Feb. 5, 1924. 1,482,690

G. LANZIUS

AEROPLANE PROPELLER

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Fig. 1.

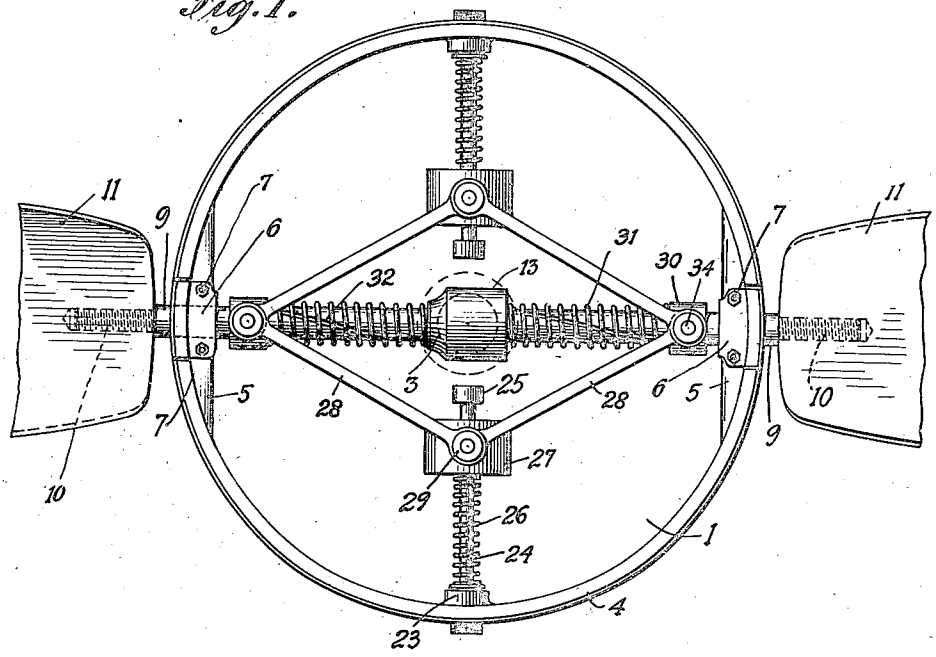
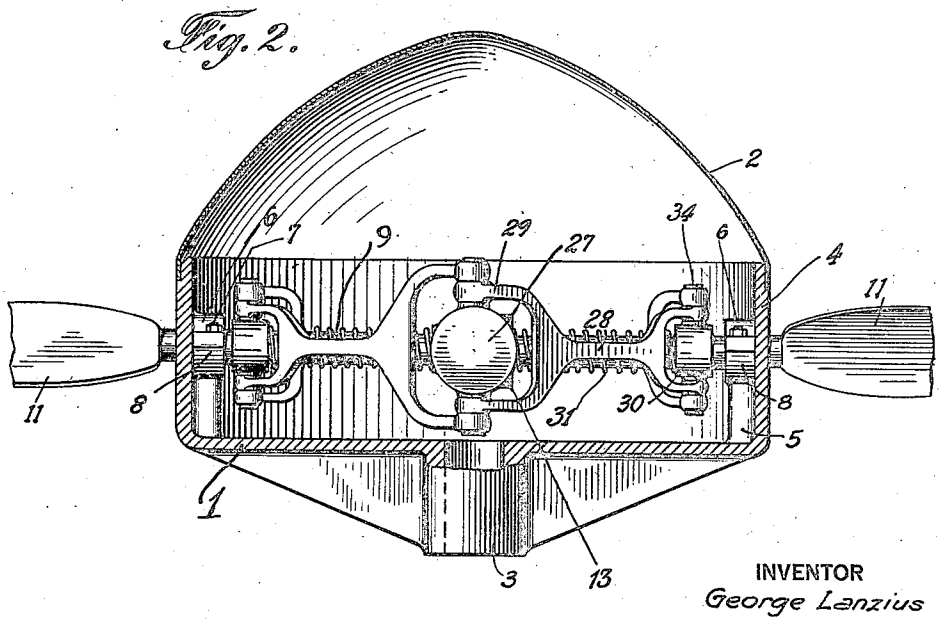


Fig. 2.



