

(No Model.)

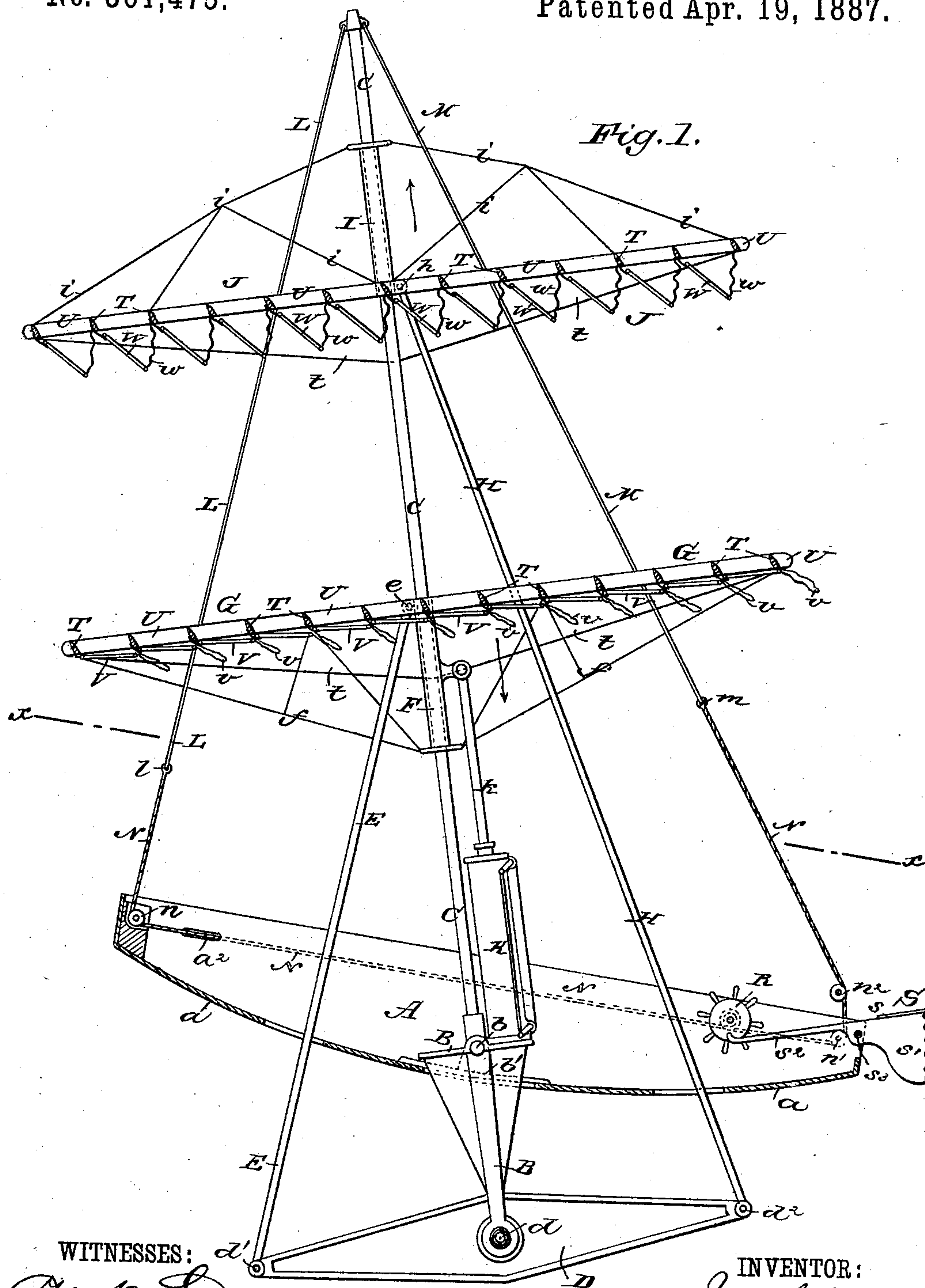
3 Sheets—Sheet 1.

