2 Sheets—Sheet 1.

M. M. MURRELL.

AERIAL NAVIGATORS.

No. 194,104. Patented Aug. 14, 1877.

Fig. 1.

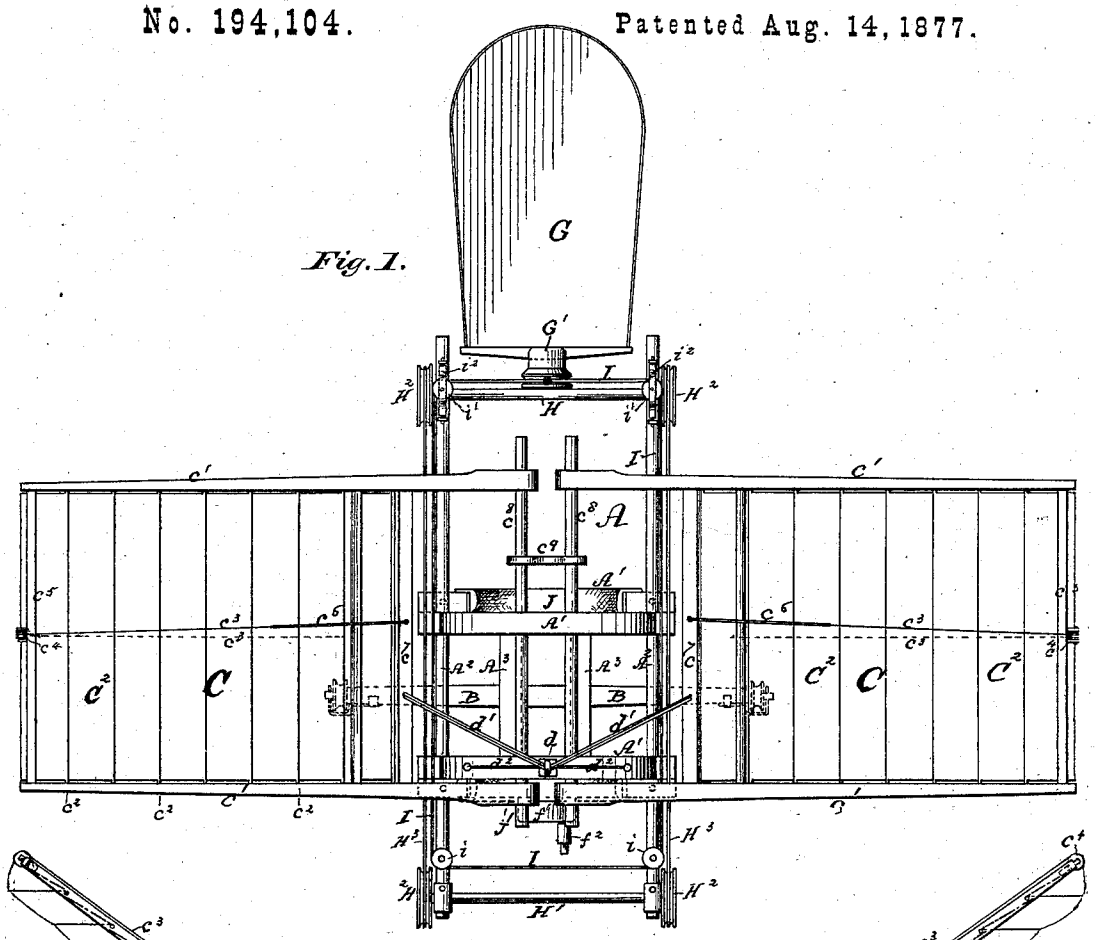
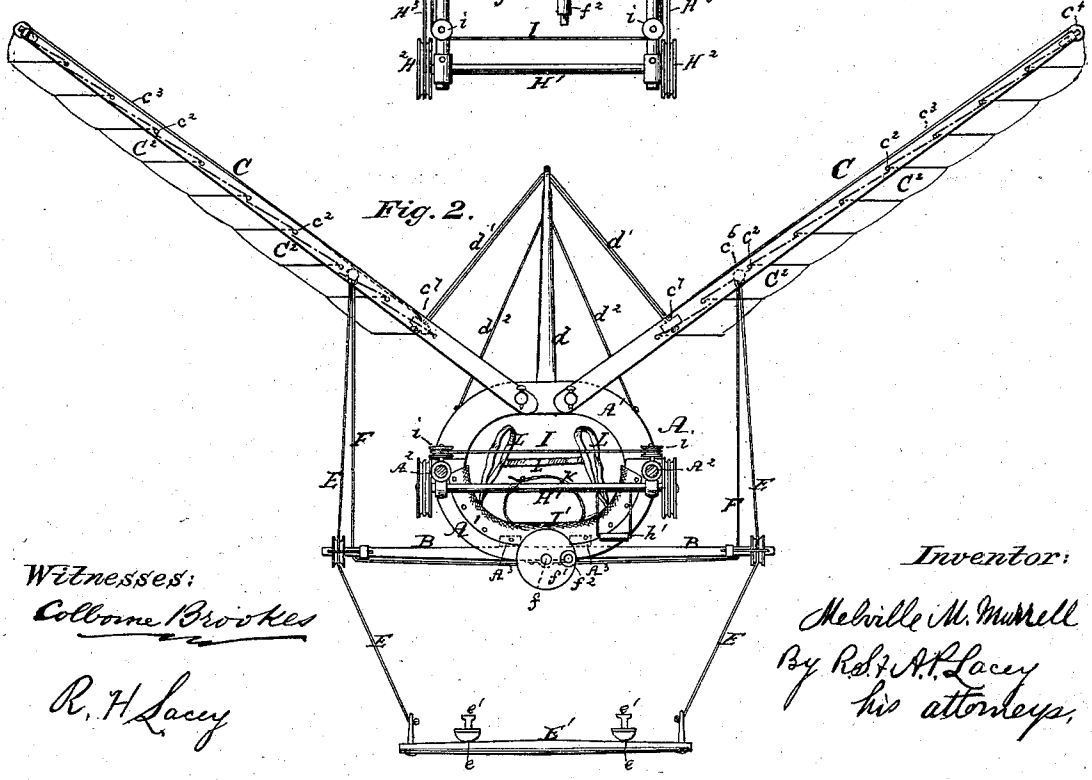


