E. L. MADDEN.

FLYING MACHINE.

APPLICATION FILED MAY 19, 1910.

992,726

Patented May 16, 1911.

3 SHEETS—SHEET 1.

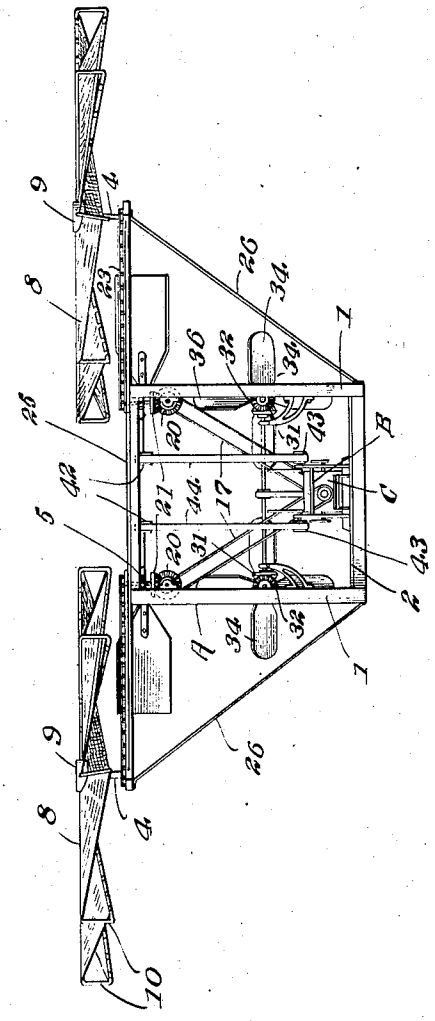

Fig. 1.

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3 SHEETS—SHEET 2.

