

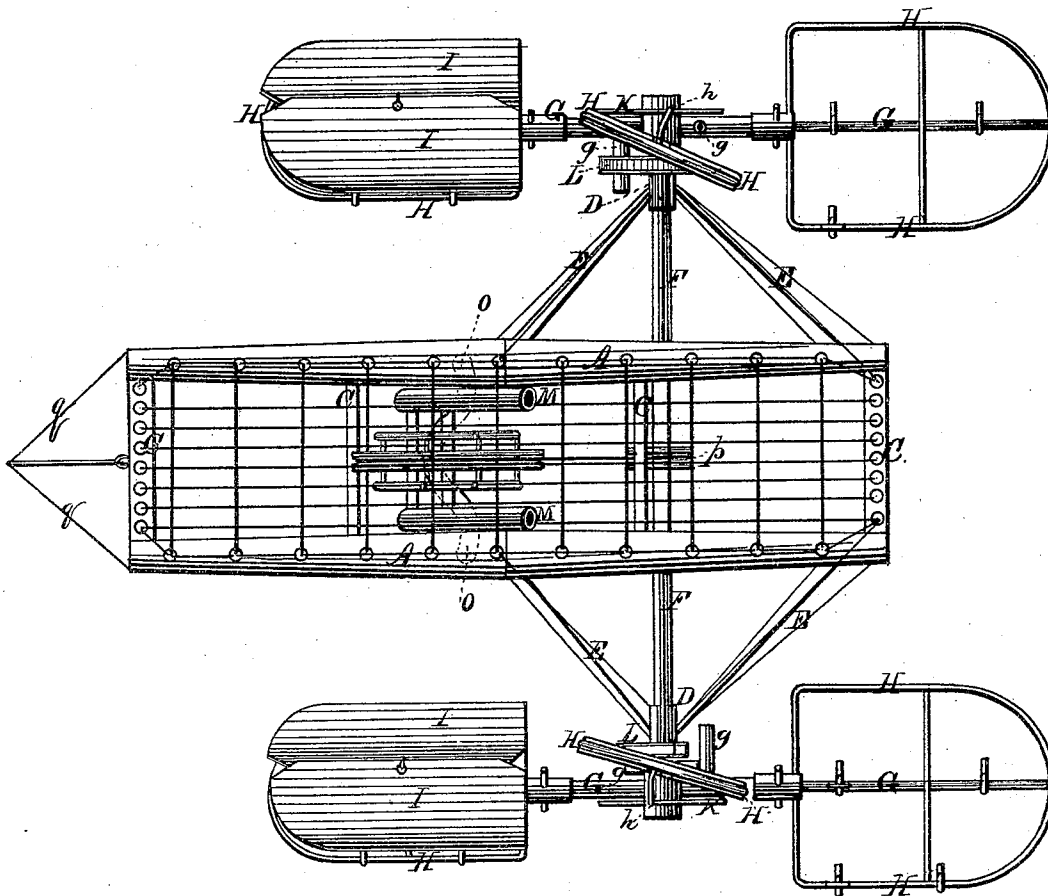
T. GREEN.

Apparatus for Navigating the Air.

No. 141,785.

Patented August 12, 1873.

Fig. 1.



WITNESSES:

James E. Hutchinson
John R. Young

INVENTOR.

Thos Green, by
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3 Sheets--Sheet 2.

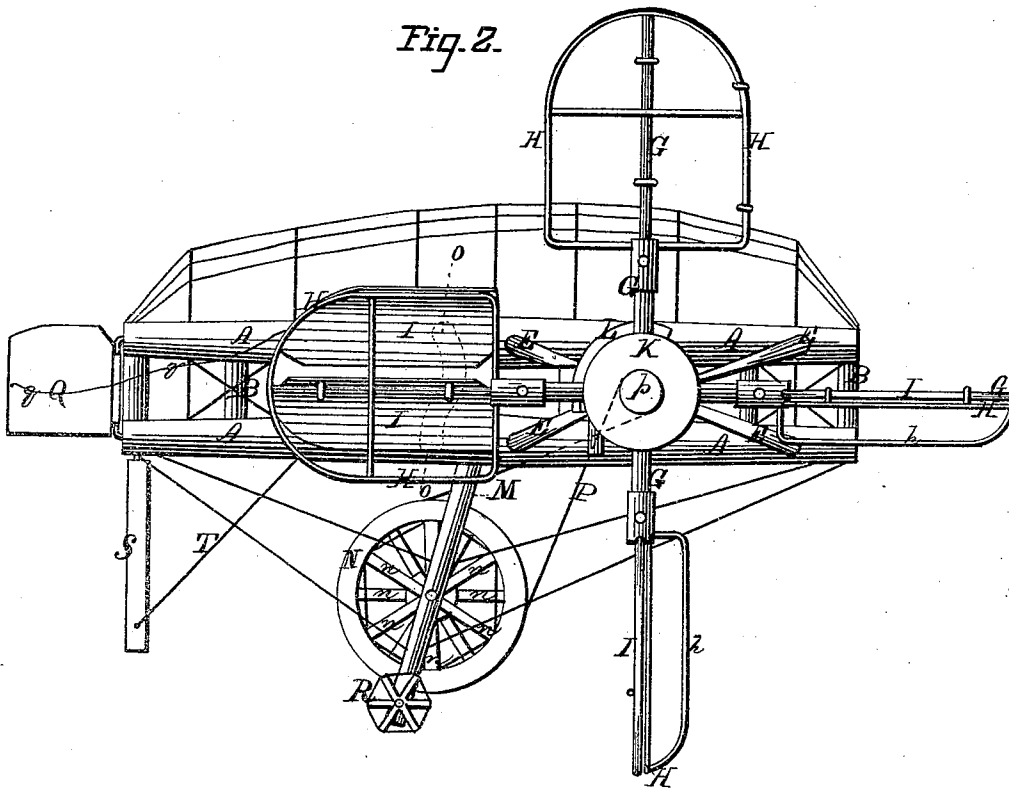
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Fig. 2.