J. M. WHEELER.

AIR SHIP.

No. 361,475.

Patented Apr. 19, 1887.



WITNESSES:

Wm. Beyer
Co. Sedgwick

INVENTOR:

J. M. Wheeler
BY *Munn & Co.*

ATTORNEYS.

(No Model.)

3 Sheets—Sheet 2.

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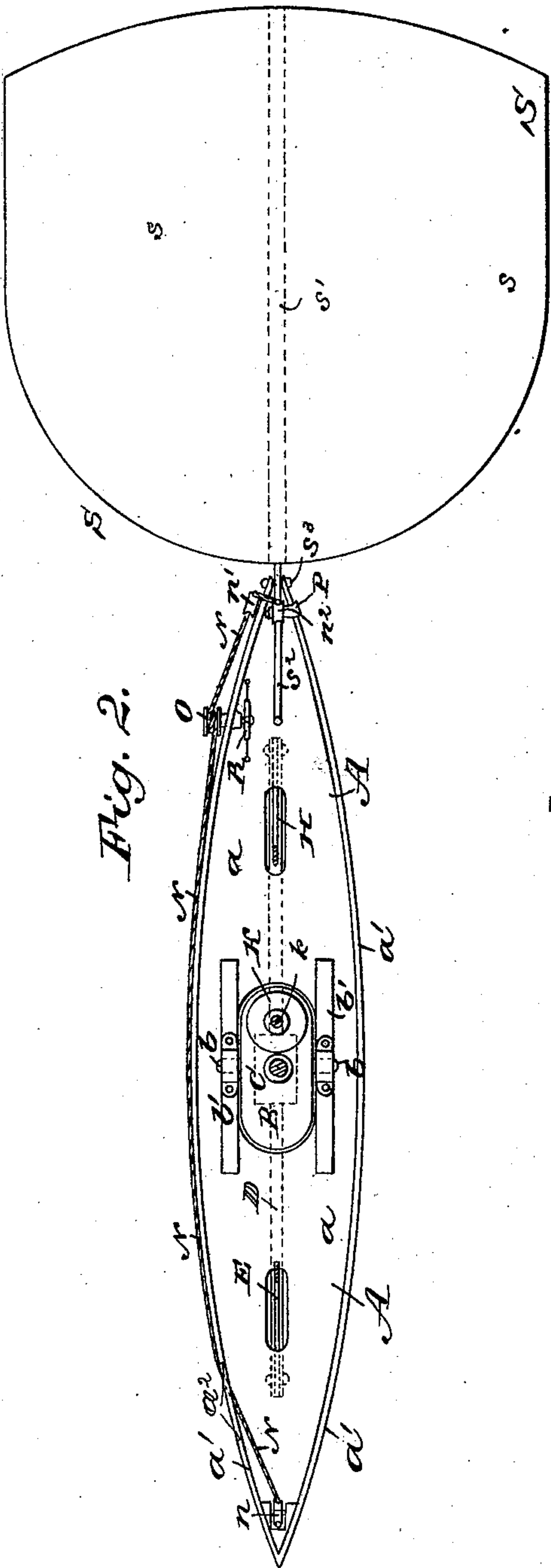


Fig. 2.

