

(No Model.)

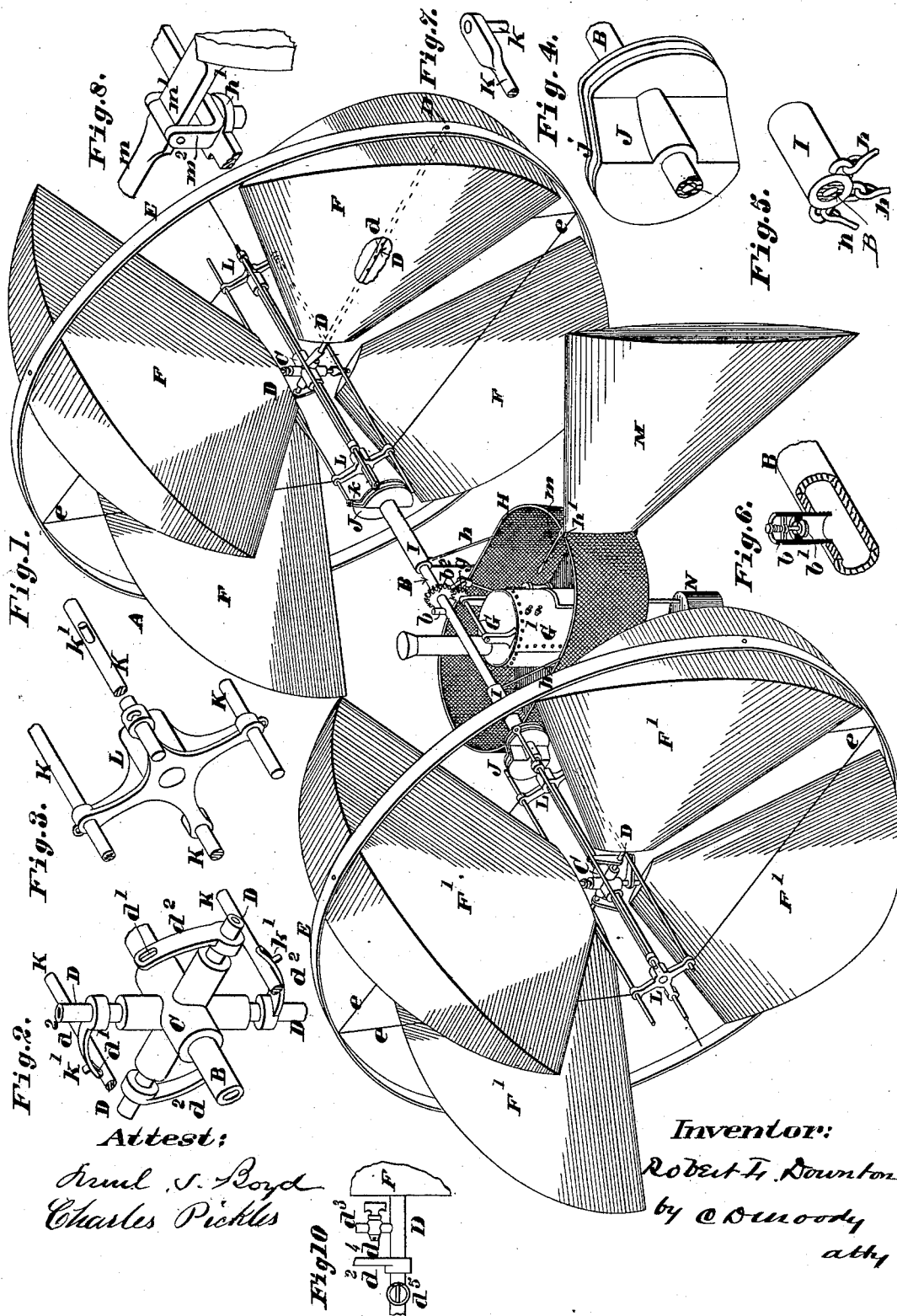
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R. L. DOWNTON.

AERIAL SHIP.

No. 264,261.

Patented Sept. 12, 1882.



Attest:  
Amel. S. Boyd  
Charles Pickles

Inventor:  
Robert L. Downton  
by C. O. Moody  
att'y

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2 Sheets—Sheet 2.

