

(No Model.)

A. SPIER.

AIR SHIP.

No. 319,758.

Patented June 9, 1885.

Fig. 1.

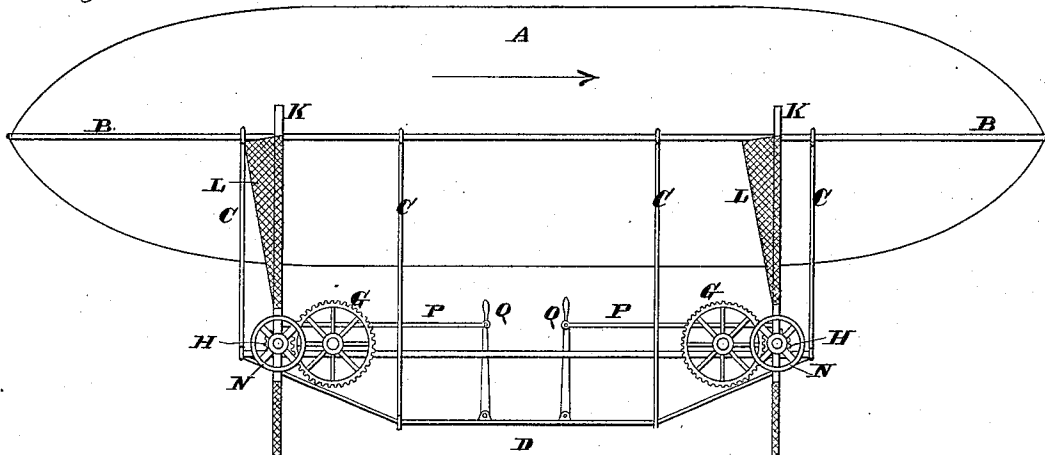
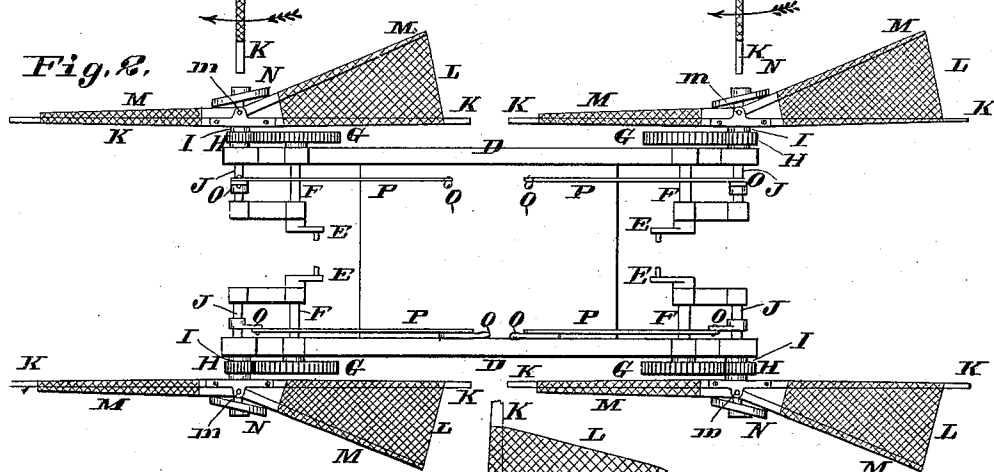
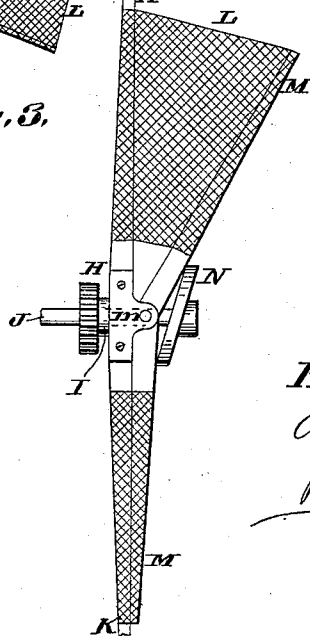


Fig. 3.



Attest:

Geo. S. Wheelock.
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UNITED STATES PATENT OFFICE.

ANTON SPIER, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-THIRD TO
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AIR-SHIP.

SPECIFICATION forming part of Letters Patent No. 319,753, dated June 9, 1885.

Application filed October 24, 1884. (No model.)

To all whom it may concern:

Be it known that I, ANTON SPIER, of the city of St. Louis and State of Missouri, have invented a certain new and useful Improvement in Aerial Ships, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This is a device for propelling and steering aerial ships or balloons.

