S. P. NEMETH.

MACHINE FOR NAVIGATING THE AIR.

APPLICATION FILED MAY 1, 1920.

1,414,577.

Patented May 2, 1922.

4 SHEETS—SHEET 1.

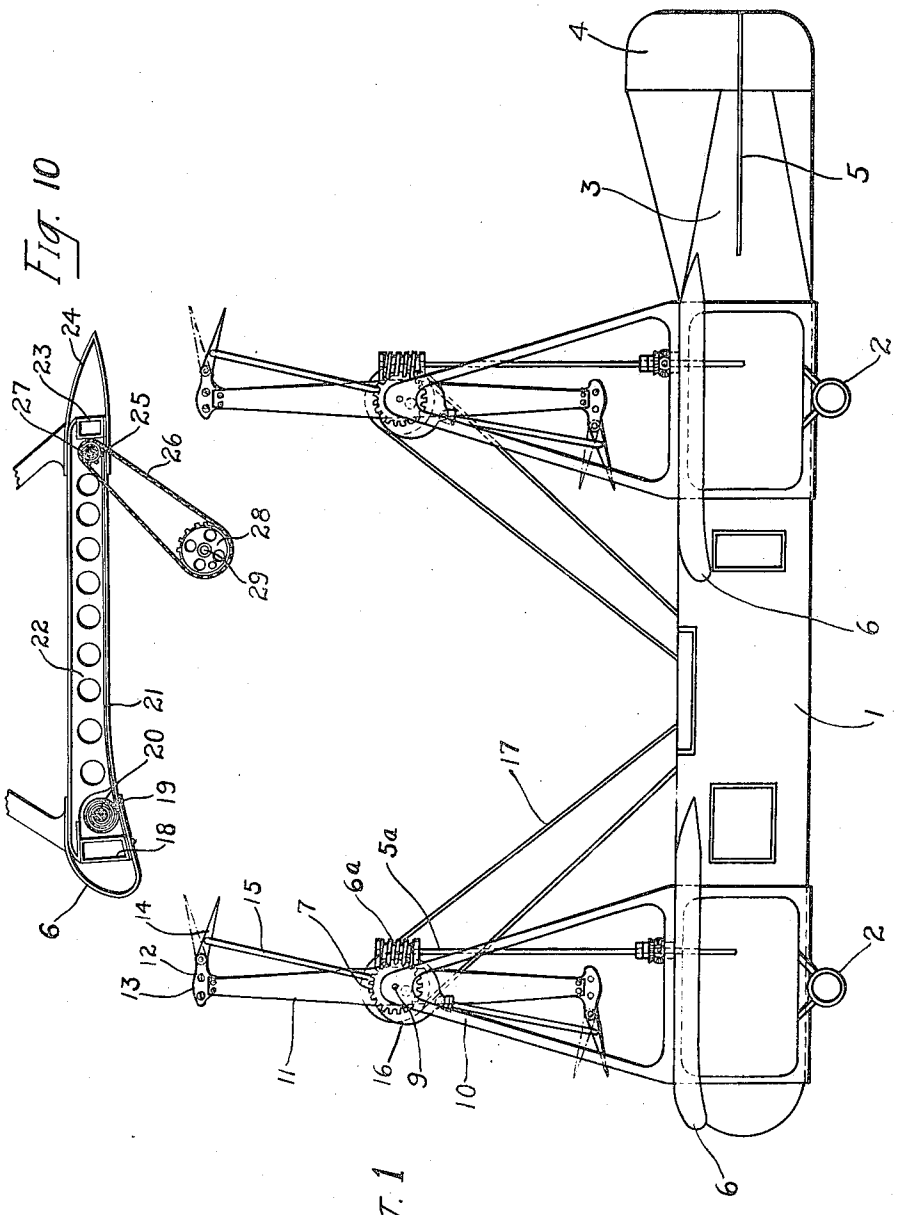


Fig. 1

Fig. 10

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4 SHEETS—SHEET 2.

Fig. 2.