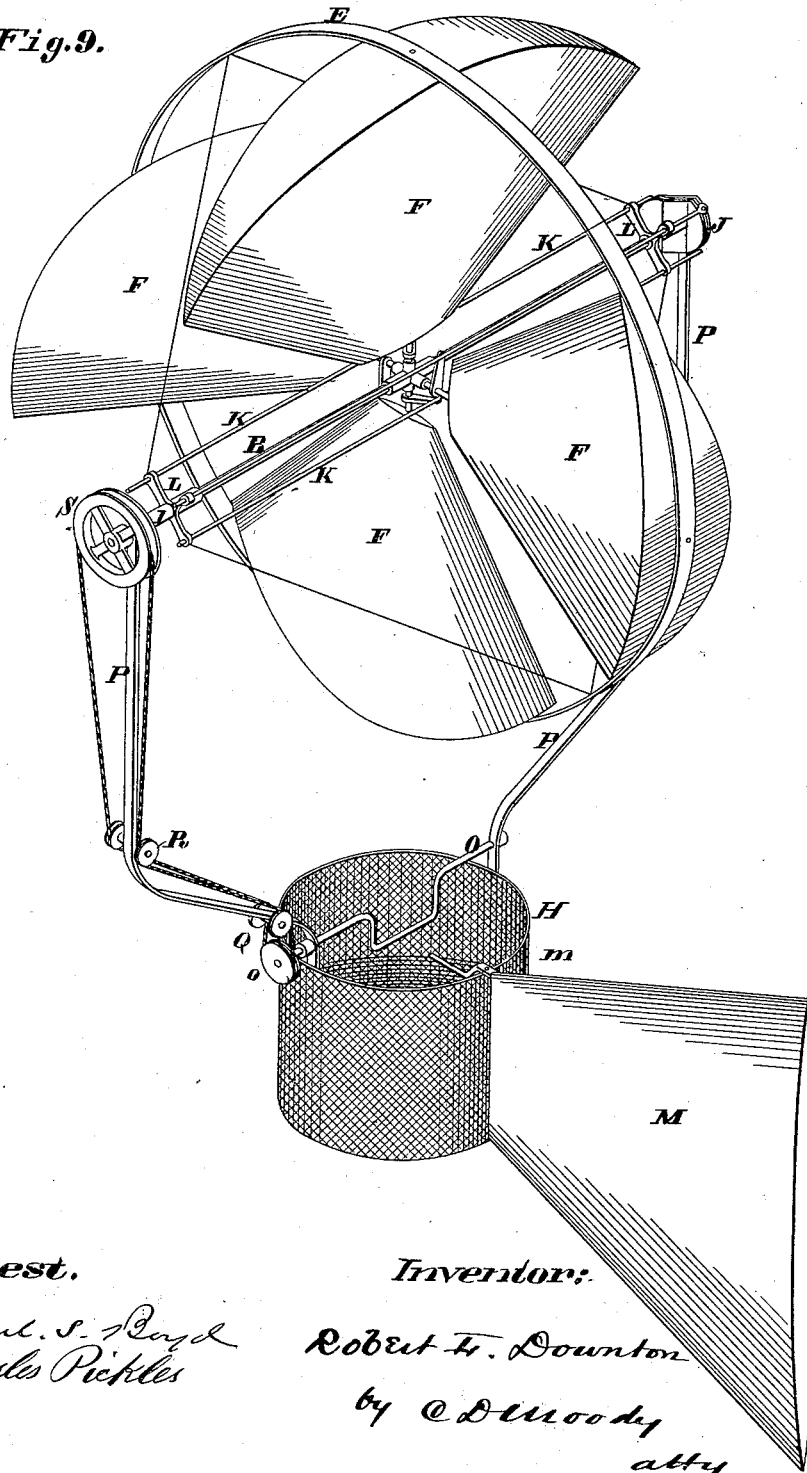
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*Fig. 9.*



*Attest.*

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# UNITED STATES PATENT OFFICE.

ROBERT L. DOWNTON, OF ST. LOUIS, MISSOURI.

## AERIAL SHIP.

SPECIFICATION forming part of Letters Patent No. 264,261, dated September 12, 1882.