Figure 1 is a side view. Fig. 2 is a top view of the mechanism, the balloon being removed. Fig. 3 is an enlarged view of one of the propeller-wings.

A is the balloon, made long and pointed at the ends, so as to travel with comparatively little resistance of the air.

B is a rail, which may surround the balloon, as shown, and from which is suspended, by hangers C, the frame D, which is occupied by the aeronauts and gives bearing to the machinery. This frame may be of any suitable construction.

A propeller is located at each corner of the frame, each propeller having independent movement or rotation, so as to enable the steering or turning of the balloon in any manner. A description of one of these propelling devices applies equally to the others.

E is a crank, which may be turned by hand or by any motor.

F is the crank-shaft, carrying a spur-wheel, G, which engages a spur-pinion, H, upon a sleeve, I, which rotates upon a cam-shaft, J.

Secured to the rotating sleeve I or hollow shaft is a straight bar, K, forming the rigid portion of the wing-frame.

L is a webbing of cloth or canvas, extending from the straight bar K to an angular bar, M, which is hinged at the angle or middle *m* to the rotating sleeve or hollow shaft I. The arrangement or construction is such that when one of the webs L is stretched the other is folded together, as seen in all the figures.

The movement of the angular bar M for the alternate opening and closing of each wing or web is imparted by an inclined cam, N, fixed upon the cam-shaft I. The action of the cam upon the hinged bar M is very clearly shown in Fig. 3.

The spread wing of course finds resistance

of the air, while the wing, when folded, finds very little resistance; consequently the balloon may be caused to move in any direction, according to the position of the cams N and the direction in which the wings are rotated. Thus if the cams should be placed in a position opposite to that shown in Fig. 3, so that the wings would be open when in their lower position, as seen in Fig. 1, the balloon would move in the direction indicated by arrow upon it, the rotation of the wings being indicated by arrows upon them. Suppose the cams to be set as in Fig. 2; the balloon may be made to rise or fall according to the direction in which the wings are rotated. This is evident without further explanation.

The cam-shaft may be turned to change the position of the cam by any desired means. I show for this purpose an arm, O, on the shaft, connected by a rod, P, to a hand-lever, Q.

It will be understood that as the wings may be rotated in either direction it will be only necessary to arrange the cams to turn about one-fourth of a circle. They may, however, be arranged to turn to a greater degree, even to such a degree that all required movements of the balloon might be had with the wings constantly rotating in one direction.

It is evident by placing the different cams in different positions, and by causing the wings to rotate at varying speeds or in different directions, that the balloon can be moved, turned, or guided in any desired manner.

It is evident that the wings might be modified by the removal of one end of the bars KM beyond the cam-bearing, and the wings would still be effective. I, however, have shown the device in my preferred form.

I claim—

1. An aerial-ship propeller comprising a hollow shaft, I, a straight bar, K, rigidly secured thereto, folding angle-bar M, hinged to the straight bar, and webbing L, secured to the straight bar and to the angle-bar, substantially as set forth.

2. An aerial-ship propeller comprising a hollow shaft, I, a straight bar, K, rigidly secured thereto, folding angle-bar M, hinged to the straight bar, and webbing L, secured to both bars to fold between them, in combination with an adjustable shaft having an in-

clined cam, over which the angle-bar works, substantially as set forth.

3. An aerial-ship propeller comprising a hollow shaft, I, a straight bar, K, rigidly secured thereto, folding angle-bar M, hinged to the straight bar, and webbing L, secured to the bars, in combination with a cam-shaft adjustable in the hollow shaft and having an inclined cam, and means for adjusting the cam-shaft, substantially as set forth.

4. An aerial ship comprising a balloon, frame secured to the balloon, independent adjustable cam-shafts having inclined cams and propellers, each propeller formed with a hollow shaft, straight bar secured to the hollow shaft, folding angle-bar hinged to the straight

bar, and webbing connecting the bars, substantially as set forth.

5. The combination of wings having a straight bar or arm fixed to a hollow shaft, an angular bar or arm hinged to said shaft, a shaft forming the bearing of the hollow shaft and carrying an inclined cam acting on the hinged arm, a flexible web or cloth extending from arm to arm, and means for rotating the wing-shaft and turning the cam-shaft, for the purpose set forth.

ANTON SPIER.

Witnesses:

SAML. KNIGHT,
GEO. H. KNIGHT.