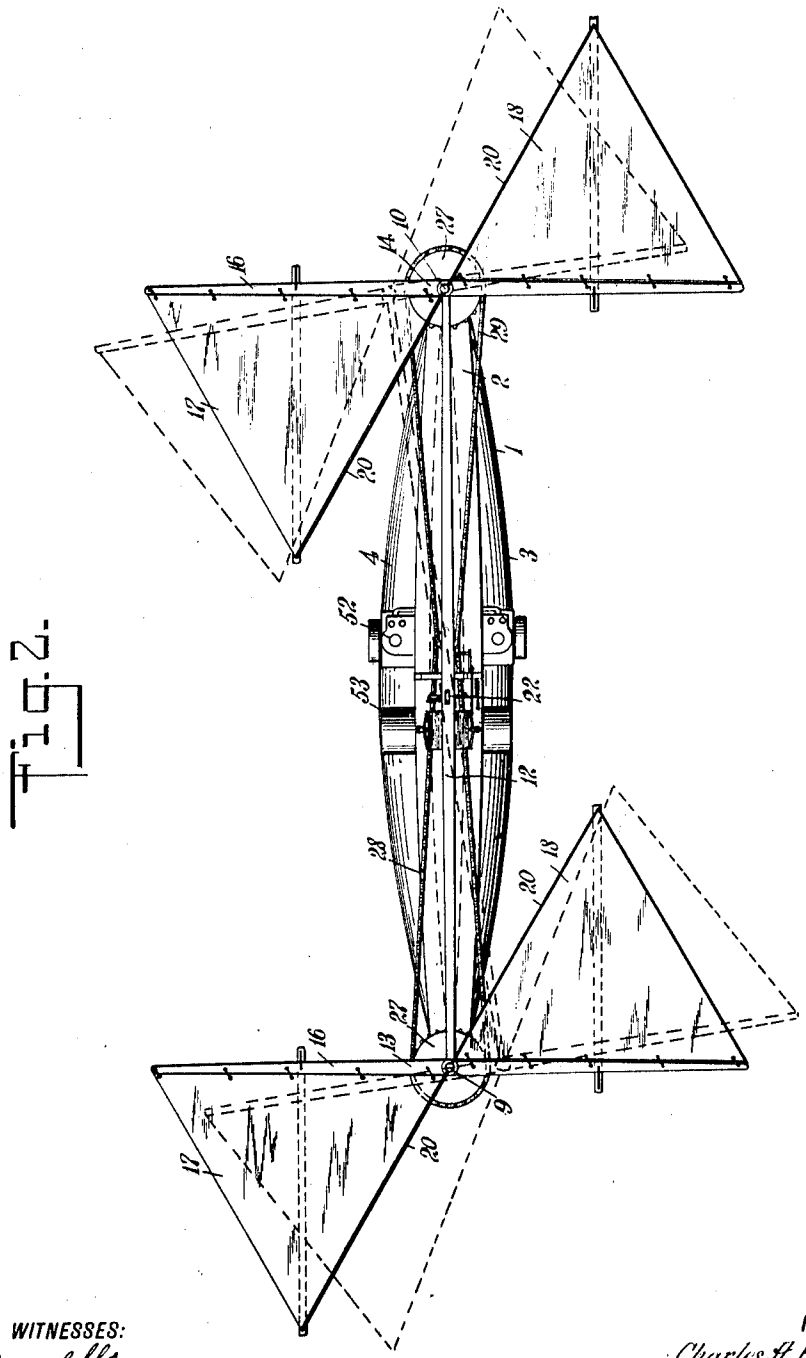


Fig. 2.

WITNESSES:

Ben. Loffe

N. Whiting

INVENTOR

Charles H. Hamilton

BY Munn & Co.

ATTORNEYS

C. A. HAMILTON.

FLYING MACHINE.

APPLICATION FILED JAN. 6, 1910.

1,035,583.