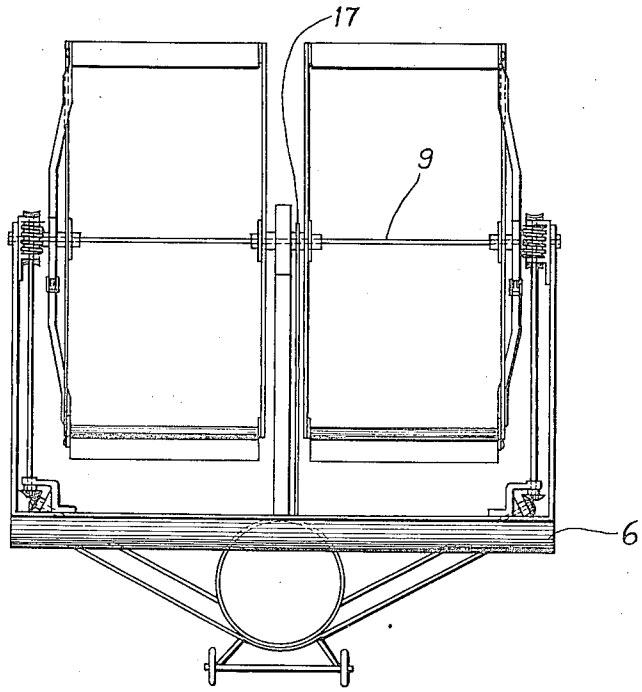
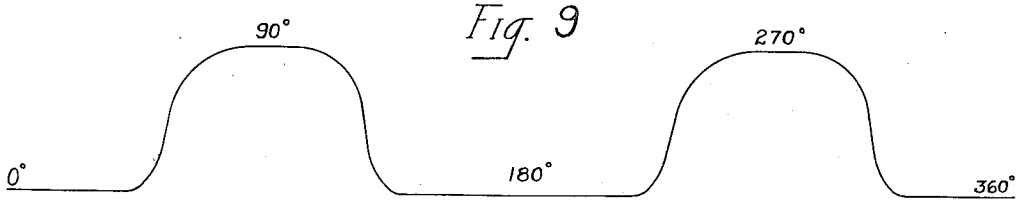


Fig. 9



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4 SHEETS—SHEET 3.

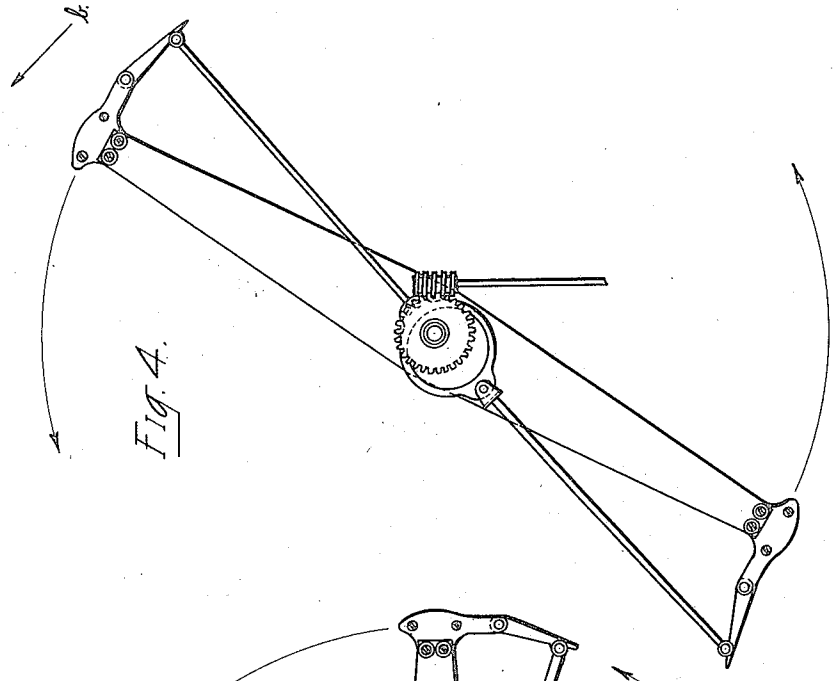


Fig. 4.