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Fig. 3

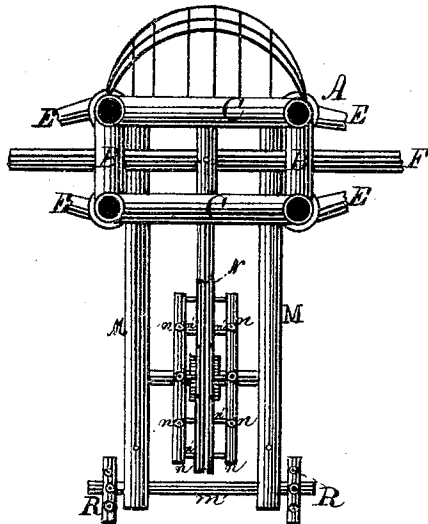


Fig. 4.

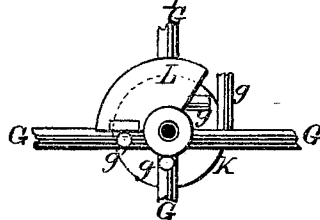
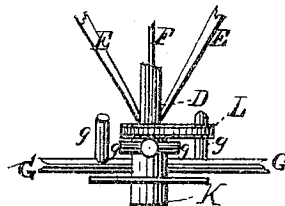


Fig. 5.



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UNITED STATES PATENT OFFICE.

THOMAS GREEN, OF NEW YORK, N. Y.

IMPROVEMENT IN APPARATUS FOR NAVIGATING THE AIR.

Specification forming part of Letters Patent No. **141,785**, dated August 12, 1873; application filed July 15, 1873.

To all whom it may concern:

Be it known that I, THOMAS GREEN, of New York, in the county of New York and in the State of New York, have invented certain new and useful Improvements in Apparatus for Navigating the Air; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 is a plan view of the upper side of my improved apparatus. Fig. 2 is a side elevation of the same. Fig. 3 is an elevation of the front side of said apparatus, the propellers being broken away. Fig. 4 is an elevation of the inner side of the hub or central portion of one of the propellers; and Fig. 5 is a plan view of the upper side of the same.

Letters of like name and kind refer to like parts in each of the figures.

The design of my invention is to enable the physical strength of a man to be utilized in elevating himself above the ground and propelling himself through the air, to which end it consists, principally, in the peculiar construction and operation of the propellers, substantially as and for the purpose hereinafter specified. It consists, further, in the means employed for operating the propellers, substantially as and for the purpose hereinafter shown. It consists, further, in the peculiar construction of the main or supporting frame of the apparatus, substantially as and for the purpose hereinafter set forth. It consists, further, in the means employed for sustaining the apparatus in an upright position when resting upon the ground, substantially as and for the purpose hereinafter shown and described.

In the annexed drawings, A and A represent two hollow bars, constructed of or from bamboo or other light material, in the form shown, and connected together in parallel lines by means of a series of hollow upright cross-bars, B, which latter extend from equidistant points between said bars A, the whole forming one side of the main frame of the machine. A second frame side, of similar construction, is placed parallel to and at a short distance from that hereinbefore described, and is connected therewith by means of a number of cross-bars, C, which extend horizontally

between the corresponding upper and lower side bars A, and firmly unite and brace the same so as to form a strong but light frame. Two bearings, D, are placed at some distance outside of the frame in front of its longitudinal center, and are connected therewith and sustained in relative position by means of suitable braces E, which, from said bearings, extend inward in diverging lines, and at their inner ends are secured to or upon the upper and lower frame bars A and A, as seen in Figs. 2 and 3. Within the bearings thus supported is journaled a hollow shaft, F, within each end of which, outside of said bearings, are journaled two rods, G, said rods passing radially through suitable openings in said shaft, and in lines having right angles to each other. Upon each end of each rod G is secured a frame, H, which has the form shown in Fig. 2, and upon one side of said frame and upon said rod are hinged two floats, I, that, when placed in a line with each other and with said frame, close the space within the outer edges of the latter; but when swung outward have a right angle to the plane of said frame, their general construction being what is generally known as feathering floats. A bowed rod, *h*, extending radially outward from the rod G at a right angle to the plane of the frame H, acts as a stop for the float, which is hinged upon said rod so as to prevent it from passing too far outward, while a chain or cord, *h'*, attached to said rod *h* and to the free end of the second float, in a like manner limits the movement of the latter. Each pair of floats I, when turned backward against the frame, occupy a plane having a right angle to the plane of the float upon the opposite end of the same rod G, and it is intended that, as the shaft F is turned forward, said floats, from a horizontal forward position to a like rearward position, shall present their faces to the air; but from said rearward position to the first-named point they shall be feathered, so as to present their edges to the air, and thus operate to raise and move forward the apparatus. To effect automatically such changes in line a rod, *g*, is secured transversely and in a line with the frame H, within each end of each rod G, at a short distance outside of the shaft F, the ends of which