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Fig. 3.

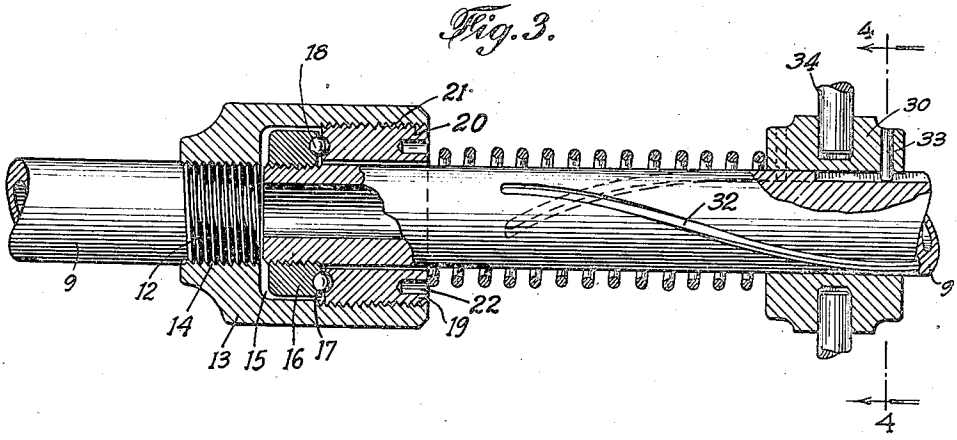
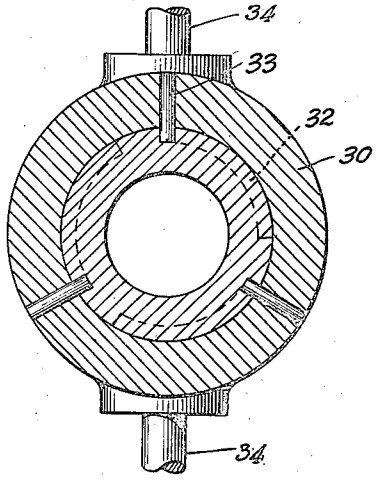


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE LANZIUS, OF NEW YORK, N. Y.; EVELYN ELIZABETH FAIRBANKS LANZIUS EXECUTRIX OF SAID GEORGE LANZIUS, DECEASED.

AEROPLANE PROPELLER.

Application filed February 10, 1919. Serial No. 275,959.

To all whom it may concern:

Be it known that I, GEORGE LANZIUS, a citizen of the United States of America, residing at 801 Park Row Building, 21 Park Row, New York city, N. Y., have invented new and useful Improvements in Aeroplane Propellers, of which the following is a specification.

This invention relates to aeroplane propellers.

The object of the invention is to provide a construction in which the centrifugal force of the blades of a propeller is balanced by the pull of one blade against the other. A further object of the invention is to provide an efficient means for varying the angle of the blades in proportion to the speed of the propeller shaft. A further object is to provide a construction which is easily assembled and taken down.

The invention consists of the construction, combination, and arrangement of parts, as herein illustrated, described and claimed.

In the accompanying drawings, forming part hereof, is illustrated a form of embodiment of the invention, in which drawings similar reference characters designate corresponding parts, and in which:

Figure 1 is an end elevation;

Figure 2 is a horizontal section through the hub, the other parts being shown in elevation;

Figure 3 is a partial section and partial side elevation of the adjacent ends of the propeller blade spindles and angle varying means; and,

Figure 4 is a vertical section taken approximately on the line 4—4 of Figure 3, looking in the direction indicated by the arrows.

Referring to the drawings, 1 designates a comparatively heavy hub, one side of which is covered by a removable cap 2, the cap 2 being disposed at the outer end of the hub. In its centre the hub 1 is provided with the usual opening 3 adapted to receive the ordinary form of propeller shaft, and the hub is further provided on one side with a peripheral rim 4.