Patented Aug. 13, 1912.

3 SHEETS—SHEET 3.

Fig. 3.

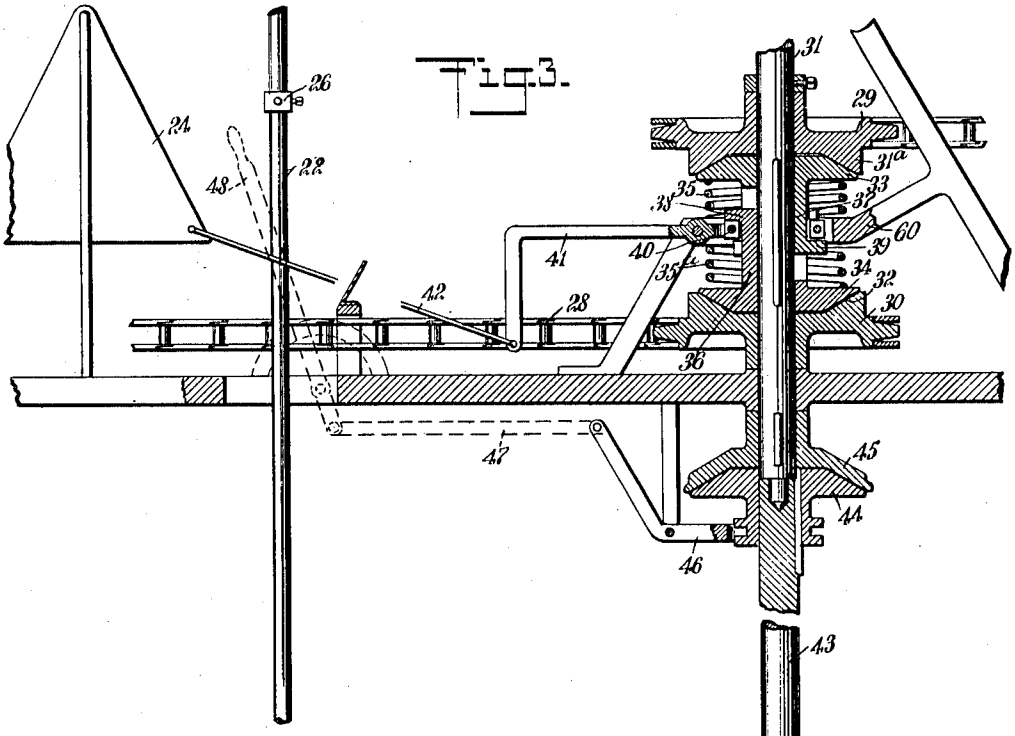
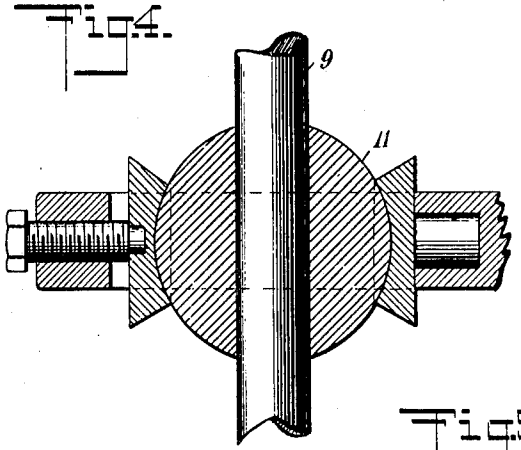


Fig. 4.



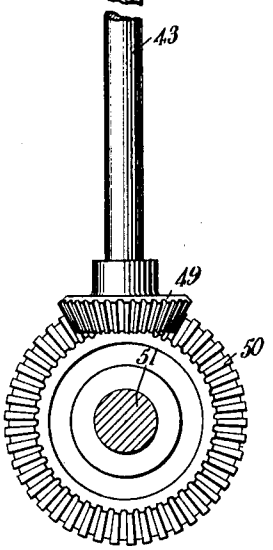
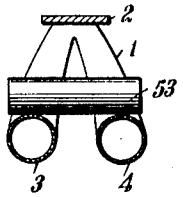


Fig. 5.