Fig. 2.



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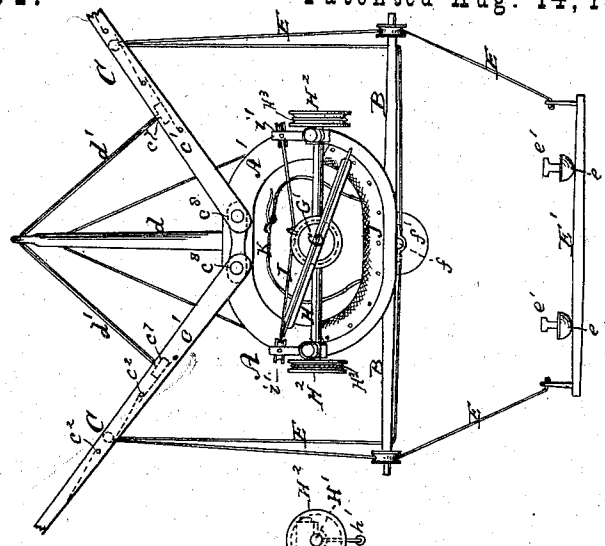
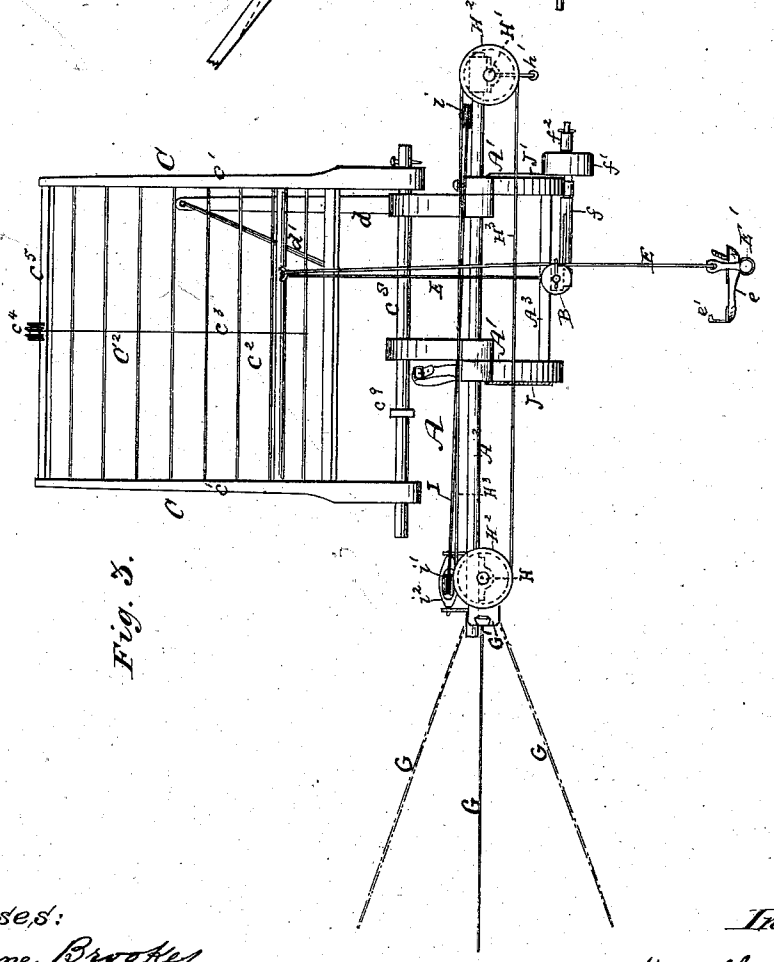


Fig. 2.



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UNITED STATES PATENT OFFICE.

MELVILLE M. MURRELL, OF PANTHER SPRINGS, TENNESSEE.

IMPROVEMENT IN AERIAL NAVIGATORS.

Specification forming part of Letters Patent No. **194,104**, dated August 14, 1877; application filed April 16, 1877.

To all whom it may concern:

Be it known that I, MELVILLE M. MURRELL, of Panther Springs, in the county of Hamblen and State of Tennessee, have invented certain new and useful Improvements in Aerial Navigators; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in flying-machines, the nature of which will be fully understood by reference to the accompanying drawings, in which—

Figure 1 represents a plan, Fig. 2 a front view, Fig. 3 a side view, and Fig. 4 an end view, of apparatus constructed according to my invention.

In each of the views similar letters of reference indicate corresponding parts wherever they occur.

A A represent the main framing of the apparatus, in which the operator is supported. The framing A is composed of two oval cross-pieces, A^1 A^1, by preference formed in two halves, and held in position by means of rods or bars A^2 A^2, extending from end to end of the machine. The lower halves of the cross-pieces A^1 A^1 are connected together by rods or bars A^3 A^3, to which is attached a cross-bar, B, to the extremities of which are attached the pulleys and guides for the cords operating the wings C C, as hereinafter more fully explained.

The wings C C are composed of frames, between the main arms c^1 of which are arranged series of fans or slats C^2, which at one side are pivoted on axes c^2, having their bearings in the arms c^1, while their opposite sides are held in position by means of a cord or band, c^3, which passes along the under face of and is attached to each of the slats or fans, and is conducted over the pulley or guide c^4, (carried by the cross-bar c^5,) and attached to one end of an elastic spring, c^6, the opposite end of which is connected to the cross-bar c^7.