Application filed April 7, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT L. DOWNTON, of St. Louis, Missouri, have made a new and useful Improvement in Aerial Ships, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a view in perspective, showing a desirable form of the improved machine; Figs. 2 to 8, details, being respectively, Fig. 2, a perspective of one of the hubs; Fig. 3, a perspective of one of the spiders; Fig. 4, a perspective of one of the cams; Fig. 5, a perspective showing one of the sleeves upon the main shaft; Fig. 6, a sectional perspective, showing a portion of the main shaft and the valve for admitting the gas; Fig. 7, a perspective showing the end of one of the cam-rods, and Fig. 8 a perspective showing the mechanism for adjusting the rudder. Fig. 9 is a perspective showing a modification of the machine. Fig. 10 is a detail.

The same letters denote the same parts.

A prominent feature of the present invention is employing a series (two or more in the series) of gas-chambers, and moving the series around a center or bearing, the chambers being suitably shaped, and suitably directed in their rotation to enable them to feather, and for the purpose partly of influencing the direction of the movement of the machine, partly of propelling the machine, and partly of increasing its ascensive force. The feathering may be upon axes arranged at any suitable angle of inclination to the main shaft of the machine, but preferably upon axes at right angles thereto. The feathering of the chambers may be made independent of their rotation.

An additional feature is employing in combination two or more of the series of gas-chambers. The machine can thus be made single, double, triple, or quadruple, as desired, and when two or more series are thus used the frame-work of the machine is suitably extended.

The improvement also has reference to various details of construction, and more especially as follows: to the frame-work used in

holding a series of the gas-chambers, to the means for admitting the gas to the various chambers, to the means for feathering the chambers, to the means for steering the machine, and to other minor details.

Referring to the drawings, A, Fig. 1, represents a desirable mode of carrying out the improvement.

B represents the main shaft of the machine.

C C represent hubs secured to the shaft.

D D may be considered spokes radiating from the hub, and at their outer ends connected with a rim or frame, E, the connections with the hub and rim being such as to enable the spokes to rotate therein.

F F represent the gas-chambers of the machine, and which, when inflated, render it buoyant. They are supported upon the spokes D D, the latter passing into and through the chambers, as shown in Fig. 1. The chambers F preferably enlarge in the direction of the rim, but are flattened somewhat, enabling them by being rotated on their supports to be presented flatwise or edgewise in the plane of their rotation around the main shaft. The chambers, saving where the gas is admitted thereto, are made tight.

The shaft B is hollow, as indicated in Fig. 6, and the gas is supplied to the machine through the shaft, entering the latter, say, through the branch *b*, and past a suitable valve, *b'*, and passing thence into the hubs C C, which are hollow. From the hubs the gas passes into the various spokes, D D, also hollow, and thence through openings *d* into the chambers F. Both series F and F' are similarly filled.

The machine being sufficiently inflated, the mechanism for operating the chambers F F' is brought into operation. To this end rotary motion is imparted to the main shaft B. Any suitable means may be employed in effecting the rotation. As seen in Fig. 1, the shaft is furnished with a gear, *b*<sup>2</sup>, and engaging therewith is a pinion, *g*, upon a shaft, G, that in turn is connected with and rotated by means of an engine, G', the latter being upheld in the basket H. The basket by means of the rods *h h* is suspended from the sleeves I I, which are loose upon the shaft B. By suita-

bly operating the engine G' the shaft B is rotated, carrying around with it the series F F' of gas-chambers.

The feathering of the chambers in their movement around the shaft is effected by means of the cams J, the rods K, and the spiders L. The cams are hung upon the main shaft, but do not rotate therewith. The spiders are fastened to and rotate with the main shaft. The rods K are held in the spiders, and are also connected with the cams and with the spokes D D—that is, the rods are connected with the cams by means of the studs *k*, that engage in grooves *j* in the cams, and they are connected with the spokes D D, as shown in Fig. 2, studs *k'* upon the rods engaging in slots *d'* in arms *d*<sup>2</sup>, that extend from the spokes.