WITNESSES:

Ben. Joffé

N. Whiting

INVENTOR

Charles A. Hamilton

BY Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES ALBERT HAMILTON, OF NEW YORK, N. Y.

FLYING-MACHINE.

1,035,583. Specification of Letters Patent. Patented Aug. 13, 1912.

Application filed January 6, 1910. Serial No. 536,608.

To all whom it may concern:

Be it known that I, CHARLES A. HAMILTON, a citizen of the United States, and a resident of the city of New York, Long Island City, borough of Queens, in the county of Queens and State of New York, have invented a new and Improved Flying-Machine, of which the following is a full, clear, and exact description.

This invention relates to an improvement in flying machines, of that type known as helicopter.

An object of this invention is to provide a device which will be simple in construction, light in weight, efficient and safe in its operation, and easily dirigible.

A further object of this invention is to provide a flying machine of the helicopter type with a plurality of propellers, and means for directing the line of action of said propellers so as to traverse the machine in any direction.

A still further object of this invention is to provide a flying machine with a plurality of helicopter propellers, and means for throwing into and out of operation any one of said propellers.

A still further object of this invention is to provide means for automatically controlling the equilibrium of the flying machine by a pendulum member connected to the driving mechanism.

These and further objects, together with the construction and combination of parts, will be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a side view in elevation, partly in section to show the detailed construction, and with some of the positions of the propellers shown in full and dotted lines; Fig. 2 is a top plan view, showing a plurality of positions of the propellers in full and dotted lines; Fig. 3 is an enlarged vertical longitudinal section showing in detail the clutches and mechanism for operating the same; Fig. 4 is an enlarged vertical sectional view of one of the universal connections of the propeller shaft to the guiding beam; and Fig. 5 is a reduced transverse section illustrating the tubular catamaran structure of the supporting frame.

Referring more particularly to the separate parts, 1 indicates the base or supporting frame, which is preferably formed of a pair of arcuate tubes 3 and 4, arranged in catamaran fashion so as to form a broad and yet light supporting structure, which will readily float on water, and which may be filled with a suitable buoyant gas, such as hydrogen, to increase the lightness of the same. The tubes 3 and 4 are connected at their ends by a platform 2, extending longitudinally of the frame to form a horizontal deck for the operator.

Rotatably supported on the frame 1, preferably adjacent the ends thereof, there are provided a plurality of stub shafts 5 and 6. Connected to these shafts 5 and 6 by means of universal joints 7 and 8, there are provided propeller shafts 9 and 10, which extend up through universal joints 11 in a guiding and supporting beam 12. A type of joint suitable for this purpose is more clearly illustrated in Fig. 4.

Beyond the universal connection of the shafts 9 and 10 with the beam 12, there are provided on each of the shafts helicopter propellers 13 and 14, which preferably consist of frames 16 extending at each side of the shafts 9 and 10 and provided with blades 17 and 18 extending from opposite sides of the frames 16. These blades 17 and 18 may be made of any suitable light material, such as Japanese silk, oiled linen, or the like, and may be curved in any form suitable to give the desired lifting and propelling force. The outer ends of these blades 17 and 18 are also preferably strengthened and reinforced by means of flexible guys 19 and 20, which extend to the shafts 9 and 10 on opposite sides of the connection of the frames 16 to the shafts. The beam 12 is pivotally connected at 21 to a supporting post 22, which has a universal connection at 23 to the frame 1. Adjacent the post 22 on the platform 2, there is provided an operator's seat 24, which is preferably pivotally supported on brackets 25 connected to the frame 1. On the post 22 in juxtaposition to the operator's seat 24, there is provided a handle 26, whereby the post 22 may be swung backward and forward, or rotated about its axis. It will be seen that by this means the operator can swing the post 22 and together with it the shafts 9 and 10, in any direction from their vertical position. Several of the positions are indicated in the full and dotted

lines in Figs. 1 and 2. It will thus be seen by this means that the propellers 13 and 14 can be directed so that their propelling force will tend to lift the flying machine either directly up, to the right or to the left, or forward or backward, or in any direction intervening the above-mentioned directions.