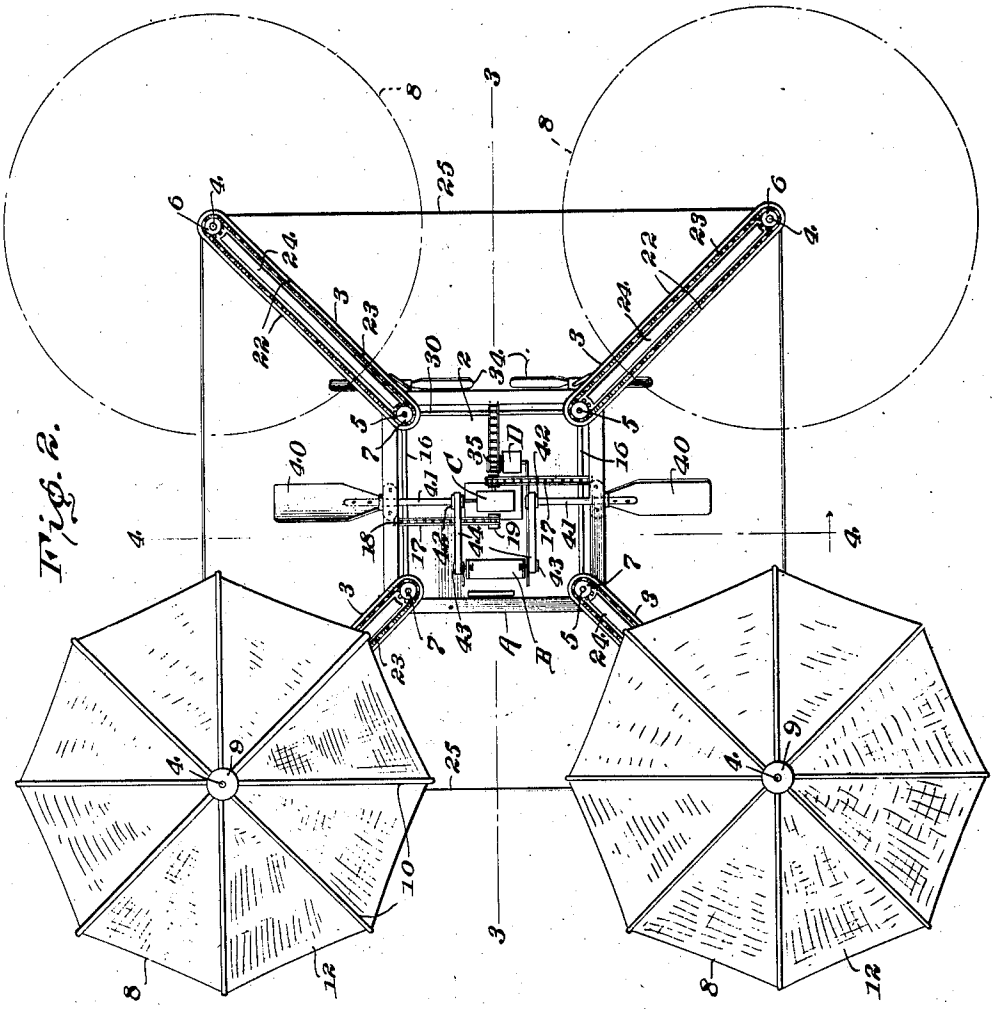

Fig. 2.

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3 SHEETS—SHEET 3.

Fig. 6.

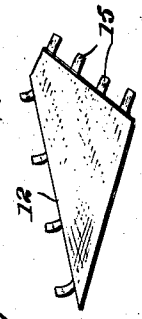

Fig. 4.

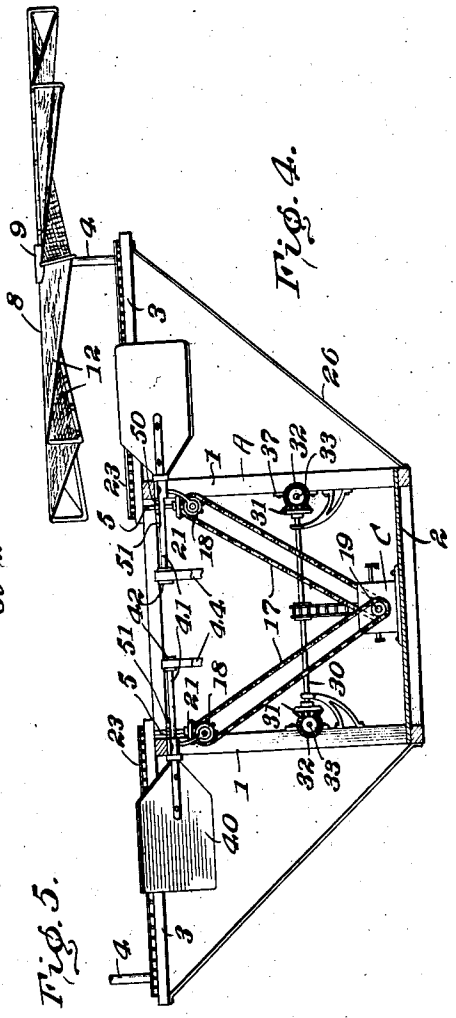

Fig. 3.

Fig. 5.

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UNITED STATES PATENT OFFICE.

EDWIN LYMAN MADDEN, OF INGERSOLL, OKLAHOMA.

FLYING-MACHINE.

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Application filed May 19, 1910. Serial No. 562,264.

To all whom it may concern:

Be it known that I, EDWIN L. MADDEN, a citizen of the United States, residing at Ingersoll, in the county of Alfalfa and State of Oklahoma, have invented certain new and useful Improvements in Flying-Machines; and I do 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.

This invention relates to heavier than air flying machines.

One object of my invention is to provide a heavier than air machine that will automatically ascend directly from the ground, thereby dispensing with all auxiliary starting mechanism.

A further object of my invention is to provide a plurality of oppositely revolving ascension wheels which will enable the machine to be raised or lowered in a vertical line without necessitating the forward or lateral rocking motion usually required in heavier than air machines.

A further object of my invention is to so arrange the framework and supporting mechanism of my improved machine that the tensile strength of the brace rods and supporting bars are utilized to the best possible advantage.

With the foregoing and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a front elevation of my improved flying machine. Fig. 2 is a plan view thereof. Fig. 3 is a longitudinal section taken on the line 3—3 of Fig. 2. Fig. 4 is a transverse section on line 4—4 of Fig. 2. Fig. 5 is a detail view of one of the ascension wheels with some of the blades removed. Fig. 6 is a detail plan view of one of said blades.

In the illustrated embodiment of my invention A designates the framework of the car, B the operator's or pilot's-seat, and C and D the motors of any desired type for revolving the ascension and propelling wheels hereinafter more fully described.