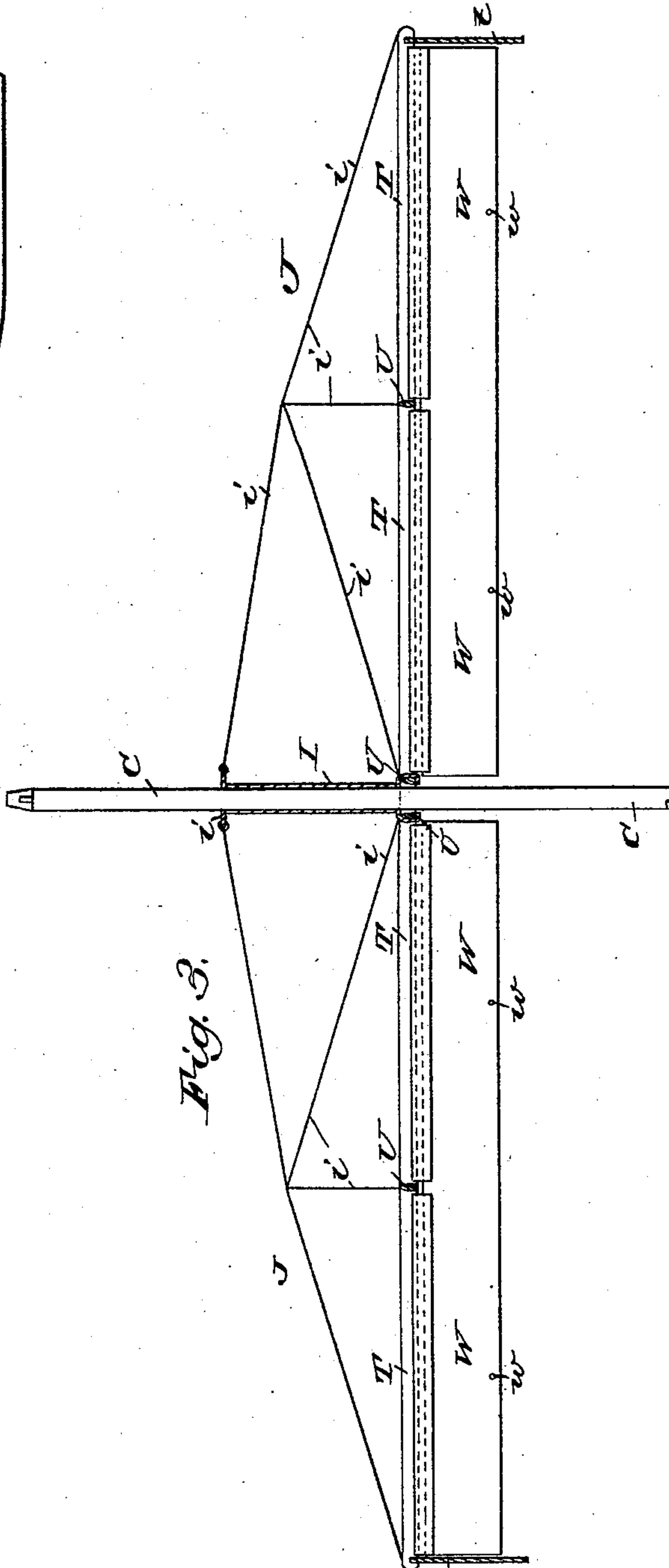


Fig. 3.

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(No Model.)