The shafts 5 and 6 are provided with suitable driving members 27, which are shown in the form of sprocket wheels, and are connected by means of any suitable flexible connection, such as chains 28, to drive sprockets 29 and 30 loosely mounted on a shaft 31.

It is often desired to stop or diminish the rotation of one of the helicopter propellers while the other is still rotating, in order that the direction of the flying machine may be changed, to raise or lower the same. For this purpose, the sprocket wheels 29 and 30 are provided with clutch faces 31ª and 32, which are adapted to be engaged by corresponding clutch faces 33 and 34, which are splined onto the shaft 31. These clutches 33 and 34 are normally held in engagement with the clutch faces 31ª and 32 by means of springs 35 and 35ª, which engage the opposite sides of a stationary bracket 60 secured to the frame 1 in any well known manner and the back side of the clutches 33 and 34.

In order that the clutches 33 and 34 may be individually drawn out of engagement with the corresponding clutch faces on the sprocket wheels 29 and 30, they are provided with interlocking fingers 36 and 37, which slidingly mesh with each other in a dovetailed fashion, and which are provided with upstanding flanges 38 and 39.

Interposed between the flanges 38 and 39, there is provided a shifting ring 40, which is adapted to engage these flanges to shift the clutches 33 and 34 in opposite directions against the tension of the springs 35 and 35ª. For the purpose of manipulating the shifting ring 40, there is provided a bell crank lever 41, which is pivotally secured to the bracket 60 in any well known manner. The bell crank lever is pivotally connected, by means of a connecting rod 42, to the swinging operator's seat 24, so as to be operated thereby. It will thus be seen that the operator, by shifting his seat 24, can throw either one of the clutches 33 or 34, which are normally in engagement with the sprocket wheels 29 and 30, out of engagement therewith, thereby disconnecting that particular helicopter propeller connected thereto from its operative connection with the shaft 31. The shaft 31 extends in alinement with, but is loosely connected to, a shaft 43. This shaft 43 is provided with a clutch 44, splined thereon, which is adapted to be moved into and out of engagement with a corresponding clutch 45 secured to the shaft 31. For this purpose, there is provided a bell crank lever 46 which engages the clutch 44 in any suitable manner, and is connected by means of a link 47 to an operating lever 48 juxtaposed to the operator's seat 24. By this means, the drive connection between the shaft 43 and the shaft 31 can be readily controlled by the operator. The opposite end of the shaft 43 has secured thereon a bevel gear 49, which meshes with a corresponding bevel gear 50 on a motor shaft 51, which is driven by a motor 52 that may be of any suitable character, such as a gasolene engine. The supply of fuel for the motor 52 can be stored in a suitable tank 53 on the frame 1, or it may be stored in the hollow tubes 3 and 4 on the frame 1.