The shaft B being rotated, the rods K, being actuated by the cams J, slide longitudinally in the spiders L. This causes the spokes D and chambers F F' to rotate in their bearings in the hubs C and rim E, and the chambers F F' to be feathered in their revolution around the main shaft. The cams J, as indicated in Fig. 4, are suitably shaped to cause the chambers to be properly feathered. The chambers F F' thus become a series of vanes that, by being carried around and round, as described, operate to propel the machine through the air and in the direction in which the vanes are turned. The vanes, also, in their movement augment the ascensive force of the machine, being analogous to the movement of the wings of a bird. The vanes, too, in a measure direct the movement; but to more perfectly guide and control the machine a rudder, M, is employed. This part may or may not be made like the chambers F F' to contain a gas to lighten it. It is of shape suitable to its aim. When two series of chambers, F F', are used it is arranged between them, being attached conveniently to be operated by the occupant of the basket, and preferably directly to the basket. The connection therewith is such as to provide for its being turned to either side as well as upward and downward. Mechanism such as shown in Fig. 8 is a desirable form for a universal movement of the rudder, the latter being furnished with a helm, *m*, that at *m'* is hinged to the swivel *m*<sup>2</sup>, that in turn is journaled at *h'* in the basket H.

The rim E can be stayed laterally by the guys *e e*, the guys extending from the rim to the main shaft or to some fixture thereon, such as the spiders L.

When a steam-engine is used to effect the rotation of the vanes the water-tank may be suspended, as shown at N, Fig. 1.

In Fig 9 another means is shown for turning the main shaft, O representing a crank-shaft journaled in the suspension-rods P P, or in other suitable bearings. The crank-shaft is furnished with a pulley, *o*, and a belt is passed thence and, if needed, over intermediate pulleys or bearings, Q R, around a pulley, S, upon the main shaft B. Then by rotating the

shaft O the vanes F are caused to revolve around the main shaft. This last-named view also illustrates the arrangement of the basket H when but a single series, F, of vanes is employed, the basket being directly beneath and the suspending-rods extending upward to the end of the main shaft.

Any suitable gas can be used for inflating the chambers F F'. The latter are suitably distensible to enable them to be rendered more or less buoyant, as desired. The gas can be discharged therefrom by any suitable means—as, for instance, by opening the valve *b'*, for which purpose a suitable connection may lead from the valve to within reach of the occupant of the basket H. If desired, also, means can be used for filling and emptying the various chambers F separately—as, for instance, by means of the cock *d*<sup>1</sup> in the branch *d*<sup>3</sup>, Fig. 10, in which case there should be a valve, *d*<sup>5</sup>, in the pipe D to cut off the passage from the hub C.

I claim—

1. A flying-machine having a series of gas-chambers, the series moving around a center or bearing of the machine.

2. A flying-machine having a rotating series of feathering gas-chambers, substantially as described.

3. A flying-machine having one or more flattened gas-chambers, said chamber or chambers being movable, and adapted, during the movement, to turn sidewise and then edgewise to the direction of the movement, substantially as described.

4. A flying-machine having two rotating series of gas-chambers, F F', said chambers in the rotation feathering, as described.

5. A flying-machine having two rotating series of gas-chambers, said chambers adapted in their rotation to feather, and having a rudder between the two series, as described.

6. The combination of the shaft B, the hub C, the spokes D D, the frame E, and the chambers F F'.

7. The combination of the shaft B, the hub C, the spokes D D, the cams J, the rod K, and the spiders L, substantially as described.

8. The combination, in an aerial ship, of the hollow shaft B, the hollow hub C, the chambers F F, and the hollow spokes D D, having the opening *d d*, as and for the purpose described.

9. The combination of the shaft B, the sleeves I I, the basket H, and rods *h h*, as and for the purpose described.

10. The machine A, having the central shaft, B, the outer frame, E, and a series of shafts which at their inner ends are connected with the shaft B and at their outer ends with the frame E for the purpose of sustaining and effecting the feathering of the chambers F F.

11. An aerial ship having a rotating series of feathering chambers, F F, said chambers being journaled at their ends in suitable bearings in said ship, and one or both of the jour-

nals of each of said chambers being hollow for the purpose of admitting and discharging the gas to and from the chambers.

12. An aerial ship having a rotating series of feathering chambers, F F, said chambers being sustained upon hollow journals.

13. The combination of the basket H, the rudder M, the helm m, the hinge m', and the swivel m<sup>2</sup>, substantially as described.

14. An aerial ship the rudder of which is a ro gas-chamber.

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Witnesses:

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