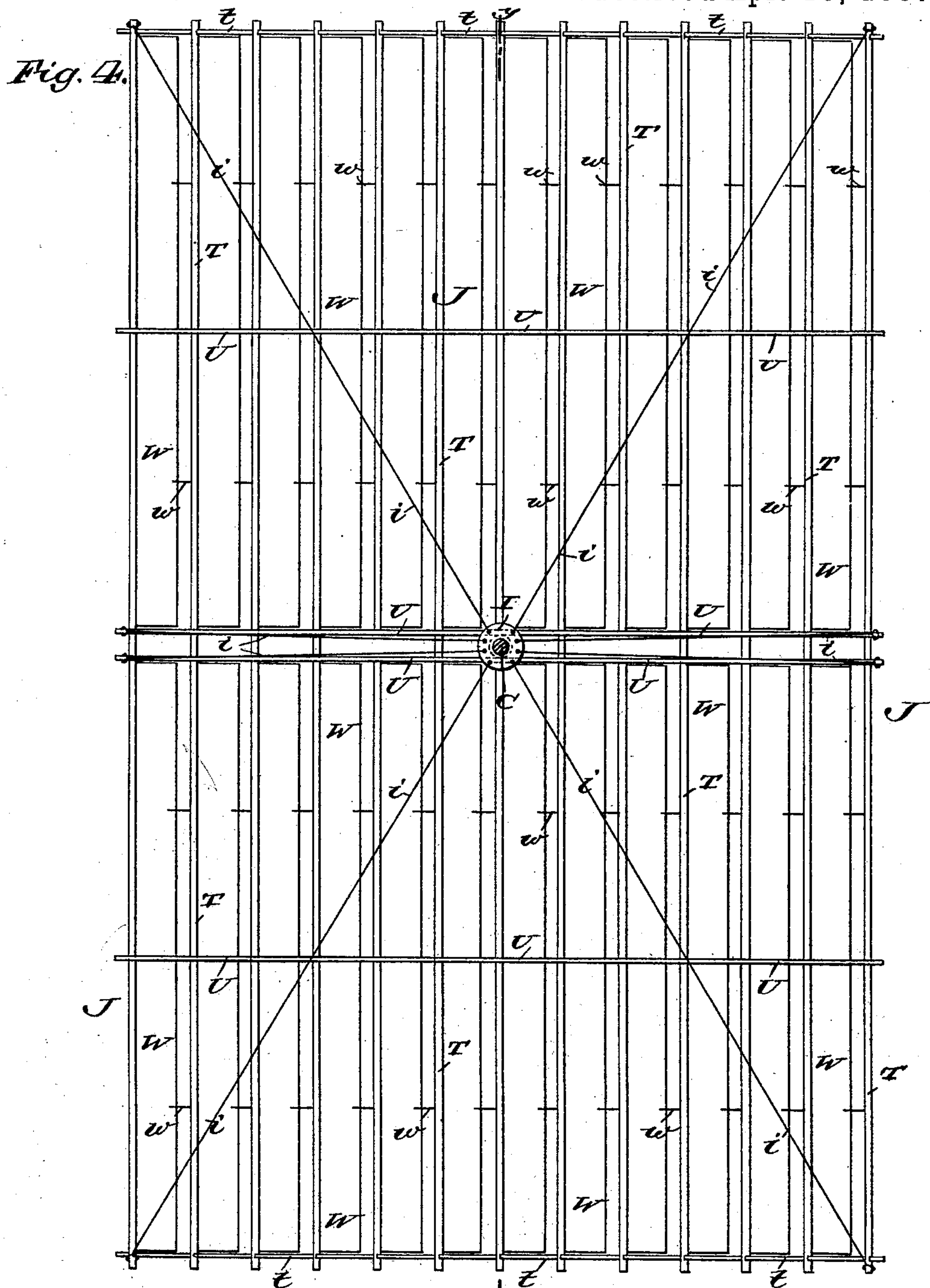
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UNITED STATES PATENT OFFICE.

JAMES M. WHEELER, OF FISH'S EDDY, NEW YORK.

AIR-SHIP.

SPECIFICATION forming part of Letters Patent No. 361,475, dated April 19, 1887.

Application filed October 26, 1886. Serial No. 217,232. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. WHEELER, of Fish's Eddy, in the county of Delaware and State of New York, have invented a new and
5 Improved Air-Ship, of which the following is a full, clear, and exact description.

My invention relates to aerial navigation, and has for its object to provide an air-ship of simple and comparatively inexpensive construction, which may be readily controlled as
10 regards the altitude reached and the course steered, and which may be easily handled by one person.

The invention consists in certain novel features of construction and combinations of parts of the air-ship, all as hereinafter fully described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate
20 corresponding parts in all the figures.

Figure 1 is a vertical sectional elevation of my improved air-ship, with the rudder partly broken away. Fig. 2 is a plan view of the
25 boat or basket of the ship, and with parts in section on the line $x x$, Fig. 1. Fig. 3 is a vertical sectional elevation of one of the aero-planes, taken on the line $y y$ of Fig. 4; and Fig. 4 is a plan view of one of the aero-planes with
30 the mast in horizontal section.

