

N^o 9129



A.D. 1896

Date of Application, 30th Apr., 1896—Accepted, 30th May, 1896

COMPLETE SPECIFICATION.

A Combined Screw Propeller and Aeroplane for Raising, Lowering, and Sustaining Airships.

I, RUDOLPH KOSCH, of 60 Centre Street, Cleveland, Ohio, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

5 The object of the present invention is to provide a screw propeller for raising and lowering airships in a vertical direction which can also be used as a sustaining surface or aeroplane when the airship is rapidly propelled in a horizontal direction. This object I effect by the peculiar construction and arrangement of screw propeller having large adjustable blades or wings hereinafter described. An
10 airship to which my invention is applied may be lifted gradually from the ground in a vertical direction, propelled forwards at high speed when the desired elevation is attained, and, having arrived above its destination, allowed to descend slowly and vertically.

I will now fully describe my invention and the manner of performing the same
15 having reference to the accompanying drawings in which similar letters refer to corresponding parts in all the figures, and wherein:—

Figs. 1 and 2 represent in side elevation and plan respectively a combined screw propeller and aeroplane constructed according to my invention. Figs. 3 and 4
20 are end views thereof.

Figs. 5, 6, 7 and 8 are details illustrating a convenient method of constructing the wings.

Fig. 9 is a vertical section of convenient means for adjusting the angle of the wings, and

Fig. 10 is an elevation of Fig. 9 seen at right angles.

25 Referring to Figs. 1, 2, and 3 which clearly illustrate the principle of the invention, *e* is a vertical shaft adapted to be revolved at a high speed from a convenient engine or motor on the airship, and *cc* are arms extending horizontally upon either side thereof and carrying the circular wings *aa* which revolve freely about central pivots *rr* and which preferably consist each of a light circular frame
30 covered with suitable fabric. These wings are adjustable as hereinafter described so that they can either be set so as to lie in relatively angular planes, as shewn in Fig. 4, or so as to lie in the same plane, as shewn in Fig. 3. Now it is apparent that if the wings *aa* are arranged in relatively angular planes (Fig. 4), then upon rotating the shaft *e* they will act as screw propeller blades and lift the airship
35 vertically from the ground in the direction of the arrow *x*. If however the wings be adjusted so as to lie in the same plane (Fig. 3), or in parallel planes, and the rotation of the shaft *e* be stopped, then upon the airship being driven forwards at a high speed in the direction of the arrow *p* by means of a small screw propeller or propellers of ordinary construction revolving in a vertical plane, they will act
40 as sustaining surfaces or aeroplanes and sustain the airship thus driven forwards. By a convenient arrangement of clutches, as will be readily understood, the same motor may be employed for rotating both the combined screw propeller and aeroplane and also the screw propeller or propellers by which the airship is driven in a horizontal direction.

45 The wings *aa* being intended to act as aeroplanes as well as screw propeller blades must necessarily be of large proportions and the velocity of their outer

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parts will consequently be very great and the air resistance, which increases as the square of the velocity, enormous. By making the wings circular, however, and mounting them so as to revolve freely about central pivots, as above mentioned, it follows that when the shaft *e* is rotated in one direction, the wings will, by the air pressure from beneath, be revolved in the reverse direction as indicated by the arrows Fig. 2, consequently the larger outside portions of the wings, indicated by the shading lines Fig. 2, will encounter little or no frictional resistance from the air since they will practically follow the air cushions upon which they rest and only the smaller inside portions of the wings will have to cut their way through the air; since however these inside portions are situated near to the centre of rotation, but a comparatively small amount of energy will be needed to overcome the edge and frictional resistance of the air to these inside portions.

I prefer that the wings should be so constructed that the air pressure from beneath will cause them to assume the shape of segments of spheres, since these and similar arched surfaces, which greatly resemble the wings of birds, are the most effective aeroplanes known at the present time. A convenient construction consists in making the framework of the wings after the fashion of an ordinary cycle wheel as represented in Figs. 5, 6, 7 and 8 where *g* is the hub which revolves freely upon the pivot *r*, *i* is a light tubular rim, and *s* are spokes connecting the rim and hub and having heads at one end with which engage slotted washers *s*² and at the other end the tightening nipples *s*¹. The said framework or wheel is covered with a loose double sheet of balloon fabric *f*, an air space being left between the sheets. This cover *f* is passed around the rim *i* as clearly shewn in Fig. 7, and under the air pressure from beneath assumes the shape of a segment of a sphere, as shewn in Figs. 1, 2, 3 and 4.