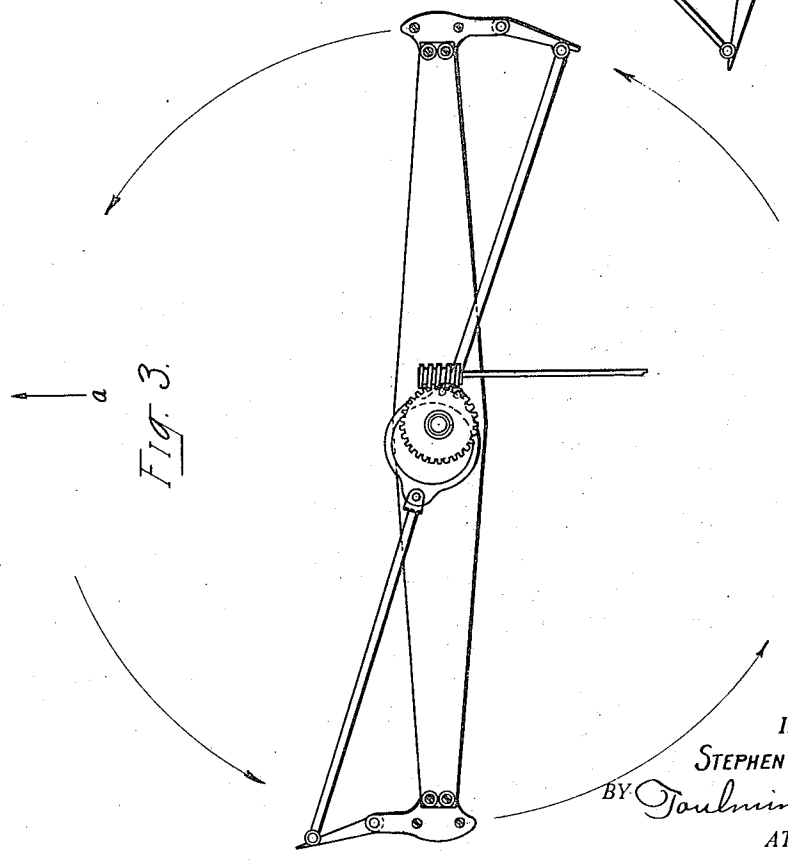


Fig. 3.

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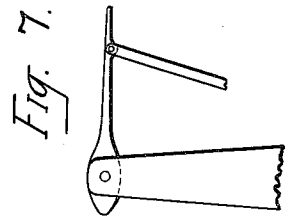


Fig. 7.