The boat or basket A of the air-ship is made with a bottom, a , pointed at the opposite ends, and with sides $a' a'$, which converge toward opposite ends, thereby forming a hull or structure sharp at both ends, as clearly shown in
35 Fig. 2 of the drawings.

At the center of its bottom the boat A is provided with fixed bearings $b' b'$, in which are journaled the trunnions $b b$ of a light but
40 strong frame or hanger, B, in which the mast C is fixed. This hanger B projects through the bottom of the boat quite a little distance, and to its lower end a walking-beam, D, is journaled centrally at d . To one end, d' , of
45 the beam D there is pivoted the lower end of a light strong rod, E, the upper end of which is attached pivotally at e to lugs on a sleeve, F, which is fitted to slide up and down the
50 mast C, and to which sleeve the lower aero-plane, G, of the air-ship is connected. A rod, H, is connected pivotally to the other end, d^2 ,

of the walking-beam D, and the upper end of the rod H is attached pivotally at h to lugs on a sleeve, I, which is also fitted to slide on the
mast C, and carries the upper aero-plane, J, 55 of the air-ship. The rods E H pass through slots in the bottom of the boat.

The sleeve F of the lower aero-plane, G, has attached to it pivotally the upper end of a piston-rod, k , attached to a piston in a motor-cylinder, K, which is mounted on the rocking
60 hanger B, and thus always retains the same relative position with the mast C which carries the aero-planes. An expansive fluid—such as steam—will be admitted to the cylinder K for operating the piston-rod k , and
65 whereby, as the sleeve F is moved upward on the mast, the sleeve I will be moved downward thereon, and vice versa, thereby causing the
planes G J to alternately approach and recede 70 from each other to cause the light folding wings of one of the aero-planes to close to offer resistance to the air, while the wings of the
other plane open and offer little or no resistance to the air, and whereby one of the aero- 75 planes will always have a tendency to lift the air-ship, as hereinafter more fully explained. The cylinder K will be supplied with expansive fluid under pressure from any suitable
80 light generator carried by the boat.

Stay-rods L M are pivotally connected at their upper ends with the top of the mast C or a metal collar thereon, and at their lower ends these rods are connected to the opposite
85 ends of a rope, N, which passes from the point of connection at l with the rod L down through or under a guide-pulley, n , journaled at the bows of the boat, and thence through an opening at a^2 in the side of the boat to and around
90 a friction-drum, O, and thence to and beneath a guide-pulley, n' , journaled on an arm, P, secured to the stern of the boat; and from the pulley n^2 the rope N passes to its point of connection at m with the stay-rod M. To the
95 shaft of the drum O there is fixed a steering-wheel, R, by turning which in one direction the mast C of the boat will be inclined forward at the top, as in Fig. 1, by the draft of the rope N on the rod L, and by turning the
100 wheel R the other way the mast may be inclined rearward at the top by the draft of the rope N on the rod M. The forward incline of

the mast C operates to give a forward impetus to the air-ship, and the rearward incline of the masts will retard the forward movement of the ship or stop it, as hereinafter more fully explained.

The rudder S of the ship comprises a broad fin or plate, *s*, which is fixed to the upper edge of a somewhat deep light board, *s'*, which stands vertically or about at right angles to the plate *s*, and is extended inward through a vertical slot in the stern of the boat A, and extends forward to form an arm or handle, *s''*, which will be operated by the aeronaut to swing or twist the rudder on a pin, *s'''*, by which the rudder is pivoted to the boat, to move the rudder, as a bird adjusts its tail, for steering the air-ship in any desired course to the right or left hand. The rudder-board *s'* serves as a sort of center-board to the boat to allow taking advantage of side-wind currents in steering the ship. In practice I will provide suitable mechanical means for operating the rudder by connection with its arm *s''*, as the resistance of the rudder to the air will be too great to allow the rudder to be manipulated by an aeronaut grasping the rudder.