rod *g* extends radially outward, as shown. Upon the outer end of the shaft *F* is secured a collar, *K*, which has a diameter sufficient to carry its periphery beyond the point at which the rods *g* are inserted, while upon the outer end of the bearing *D* is attached a segmental collar, *L*, that has the form shown in Fig. 4. The lengths of the rods or pins *g* are such as to cause them to bear against the inner face of the collar *K*, or upon the outer face of the segment *L* as they pass the latter, the arrangement being such as to cause said pins to alternately strike against one edge of said segment and be turned inward and held in a radial position with relation to the shaft *F* until the opposite edge of said segment has been passed, when the second pin, *g*, within the opposite end of the rod *G*, will strike said segment and turn said rod and said first pin *g* to their first position, the operation being to instantly turn each vane or pair of floats from a position in a line with the plane of their rotary motion, to a position at a right angle therewith as it moves downward and rearward, and to reverse its position as it passes upward and forward.

The propelling-vanes and their shaft are operated by the following-described mechanism: Upon one of the cross-bars *C* are pivoted two hollow bars, *M*, which extend downward, and are connected together just below their longitudinal centers, and at their lower ends by means of two horizontal rods, *m* and *m'*. Upon the upper rod, *m*, is journaled a grooved wheel, *N*, to the ends of the hub of which are secured a number of spokes, *n*, that extend radially outward to points near the periphery of said wheel. From near the end of each spoke *n* a rod, *n'*, extends horizontally inward to the contiguous spoke, or other portion of the wheel *N*, and not only connects the former therewith, but also furnishes a bearing for the foot of the operator, who, being placed over said wheel, slightly in rear of its center, turns the same rearward by alternately pushing downward with his right and left foot upon the foot-rods *n'* of the corresponding sides of said wheel.

In order that the position of the operator may be insured, and a sufficient leverage obtained, a band, *O*, is secured to the lower frame-bar *A* of each side, and from thence passes upward and across his shoulders. A cord, *P*, passes from and around the grooved wheel *N* to and around a grooved pulley, *P*, attached to the shaft *F*, and enables the motion of said wheel to be communicated from the former to said shaft and its vanes.

The course vertically of the apparatus is regulated by means of the pivoted frame *M* of the driving-wheel *N*, as by swinging it rearward the forward end of the apparatus will be elevated, while, by swinging said frame forward, the forward end of said apparatus will be correspondingly lowered, it being

found that the position and weight of the operator will cause said swinging or pivoted frame to maintain a vertical position regardless of the inclination of the main frame of the machine. The horizontal course of the apparatus is regulated by means of an ordinary rudder, *Q*, which is hinged to the rear end of the main frame, and is operated by suitable cords *q*, that are attached to its rear or free end, and pass outward along the sides of said frame to a position somewhat in front of the operator, and thence across, and are united together.

In order that the apparatus may not be shocked or injured by violent contact with the earth when alighting, two ground-wheels, *R*, are pivoted upon the projecting ends of the lower cross-bar *m*, and furnish a rolling bearing for and upon which said apparatus may move until its momentum is arrested by inertia.

The rear end of the apparatus is prevented from tilting downward by a bar, *S*, which is pivoted at its upper end to or upon the rear end of the main frame, and from thence extends downward to the necessary point. A cord, *T*, attached to its lower end, and from thence extending forward and upward to some portion of the main frame, insures its vertical position.

The machine thus constructed is simple, of light weight, strong, and enables the entire strength of a man to be exerted in such a manner as to elevate and propel him through the air with great ease and rapidity.

Having thus fully set forth the nature and merits of my invention, what I claim as new, is—

1. The shaft *F*, the pivoted rods *G*, the frames *H* and *h*, and the floats or vanes *I*, when constructed and combined to operate in the manner and for the purpose substantially as specified.

2. In combination with the vane-rods *G*, provided with the pins *g*, the disk or collar *K*, secured upon the shaft *F*, and the segmental disk *L*, attached to or upon the bearing *D*, substantially as and for the purpose shown.

3. The main or supporting frame, when its parts are constructed and combined in the manner and for the purpose substantially as set forth.

4. In combination with the main or supporting frame, the pivoted wheel-frame *M* and *m*, provided with the rollers *R* and the bar *S*, pivoted to or upon the rear end of said frame, substantially as and for the purpose shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 2d day of July, 1873.

THOMAS GREEN.

Witnesses:

GEO. S. PRINDLE,
EDM. F. BROWN.