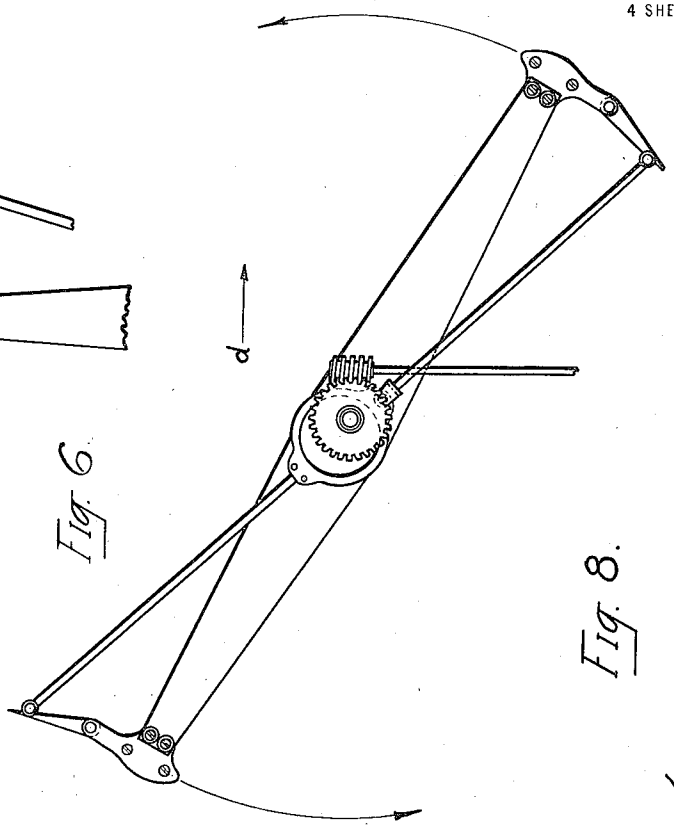


Fig. 6.



Fig. 8.

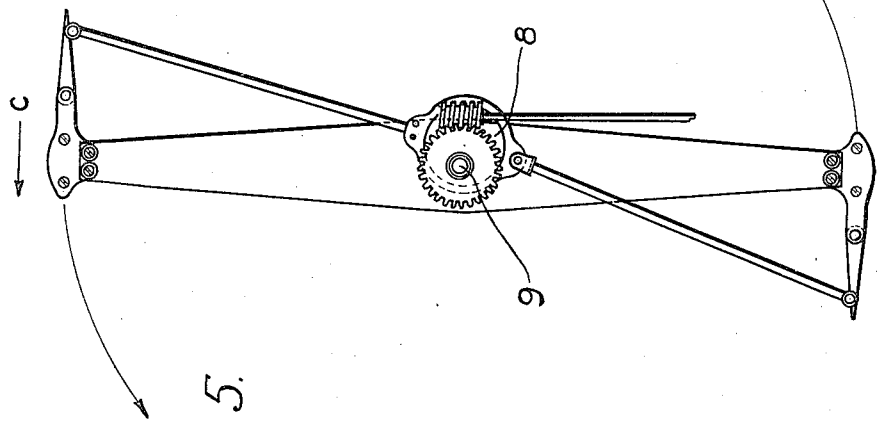


Fig. 5.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR NAVIGATING THE AIR.

1,414,577. Specification of Letters Patent. Patented May 2, 1922.

Application filed May 1, 1920. Serial No. 378,264.

To all whom it may concern:

Be it known that I, STEPHEN PAUL NEMETH, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Machines for Navigating the Air, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to machines for navigating the air.

The object of my invention is to navigate the air without the use of planes, with the elimination of the propellers, as usually known, and to provide a machine for navigating the air which will take off of the ground in nearly a vertical plane without the necessity for a run, common to present machines used in aerial navigation. I have shown planes in my embodiment, but they are not essential.

It is an additional object of my invention to provide a machine which shall not depend for its operation upon the variation of speed of its motive power. It is the object of the invention to provide mechanism which will enable me to direct my machine upwardly, forwardly or backwardly, or downwardly, or any of the components thereof, such as turning, banking, or side-slipping without the variation in speed of the motive power. It is a further object of my invention to be able to light in a very restricted area and to regulate the rate of descent at will.

When it is desired to bank the machine, this result can be achieved as follows: The angle of the airfoils on one side can be increased or so adjusted as to retard or give a backward movement to that side of the machine. If it simply retards that side of the machine, the machine will have a tendency to drop on that side. Any turning action can be counteracted by suitable adjustments of the rudder.

When it is desired to get off the ground, it is possible by my machine to rise almost directly from the ground and it is also possible in landing to light within a very small area thus obviating in both instances the necessity for an extended area for taking off or for landing.

Referring to the drawings:

Fig. 1, is a side elevation of a complete machine with a double grouping of airfoils. The fuselage is adapted for both land and aquatic maneuvers.