The aero-planes G J of the air-ship are made alike as regards their frames and self-adjusting feathers, and stand with their longer dimensions crosswise of the boat or basket A of the ship. Each of the frames will be about twelve by twenty feet in area, (more or less,) and comprises a series of long light rods or strips, T, standing edgewise, and a series of shorter rods or strips, U, also standing edgewise and crossing the rods T and fixed to them, and at their ends the rods T are stayed to each other by braces *t t*, which, preferably, are thin flat plates of some light strong material standing edgewise, so as partially to confine the atmosphere and add to its resistance, and also form keels to prevent leeward inclination of the ship in turning to either side. The braces *t t* may, however, be frames of trussed rods, if desired. The two center rods, U U, of the frame of each aero-plane are spaced apart a little to give passage between them of the mast C and also the stay-rods L M, and these stay-rods prevent swinging around of the aero-planes on the mast.

The frame T U of the lower aero-plane, G, is connected to the upper end of the sleeve F, to the lower end of which the outer margin of the aero-plane is braced by a series of stay-rods, *f*, and the frame T U of the upper aero-plane, J, is connected to the lower end of the sleeve I, and is braced to the top of said sleeve by a series of stay-rods, *i*. This arrangement of the stay-rods *f i* is made to brace the aero-planes against strains induced by the closing of the wings of the planes and their passage in closed condition through the air. The wings V W of the lower and upper aero-planes, G J, respectively, are hinged in any suitable manner to the plane frame-rods T at the lower edges of said rods, and the wings of the aero-planes are adapted to close at their free edges

onto the lower edges of the next adjacent frame-rods, T, and whereby as the wings of the aero-planes close they will present a resistance to the air for the whole area of the plane frames. Cords *v w* are attached to the frame-rods T and to the free edges of the aero-plane wings in a manner to prevent the wings from opening or falling by gravity or air-pressure quite to the vertical position, and thereby insuring a prompt closure of the wings against the rods T as the aero-planes are moved downward to have effect on the air to buoy up or propel the air-ship. As the aero-planes G J are moved simultaneously in opposite directions on the mast C by the operation of the walking-beam D and rods E H, as above described, the wings of one of the planes will be closed for propelling effect on both the up and down strokes of the piston in the motor-cylinder K, and a buoyancy of the air-ship will be maintained as long as the motor is operated.

I purpose making the wings V W of any light substance, such as aluminum; or they may consist of light rod-frames covered with silk or paper or other suitable material. The wings may be made the full length of the aero-plane frames, except where the passage of the mast and stay-rods through the planes will prevent it; or the wings may be made in larger or smaller lengths or sections, as desired.

The general operation of the machine, briefly stated, is as follows: To lift the air-ship from the ground, the mast C will be set perpendicularly by operating the steering-wheel R and rope N to draw on the stay-rods L M, as required, and the motor will be started to simultaneously operate the aero-planes, and when the ship rises to the proper altitude, and it is desired to move forward through the air, the mast C will be adjusted more or less on a forward incline relatively to the boat or basket A, and as represented in Fig. 1 of the drawings, and whereby the closed wings of the sails will drive the ship ahead, and by adjusting the forward inclination of the mast, which may be done at any time without interfering with the operation or reciprocation of the aero-planes, the planes may be trimmed to air-currents moving in any direction with greater or less force, and whereby the speed of the air-ship may be controlled within safe limits. The steering-wheel R is in reach of the aeronaut handling the rudder-arm *s''*; hence the rudder S may be raised or lowered or otherwise manipulated by him to steer the ship in any required course to either side at the same time that the wheel R is being turned to govern the altitude of the ship. To slacken or stop the speed or forward travel of the air-ship, it is only necessary to operate the wheel R to give a backward slant or inclination to the mast, and the closed wings will then retard and finally stop the ship, which may be lowered to the ground safely by slackening the speed of reciprocation of the aero-planes.