The framework of the car may be of any desired shape or size and is herein shown as rectangular and composed of light bars or rods suitably connected together to form side, top and floor sections, the side sections comprising vertically-disposed corner beams 1. A solid floor 2 is suitably connected to the floor sections and supports the motors C and D and the operator's seat B, as clearly indicated in Fig. 1.

Suitably secured adjacent their inner ends to the top sections of the car frame and extending diagonally from the corners of the car are supporting bars 3, having journaled within their opposite ends vertical stud shafts 4 and 5 carrying horizontally-disposed pulleys or sprocket wheels 6 and 7 respectively. The shafts 4 arranged at the outer ends of the supporting bars 3 carry the ascension wheels 8, which, as herein shown, are composed of a hub portion 9 having a plurality of radial blade-supporting frames 10 extending therefrom, to which are removably secured the blades or vanes 12.

As clearly illustrated in Fig. 5, the blade-supporting frames 10 are triangular and comprise a light rod suitably bent into shape and having upper and lower arms 13 and 14 respectively. The vanes 12 as herein shown are triangular in shape and are provided with a plurality of attaching strips 15, by means of which one edge of each blade is secured to the upper arm 13 of one of the radial frames 10 and the opposite edge of said blade is secured to the lower arm 14 of the adjacent radial frame 10. In this manner the blades 12 are secured slantwise around the ascension wheels, and are designed, upon the rotation of said wheels, to draw up the air beneath said wheels and create a vacuum therebeneath, according to well known principles. The surrounding air will rush inwardly to fill the space left vacant by the vacuum and will lift the machine in a direct or vertical line, without requiring any lateral or forward motion of the machine.

The rotation of the ascension wheels at any desired speed, is attained by means of the mechanism now to be described.

The operating shafts 16 are suitably connected to be driven by the same motor C, as by sprocket chains 17 passing around suitable sprocket wheels 18 and 19 on the shafts 16 and the motor driving shaft respectively. The ends of these shafts 16 are suitably journaled in bearings carried by the corner bars 1, and adjacent each end are provided with bevel gears 20 adapted to mesh with bevel gears 21 on the lower ends of the stub

shafts 5 at the inner ends of the diagonally-disposed supporting beams 3, the operating or toothed faces of the bevel gears 20 extending in opposite directions, as clearly shown in Fig. 3. The upper faces of the diagonal supporting bars 3 are longitudinally grooved or recessed, as at 22, to form guideways for sprocket chains 23, passing around the sprocket wheels 4 and 5 at the opposite ends of the supporting bars, the longitudinal rib 24 extending between said grooves and separating the opposite rows of sprocket chains, thereby eliminating all danger of their accidentally contacting during the operation of the machine. It will be apparent that upon the rotation of the operating shafts 16, the ascension wheels operated by the beveled gears on the opposite ends of said operating shafts will revolve in opposite directions for the purpose hereinafter more fully explained.

To prevent the reverse rotation of the ascension wheels, each of the shafts 5 is provided with a ratchet wheel, as 50, adapted to coöperate with a spring pressed pawl 51 suitably mounted upon the framework of the car.

To strengthen the framework of the machine, a plurality of light brace wires or rods are stretched between the extending portions as herein shown, and having wires 25 connecting the several diagonal supporting bars to each other and wires 26 connecting each of the diagonal bars to the framework of the car. The ascension wheels 8 are also reinforced by suitable braces 27 on the wheels extending diagonally between the upper and lower arms 13 and 14 of adjacent radial frames 10, as clearly shown in Fig. 5. Adjacent the opposite ends of the shaft 30, suitably journaled near the lower ends of the corner bars 1 at the rear of the frame, are secured oppositely facing bevel gears 31 adapted to mesh with bevel gears 32 on the inner ends of the rearwardly-extending shafts 33 carrying the propeller wheels 34 to thereby revolve the propeller wheels in opposite directions upon the rotation of the shaft 30. As herein shown, a sprocket chain passing over a suitable sprocket wheel on the shaft 30 and the driving shaft 35 of the motor D, is employed to rotate the shaft 30, but it is to be understood that any desired means may be employed for rotating the propeller wheels from the motor D, or the same motor may be employed to revolve the propeller and ascension wheels. The propeller wheels 34 are preferably composed of radial blades 36 arranged at a suitable angle to propel the machine in the desired direction and the shafts 33 carrying the same are preferably mounted in suitable journal boxes, or bearings 37 carried by the framework.