Referring to Figs. 9 and 10 which illustrate convenient means for simultaneously adjusting the wings *a* to the desired angle, it will be seen that the arms *c c* which carry the wings are tubular and fit into one another at their ends which enter a tubular bearing *j* formed on the end of the shaft *e*. Upon each tubular arm *c* there is fixed by keys *m m* a lever *k k* the free ends of these levers being connected by the links *u u* with pins *u*¹ on the sleeve *v* which slides freely upon the shaft *e*. *w* is a collar surrounding the sleeve *v* and maintained in place by the screw ring 4. *q* is a forked lever pivotted at 2 to the bracket 3 and engaging with the pins *y* on the collar *w*. Upon moving the lever *q* by means of the rod 1 attached thereto, the sleeve *v* will be raised or lowered thus operating the levers *k k* through the links *u u* and thereby causing the tubular arms *c c* to revolve about their axial lines whereby the angle of the wings *a* is adjusted so as to cause them to act either as screw propeller blades (Fig. 4) or as aeroplanes (Fig. 3) as before explained. Any other convenient means may be employed for effecting the adjustment of the wings *a* to the desired position.

It should be remarked that in applying my invention to an airship, at least two of my combined screw propellers and aeroplanes must be employed, arranged to revolve in reverse directions, since if only one were used, as soon as the vessel left the ground it and the motor would commence to revolve with the shaft *e*.

In conclusion I would observe that I do not confine or limit myself to the precise details of construction above specified, since the same may obviously be varied without in any way departing from the spirit of my invention as set forth.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed I declare that what I claim is:—

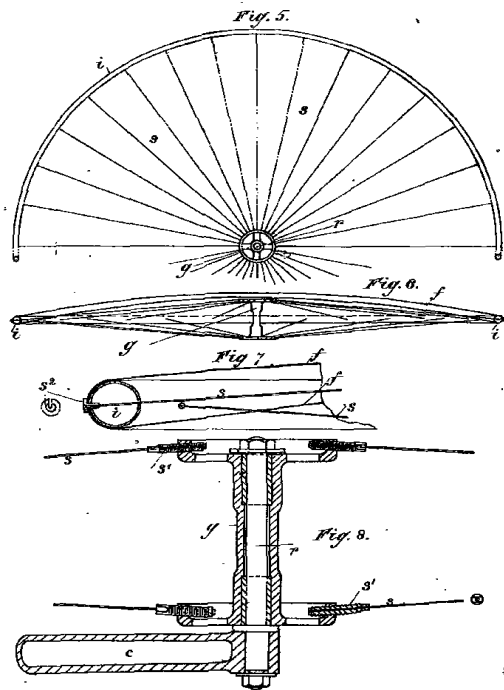
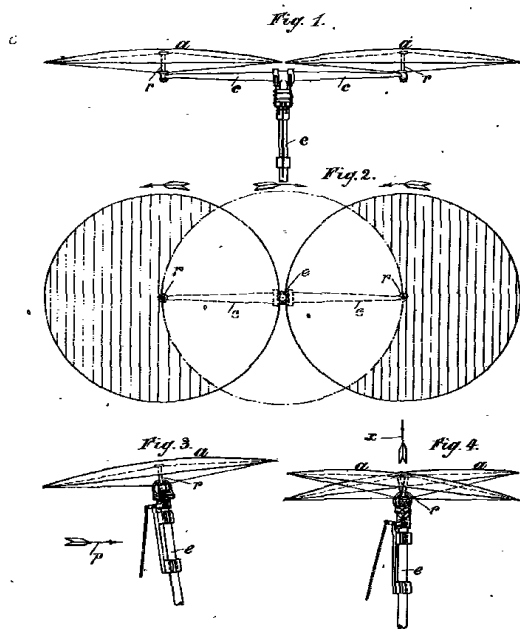
1. The use in combination with an airship of a screw propeller for raising and lowering the same in a vertical direction, said propeller having adjustable wings or blades which can be set so as to lie in the same plane or in parallel planes and thus act as aeroplanes when the airship is driven forwards, substantially as described.