I do not limit myself to the use of the drum O and steering-wheel R for adjusting the in-

clination of the mast, as the rope N may be in two parts, to be hauled in or let go as required, and made fast to chocks on the boat A of the air-ship; and I also do not confine myself to the use of the walking-beam D and connecting-rods E H for operating the aero-planes, as other well-known mechanical means may be employed for the purpose and arranged to be driven by the motor piston-rod *k*. An endless chain or belt, for instance, may be used and would run around upper and lower pulleys fixed to the mast, and to which chain the sleeves F I of the aero-planes would be connected, as will readily be understood.

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

1. An air-ship constructed with a boat or basket, a mast thereon, and aero-planes fitted for bodily movement on the mast and having wings adapted to open and close as the planes are reciprocated, substantially as shown and described.

2. The combination, in an air-ship, of a boat or basket, a mast pivoted thereto, and aero-planes fitted for reciprocation bodily on the mast, substantially as described, for the purposes set forth.

3. The combination, in an air-ship, of a boat or basket, a mast pivoted thereto, aero-planes fitted for reciprocation bodily on the mast, and stays leading from the head of the mast to the boat, substantially as shown and described, whereby the inclination of the mast may be varied to control the forward movements of the ship or stop it, as set forth.

4. The combination, in an air-ship, of a boat or basket, a mast pivoted thereto, aero-planes fitted for reciprocation bodily on the mast, and a cylinder and piston held to the mast or its bearing to swing therewith, and rod-connections from the piston to operate the aero-planes, substantially as shown and described.

5. The combination, in an air-ship, of a boat, A, a pivoted bearing, B, a mast, C, fitted in said bearing; a walking-beam, D, journaled on bearing B, aero-planes G J, fitted for reciprocation bodily on the mast and having wings adapted to open and close, and rods E H, con-

necting the aero-planes G J to the beam D, substantially as shown and described.

6. The combination, in an air-ship, of a boat, A, bearing B, mast C, walking-beam D, aero-planes G J, fitted for reciprocation bodily on the mast and having wings adapted to open and close, rods E H, connecting the aero-planes with the beam D, and a cylinder, K, held to the mast or its bearing B and having a piston-rod, *k*, connected to the mast-bearing of the lower plane, G, substantially as shown and described.

7. The combination, in an air-ship, of a boat, A, a mast, C, pivoted thereto, aero-planes fitted for reciprocation bodily on the mast, stays L M, connected to the head of the mast, and ropes N, connected to the stays and leading aft within reach of the steersman, substantially as shown and described.

8. The combination, in an air-ship, of a boat, A, a mast, C, pivoted thereto, aero-planes fitted for reciprocation bodily on the mast, stays L M, connected to the head of the mast, a rope, N, connected at opposite ends to the stays, a drum, O, around which the rope is wound, and a steering-wheel, R, connected to the drum, substantially as shown and described.

9. An air-ship constructed substantially as herein shown and described, and comprising a boat or basket, A, a bearing, B, pivoted thereto, a mast, C, aero-planes G J, fitted to slide on the mast and having wings V W, adapted to open and close, and limited in opening movements by cords *vw*, a walking-beam, D, pivoted to the mast or its bearing B, rods E H, connecting the beam to the aero-planes G J, respectively, stays L M, connected to the head of the mast, a rope, N, connected at opposite ends to the stays L M, a drum, O, having a wheel, R, and to which drum the rope N passes from the stays L M, and a rudder, S, comprising plates *s s'* and a handle, *s²*, and pivoted at *s³* at the stern of the boat, near the steering-wheel R, substantially as described, for the purposes set forth.

JAMES M. WHEELER.

Witnesses:

HENRY L. GOODWIN,
JOHN W. HOUSTON.