Fig. 2, is a front elevation of my machine for aerial navigation, showing the airfoils;

Fig. 3, shows my airfoils having their trailing edges adjusted to lift my machine upwardly in the direction of the arrow A;

Fig. 4, illustrates the position of the airfoils and trailing edges adjusted to the maximum angle and position for securing a combination movement upwardly and forwardly, resulting in a component line of motion in the direction of the arrow B;

Fig. 5, illustrates the position of the airfoils and their trailing edges at the maximum position when the machine is traveling in the direction of the arrow C or straight-forward on a horizontal plane;

Fig. 6, shows the position and the maximum angle which the airfoils and their trailing edges make with the line of rotation when the machine is going backward in the line of the arrow;

Fig. 7, is a detail showing the airfoil pivoted fore and aft;

Fig. 8, is a detail showing in section the streamline effect of the double cambered airfoil;

Fig. 9, is a curve showing the typical movement of the airfoil and the angle it makes to the line of rotation during one complete revolution; and

Fig. 10, is a detail showing the means of drawing a surface of fabric over the plane structure.

Referring to Figure 1, 1 is the fuselage, 2—2 are the support wheels for the fuselage, 3 is the rudder with a laterally moving member 4, and a fin 5, 6—6 are plane surfaces stream line in form, which may or may not be applied to my machine, as they are not essential to its operation, but constitute in combination with the remainder of the mechanism one embodiment of it. 5^a is a control member of any desired character, but in this instance a shaft with a worm 6^a on its upper end meshing with a worm wheel 7. This worm wheel 7 is connected to the cam 8 which is best seen in a construction like that in Figure 5. This cam member connected to the worm gear, is eccentrically located with respect to the supporting power shaft 9 (see Fig. 2 and see Fig. 5). The power shaft 9 turns freely in the supports 10 at either end and carries fixed to it arms 11.

In my embodiment I have shown a plurality of these arms. One unit of the mechanism will have a pair of these arms supporting between each of their outer ends an airfoil 12. This airfoil consists of a double cambered member of streamline exterior, such as shown in Figure 5. This airfoil 12 will have one member 13 fixed to the blades as shown in one embodiment. This fixed portion of the airfoil is known as the leading edge; 14 designates the portion of the airfoil which constitutes the trailing edge.

I may, however, as in Figure 7, make this airfoil rigid pivoting it at its forward end and actuating it by some means connected to its rear end. The precise details of construction are immaterial as suitable variations are comprehended within the scope of my invention.

The trailing edges are connected to a controlling means, 15, which at one end is fixed to the cam ring 16 and at the other end is pivoted, depending to which one of the airfoils it is attached. In the particular mechanical embodiment which I have illustrated in Figure 1, and some of the other figures, it is necessary to have one of these controlling means fixed to the cam ring and the other pivoted, but these are mere mechanical details. The shaft 9 is revolved by any suitable source of power communicated by the member 17, Figure 2.

The method of operation is as follows: The shaft 9 is rotated rapidly in the direction of the arrow shown in the figures. The airfoil may have its angle to the path of its rotation set as desired by actuating the shaft 5^a and thereby rotating the cam member 8 eccentrically placed on the shaft 9. As a result of the fixing of the angle of the airfoil to the path of rotation, the airfoil will gradually proceed from a position where it is coincident with the path of rotation to its maximum angle to that path a suitable number of times during the period of rotation of the blades.

In Fig. 9, will be seen a curve representing the angular position of the trailing edge of the air foil with respect to its path of rotation at successive times during a complete revolution of 360°. This particular curve refers to one airfoil only. It starts at zero with the airfoil traveling in the path of rotation gradually achieving its maximum angle at 90°., then decreasing to 180°, ascending to another climax of 270°, and then descending again to parallelism with the line of rotation at 360°.

I have provided in one embodiment illustrated here plane surfaces 6, if it is desired to use them. The purpose of providing such surfaces is to permit of gliding, if desired, but they are not essential to my invention.