A Combined Screw Propeller and Aeroplane for Raising, Lowering, &c., Airships.

2. A combined screw propeller and aeroplane comprising a vertical shaft, arms or their equivalent extending laterally thereof, circular wings carried by the said arms and free to revolve about central pivots, and means whereby the said wings may be adjusted and set either in relatively angular planes or in the same plane or parallel planes, substantially as and for the purpose set forth.
3. The combination of a vertical shaft, arms extending laterally thereof and rotatable upon their axial lines, wings carried by the said arms, and means for rotating the latter about their axial lines whereby the angle of the said wings may be adjusted, substantially as described and for the purpose set forth.
4. The combination of the vertical shaft *e*, the arms *c c* extending upon either side thereof and rotatable about their axial lines, the wings *a a* carried by said arms and free to revolve upon central pivots *f*, and means substantially as illustrated in Figs. 9 and 10 for simultaneously effecting the adjustment of the wings, substantially as and for the purpose described.
5. In a combined screw propeller and aeroplane the employment of wings consisting each of a light circular frame free to revolve about a central pivot and covered with fabric which under air pressure from beneath assumes the shape of a segment of a sphere, substantially as described and illustrated.
6. A combined screw propeller and aeroplane combined and arranged substantially as illustrated in the annexed drawings.

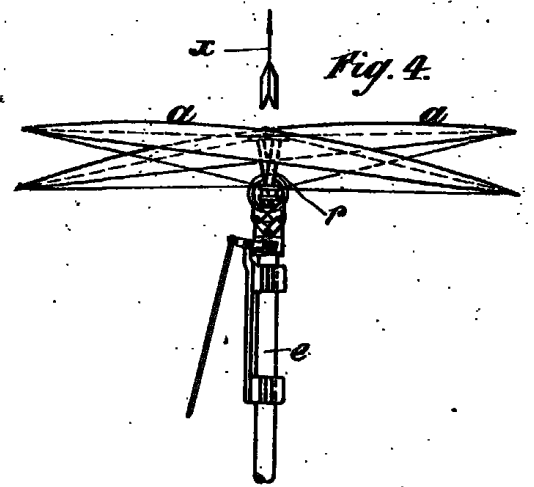