The operation of the device will be readily understood when taken in connection with the above description. The machine may be started from the water, or from the ground, if desired. In starting the machine, the motor 52 is run until it is shown to be in good working order, and then the clutch member 44 thrown into engagement with the clutch member 45, by means of the lever 48, and inasmuch as the clutches 33 and 34 are normally in engagement with the driving sprockets 29 and 30, the propellers 13 and 14 will be simultaneously rotated. These propellers, which are shown to rotate in the same direction, may be caused to rotate in opposite directions if desired, and will exert a lifting force on the machine and tend to raise it up in the air. By manipulating the handle lever 26, the operator can direct the pull of the propellers of the machine, so as to cause it to travel forward, rearward, to one side or the other, or directly vertical. If for any reason it is desired to rotate one of the propellers and leave the other idle, the operator can, by bracing back on the platform 2, actuate the seat 24, to shift one of the clutches 33 or 34 out of engagement with its corresponding clutch face on the gears 29 and 30. By this means, the machine can be pulled entirely from the front or entirely from the rear, and thereby alter its vertical direction or counteract any irregularities in the equilibrium of the machine. This latter feature is quite important, in that it constitutes an automatic equilibrium control for the machine. For example, if the operator allows his weight to remain substantially dead in the swinging seat 24 without bracing himself to any extent, the tendency of the seat with his dead weight thereon, acting like a pendulum to hold a position in line with the center of gravity of the earth, will counteract the tilting motion of the machine by throwing out of operation the propeller on the highest end of the machine.

While the frame of the machine is best adapted to land on and rise from water, it

may be provided with suitable roller supports, by means of which it can travel on the ground.

While I have shown one embodiment of my invention, I do not wish to be limited to the specific details disclosed therein, but desire to be protected in various changes, modifications and alterations which I may make within the scope of the appended claims.

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

1. The combination with a frame, of a pair of propeller shafts mounted on said frame, propellers on said shafts, a drive shaft mounted on said frame, means for driving said drive shaft, a pair of sprockets loosely mounted on said drive shaft, driving connections between said sprockets and said propeller shafts, said sprockets having clutch faces, a pair of clutches slidingly mounted on said drive shaft, a spring for normally urging said clutches in driving engagement with said clutch faces on said sprockets, and a lever for operating alternatively either of said clutches against the tension of said spring.

2. The combination with a frame, of a pair of propeller shafts mounted on said frame, propellers on said shafts, a drive shaft mounted on said frame, means for driving said drive shaft, a pair of sprockets loosely mounted on said drive shaft, driving connections between said sprockets and said propeller shafts, said sprockets having clutch faces, a pair of clutches slidingly mounted on said drive shaft, a spring for normally urging said clutches in driving engagement with said clutch faces on said sprockets, a lever for operating alternatively either of said clutches against the tension of said spring, and an operator's seat for operating said lever.

3. The combination with a frame, of a plurality of propeller shafts on said frame, propellers on said shafts, a drive shaft on said frame, members on said drive shaft, driving connections between said members and said propeller shafts, said members having opposed clutch faces, a pair of clutches slidingly mounted on said drive shaft and adapted to engage said clutch faces, a spring interposed between said clutches and adapted to urge both of said clutches normally into engagement with said clutch faces, a collar for forcing either of said clutches out of engagement with either of said clutch faces, and a lever for operating said collar.

4. The combination with a frame, of a plurality of propeller shafts on said frame, propellers on said shafts, a drive shaft on said frame, members on said drive shaft, driving connections between said members and said propeller shafts, said members having opposed clutch faces, a pair of clutches slidingly mounted on said drive shaft and adapted to engage said clutch faces, a spring interposed between said clutches and adapted to urge both of said clutches normally into engagement with said clutch faces, a collar for forcing either of said clutches out of engagement with either of said clutch faces, a lever for operating said collar, and a pendulum member for operating said lever.

5. In a flying machine, the combination with frame, of a shaft located at the front and rear ends of said frame, a propeller shaft having a universal connection with each of said first-mentioned shafts, a propeller on each of said propeller shafts, a beam extending longitudinally of said frame and connected at its ends to said propeller shafts by a universal connection, a post located substantially at the middle of said frame and having a pivotal connection with said beam and a universal connection with said frame, a handle connected to said post, whereby said post may be manipulated to manipulate said propellers, and means for driving said first-mentioned shafts.

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

CHARLES ALBERT HAMILTON.

Witnesses:

LUCIUS N. MANLEY,

CHARLES A. WADLEY.