In Fig. 10, will be seen a detail of the plane structure. 18 is a transverse member, 19 is the fabric of the wing surface which is rolled up on the roller 20. The fabric is connected by strips 21 to the roller 27 which is actuated by the sprocket 25, the chain 26, the sprocket 28 and the power shaft 29. 23 is another transverse member and 22 a spacing element which supports the fabric at equi-distant intervals across the plane surface. The roller 20 is actuated in one direction by a spring so that its normal tendency is to roll up the fabric on it. 24 is a stream line trailing edge of the plane. In normal conditions the plane surface will not be used, but if it is desired to have a plane surface for gliding, the operator may unroll the fabric, drawing it across the frame work, rolling the strips 21 on 27, thus securing a wing structure of the usual kind.

It will be understood that I embrace within my invention all of its equivalents and do not intend to limit myself to the specific embodiment which I have illustrated and described here.

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

1. In a machine for navigating the air, a pair of air foils centrally mounted on a common power shaft each air foil comprising a double cambered portion, and an adjustable trailing portion tapered to an edge, means for moving the air foils about the common power shaft, and means to adjust the position of the trailing edges relative to the power shaft.

2. In a machine for navigating the air, a pair of air foils, arms spaced apart for carrying the air foils, said arms being centrally mounted on a common power shaft, each air foil comprising a double cambered portion rigidly attached to the arms, and an adjustable trailing portion tapering to an edge, means for moving the air foils about the common power shaft, and means to adjust the position of the trailing edges relative to the power shaft.

3. In a machine for navigating the air, a pair of arms spaced apart and centrally mounted on a common power shaft, a power shaft, an eccentric on said shaft, airfoils located between the outer ends of the arms, the leading edge of each airfoil being in the direction of rotation, an adjustable trailing edge of each airfoil, means to connect said trailing edges to said eccentric and means to rotate said eccentric relative to said shaft to adjust the angle of the trailing edges to the path of their rotation.

4. In a machine for navigating the air, a pair of arms spaced apart and centrally mounted on a common power shaft, a power shaft, an eccentric on said shaft, airfoils located between the outer ends of the arms, the leading edge of each airfoil being in the

direction of rotation, an adjustable trailing edge of each airfoil, means to connect said trailing edges to said eccentric, means to rotate said eccentric relative to said shaft to adjust the angle of the trailing edges to the path of their rotation, and a plane surface co-operating therewith.

5. In a machine for navigating the air, a pair of arms spaced apart and turning centrally on a common power shaft, a power shaft, an eccentric turning loosely on said shaft, airfoils connected between the outer ends of said arms, the leading edge of each airfoil being in the direction of rotation, means for connecting one of said airfoils at its trailing edge to a strap, each of the ends of said means being attached pivotally, a second means attached pivotally to the trailing edge of the other airfoil at one end and fixed at its other end to the strap, a strap slidably embracing the outer periphery of the eccentric member, a gear connected to said eccentric, means to actuate said gear whereby the angle of the trailing edges may be adjusted to assume successive positions relative to the path of rotation in which they travel, and a plane surface co-operating therewith.

6. In a machine for navigating the air, a shaft, a pair of arms thereon, an airfoil pivoted between the arms, an eccentric and strap and connections between the strap and the airfoils at one side of the airfoil pivots, and means for turning the eccentric relative to the shaft to vary the effective force of the airfoils, a wing comprising fore and aft transverse members, spaced members between said transverse members, means on one edge of said plane surface for rolling the fabric thereon, means connected to the fabric adapted to roll on a second rolling means on the other edge of the plane surface, and means for actuating each of said rolling means whereby the plane structure may have the fabric drawn across it or withdrawn at the will of the operator.

7. In a machine for navigating the air, a pair of arms spaced apart and centrally mounted on a common power shaft, a power shaft, an eccentric on said shaft, airfoils located between the outer ends of the arms, the leading edge of each airfoil being in the direction of rotation, an adjustable trailing edge of each airfoil, means to connect said trailing edges to said eccentric, means to rotate said eccentric relative to said shaft to adjust the angle of the trailing edges to the path of their rotation, a plane structure and means on said plane structure whereby fabric may be drawn across said structure and withdrawn from said structure at will of the operator.

In testimony whereof, I affix my signature.

STEPHEN PAUL NEMETH.