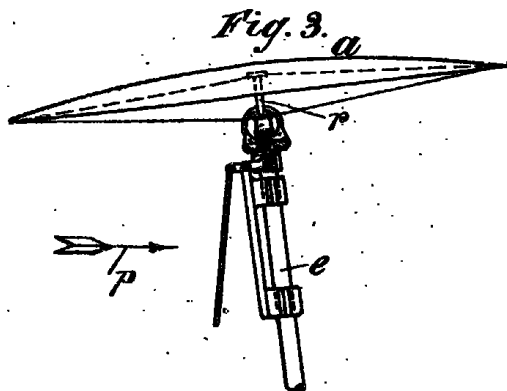
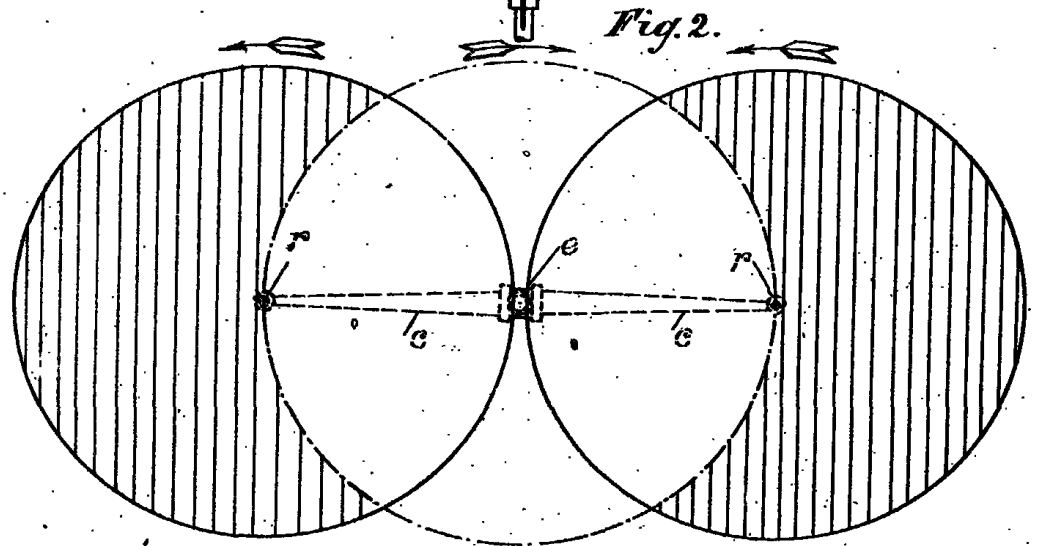
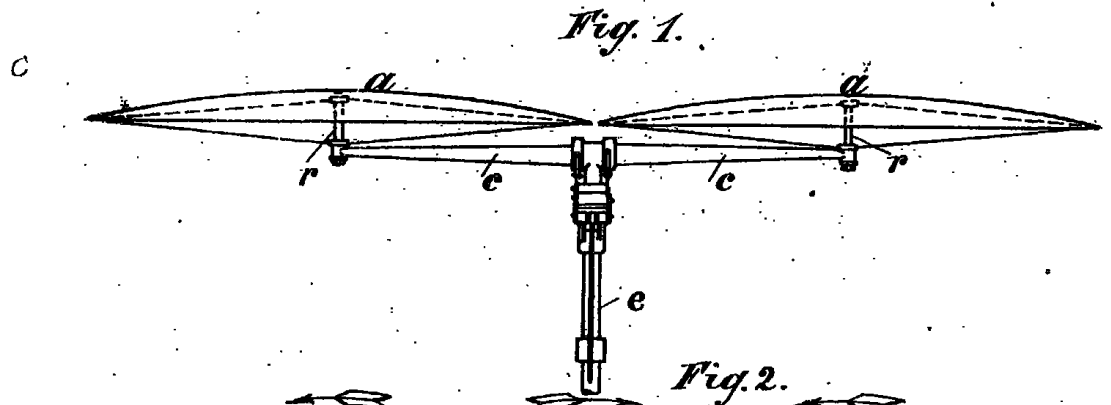
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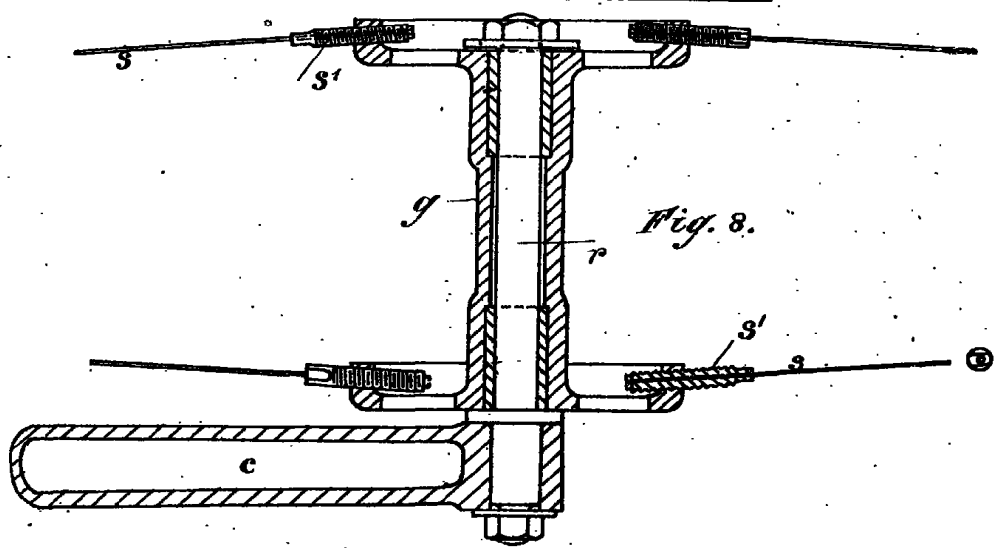
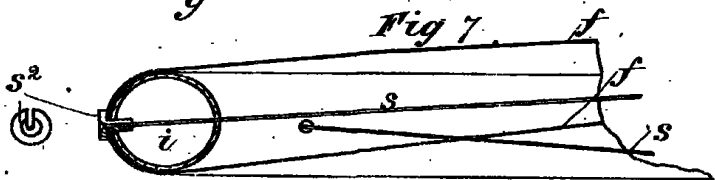
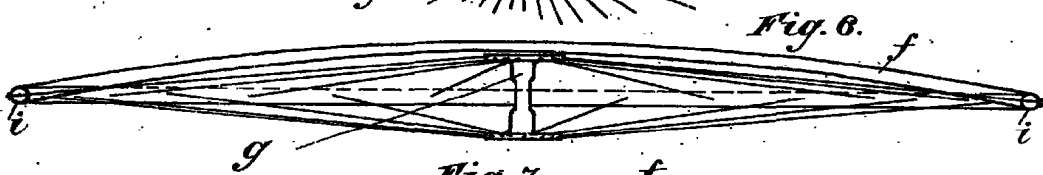
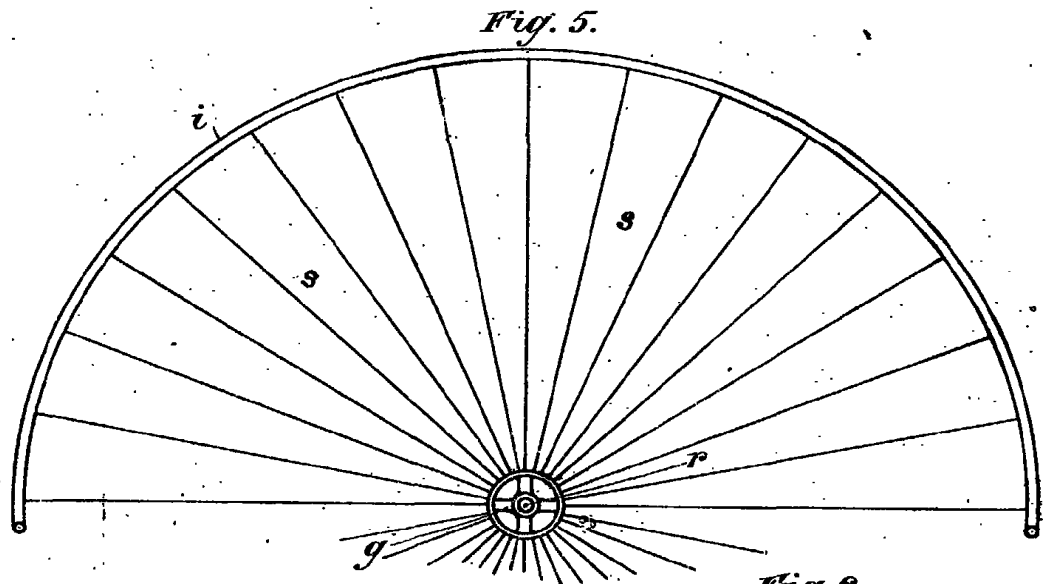
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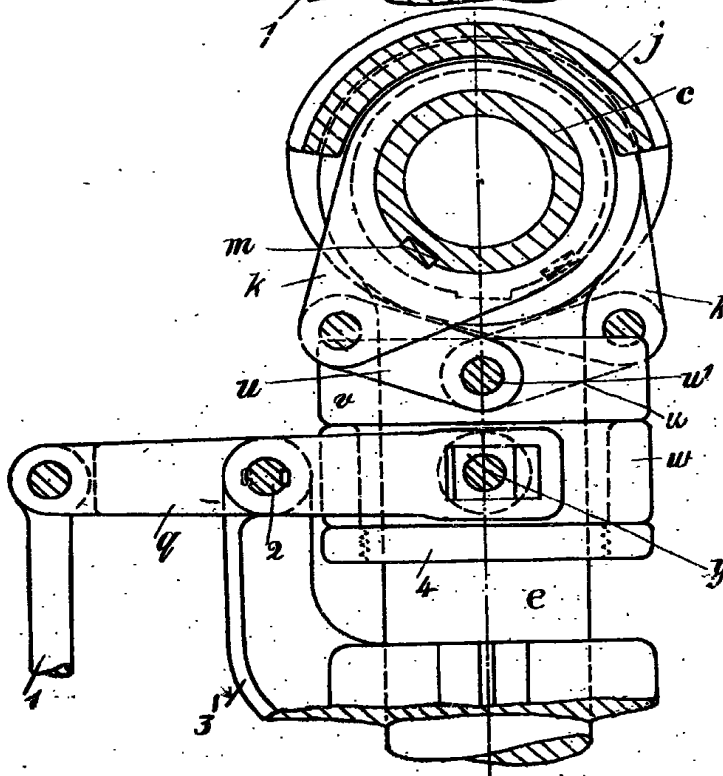
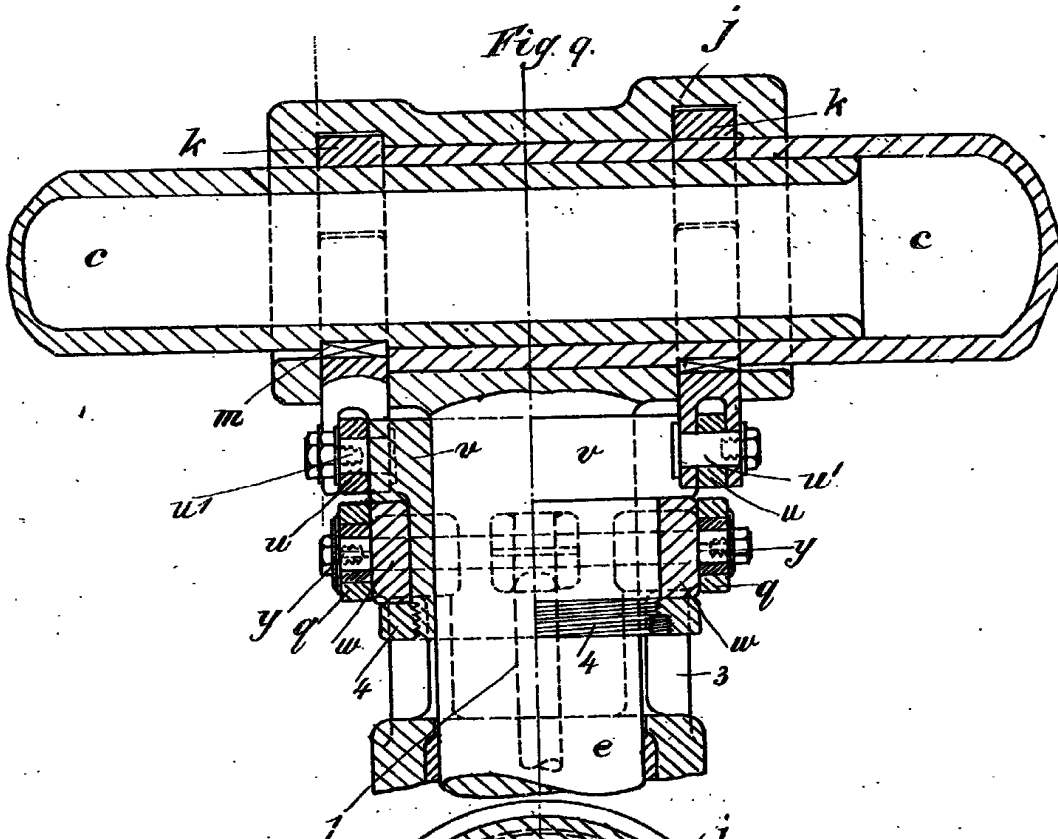
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