The wings C C are pivoted on rods or axes c^8, or any other suitable axis, supported or carried by the framing A. c^9 is a cross-brace for holding the axes c^8 at a proper distance apart. d is a standard carried by the framing A, to the upper end of which are attached one end of each of the springs d^1, while the opposite end of one of each of the springs d^1 is attached to the cross-bar c^7, thereby serving to hold the wings in an upward direction when not otherwise controlled, and bringing them back to an upward position, as shown by Fig. 2, after they have been lowered, as described hereinafter. d^2 d^2 are braces for holding the standards d in position. A vertical or flapping motion is communicated to the wings C by means of the cords E E, one end of each of which is connected to a cross-bar of the frame C^1, while their lower ends are connected to the trapeze or cross-bar E^1, which, by preference, is formed with pivoted foot pieces or rests e, the forward ends of which are provided with sandals or straps to go over the toe of the boot of the operator, while the heel is pressed forward into the same by means of the spring e^1.

F F are cords for controlling the amount of upward throw allowed to the wings C C. These cords F at one end are each connected to and wound partially round a shaft, f, supported centrally beneath the apparatus, as shown, while the opposite ends are conducted through guides in the ends of the cross-bar B upon and attached to the cross-bar c^6 of the frame C^1. The shaft f is capable of revolving in suitable bearings carried by the framing, and at its forward end is provided with a plate or pulley, f^1, having a crank or handle, f^2, in position to be readily actuated by the hands of the operator.

The plate or pulley f^1 on its rear face is provided with a catch or stop or a pin, so arranged as to prevent the revolution of the shaft f, except when desired by the person using the apparatus. When it is desired to shorten or extend the throw of the wings C, it is simply necessary to turn plate or pulley f^1 in either direction, by means of the handle f^2, until sufficient of the cords F F has been wound upon the shaft f to bring the wings C into the desired position.

G represents the tail of the apparatus, which is mounted on an extension from a pulley, G′, capable of revolving on an axis carried by a rock-shaft, H, supported with capability of

partial revolution in bearings carried by the main framing.

H^1 is another rock-shaft, supported at the front of the machine, and provided with a drop-loop or handle, h', in position to be readily operated by the hand of the aeronaut. The rock-shafts H H^1 are each provided with pulleys H^2 H^2, connected together by cords or bands H^3 H^3, in such manner that any motion connected to the shaft H^1 shall be instantaneously conveyed to the shaft H for the purpose of flapping the tail vertically.

A wriggling or partially-rotary motion may be imparted to the tail, or the angle of the tail G horizontally altered, or it may be caused to assume a vertical position by means of an endless cord, I, which is conducted over pairs of pulleys i i i^1 i^1 and around the pulley G′ of the tail G.

The cord I is operated in either direction and the angle of the tail controlled by one of the hands of the operator, grasping it between the pulleys i-i. The pulleys i i are arranged on stationary axes, while the pulleys i^1 i^1 are mounted in blocks or frames i^2, pivoted in standards carried by the framing.

The fans or slats C^2 of the wings C, and the tail G, may be formed of any suitable light material, which may be kept extended by wire or other suitable framing or stiffening means. The person using the apparatus rests with his body upon the pads or cushions J J′, with his feet in the rests e' of the cross-bar E. K L are straps for holding the operator in the apparatus.

The straps K pass over the back, while the straps L pass around the arms and over the shoulders, leaving the arms and hands free to operate the different parts, as described.

One or both of the wings may be operated at a given time by depressing one or both feet at the same time.

The machine is operated by the hands and feet, and is guided by the tail.

The fans or slats of the wings C are so arranged that when the wings are being raised they shall open, so as to present as little resistance as possible, while on the reverse motion they become closed, so as to render the greatest possible resistance to the atmosphere.

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

1. A flying-machine embodying in its construction a framing, A, having pivoted wings C C, controlled and operated by cords or ropes E E and F F, and a guiding-tail, G, controlled and operated by means of cords or endless bands H^3 and I and rock-shafts H^1 H, substantially as set forth.

2. The combination, with the frame of a flying-machine, of the wings C C, pivoted on rods or axes c^8, and controlled in their upward movement by springs d^1, substantially as set forth.

3. In a flying-machine, a guiding-tail, G, pivoted on a rock-shaft, H, and controlled and operated by cords or bands H^3 and I, substantially as shown and described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

MELVILLE M. MURRELL.

Witnesses:
F. L. LOTHROP,
E. E. THOMPSON.