The guiding means for the machine preferably comprises a pair of oppositely extending vanes or planes 40 secured at their inner ends to transverse shafts 41 which are rotatably mounted upon the top bars of the framework at opposite sides thereof. At the inner ends of said shafts 41 are provided pulleys 42, while suitably mounted upon the side beams of the operator's or pilot's seat B are similar pulleys 43. Belts or chains 44 are designed to connect the pulleys 42 and 43, a rotative motion of the pulleys 43 being communicated directly to the upper pulleys 42 to thereby change the angle of the guiding vanes 40. Suitable levers 45 are connected to the lower pulleys 43 whereby the said pulleys may be rotated at the will of the operator. While the guide vanes 40 and their operating mechanism are exactly similar, it is to be understood that they are independent of each other and may be separately operated to change the direction of the machine, as hereinafter more fully explained.

In the operation of my flying machine, the operator, upon taking his seat upon the floor of the car, starts the motor C to revolve the vanes 12 in opposite directions through the hereinbefore described mechanism, creating a vacuum beneath the ascension wheels, and being carried up by the incoming air which rushes from all sides to fill the vacuum thus created. The machine will, by this means, be carried directly upward, enabling it to start from a narrow inclosure, as, for example, a city street, without danger of contacting with the surrounding objects. When the machine has attained the desired height, the motor D may be started by the operator to revolve the propelling wheels 34 which are rotated in opposite directions through the shaft 30 and the bevel gears 31 and 32, as hereinbefore described. The revolution of these wheels will act to drive the machine forwardly according to the well known principles of physics and the air in being driven forward will strike the lower faces of the blades of the ascension wheels and assist to maintain the machine in its elevated position. The movements of the machine in any direction may be controlled by means of the guide vanes 40. When said blades are arranged so that they extend in a vertical plane, *i. e.*, at right angles to the top frame bars, the machine may be raised or lowered, the blades 40 offering no resistance to the movement of the machine. When, however, the guiding vanes are rotated so that they are arranged at different angles to the top frame bars of the machine, the air will contact with the inclined faces and force the machine in a forward, rearward or intermediate direction according to the angle at which the vanes are disposed. When said vanes are all extended in a horizontal plane, *i. e.*, parallel with the

top frame bars of the machine, all upward or downward movement of the machine will be effectively prevented, while the said vanes will offer no resistance to the forward or rearward movement of the machine. It will be apparent from the above that the operator, by moving the levers 45 may, through the intermediate mechanism, rotate the guiding vanes 40 to vary the angles at which the air will strike said vanes thereby offering a greater or less resistance to the movement of the machine in any direction.

Should, at any time, the operating mechanism of the ascension or propeller wheels become broken or disarranged, the ascension wheels will serve as a parachute which will allow the machine to gradually drop and land lightly upon the ground, and in the usual operation of the machine said ascension wheels may be employed to break the force of the descending movement of the machine.

From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principles or sacrificing any of the advantages of this invention as defined in the appended claims.

Having described my invention what I claim as new and desire to secure by U. S. Letters Patent is:

1. The combination of a rectangular main frame, supporting arms radiating from the upper corners of the main frame, ascension wheels on the outer ends of said arms, means for rotating said wheels, a steering shaft mounted transversely in the top of the frame and projecting beyond the sides thereof, vanes secured on the projecting ends of said shaft, means for rotating said shaft, propeller shafts mounted on the sides of the frame at the rear thereof and having propellers on their rear ends and bevel gears on their front ends, a transverse shaft on the rear of the frame having bevel pinions at its ends meshing with the gears on the propeller shafts, and means for rotating said transverse shaft.

2. In a flying machine, the combination of a main frame, supporting arms radiating from the upper ends of the frame, ascension wheels having vertical shafts journaled in the outer ends of the respective arms, sprockets on said shafts, vertical shafts on the frame at the inner ends of the arms, sprockets on said shafts, sprocket chains disposed longitudinally of the arms and connecting said sprockets, shafts arranged longitudinally of the frame on opposite sides thereof, gearing at the opposite ends of said shafts connecting each shaft with the inner two vertical shafts, a motor on the frame, and gearing connecting the motor with the longitudinal shafts.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

EDWIN LYMAN MADDEN.

Witnesses:
A. C. MADDEN,
JNO. BLUE.