Diametrically disposed on the hub are thickened portions 5, arranged to receive bearing caps 6, which are held in position by means of bolts 7, so that bearings 8 are formed on the opposite sides of the hub.

Rockably disposed in the bearings 8 are tubular blade spindles 9, disposed in alignment with each other and arranged so that their inner ends are located adjacent to each other. The outer ends of the blade spindles 9 may be provided with a screw-threaded portion 10 for engagement with common forms of blades 11, or any suitable known means may be used for connecting the outer ends of the spindles with the blades.

One of the spindles 9 adjacent its inner end is provided with a screw-threaded portion 12. Disposed over the adjacent end of the spindle 9 is a sleeve 13 provided with an interiorly screw-threaded portion 14 arranged to engage the screw-threaded portion 12 of the spindle 9, which is entered from one side of the hub 1. The sleeve 13 is provided with a chamber 15 arranged to receive the spindle 9 entered from the opposite side of the hub and also to receive a screw-threaded nut 16 which is secured on the other spindle 9. The nut 16 is provided with a race-way 17 adapted to receive balls 18 which are retained in position by means of a nut 19. The nut 19 is maintained in position on the sleeve 13 by means of exterior screw threads 20, arranged to engage interior screw threads 21 formed in the wall of the chamber 15 of the sleeve 13. Suitable openings 22 are formed in the outer face of the nut 19 for the introduction of a spanner or similar instrument, so that the nut 19 may be adjusted. By this construction the spindles 9 may be rocked with relation to each other and the friction thereof is easily taken up by the balls 18 disposed in the race-way 17. Also any centrifugal force exerted by the blades 11 upon the spindles 9 will be balanced one against the other, the inner ends of the spindles being connected to each other as described instead of being secured to the hub 1.

Diametrically disposed on the rim 4 of the hub 1 are thickened portions 23 adapted to receive guide rods 24 formed at their inner ends with stops 25. Coiled springs 26 are disposed around the guide rods and are arranged to exert a tension against weights 27 which are slidably disposed on the guide rods 24. Cooperating with each of the weights 27 there is a pair of links 28, having their inner ends bifurcated and pivotally connected to the weights, as at 29, and having their outer ends likewise connected to slidable collars 30 disposed on the spindles

9. Suitable coiled springs 31 are arranged to thrust against the collars 30, so that the collars are normally maintained away from the meeting ends of the spindles 9. The springs 26 normally cooperate with the springs 31 to this end.

Formed in the outer surfaces of the spindles 9 are helical grooves 32 arranged to receive inwardly projecting pins or lugs 33, formed on the collars 30. Suitable pins 34 may be used for connecting the outer ends of the rods 28 to the collars 30.

In the operation of the device, when a predetermined speed is reached, centrifugal force will throw the weights 27 outward, overcoming the tension of the springs 26 and causing the collars 30, through the medium of the rods 28, to be moved toward the centre of the hub. This movement of the collars causes a rocking of the spindles 9 in their bearings as the projecting pins 33 ride in the helical grooves 32 to cause such rocking movement. The spindles being rocked, necesarily the angle of incidence of the blades 11 is changed in proportion to the degree to which the spindles are rocked. In the operation of the device the centrifugal action of one propeller blade 11 is counterbalanced by the centrifugal action of the other propeller blade 11, and the construction shown for connecting the free inner ends of the blade spindles, while sufficiently rigid to hold the ends together, is of such a nature as to permit the easy rocking of one spindle with relation to the other.

Having thus fully described the invention, what is claimed as new and is desired to be secured by Letters Patent is:

1. In a propeller, the combination comprising a hub, a pair of spindles carried by the hub having their inner ends juxtaposed, a sleeve secured on one spindle and arranged to receive the other spindle, a securing member on the other spindle, a securing member loosely disposed on the other spindle and secured to the sleeve, and friction-reducing means disposed between the securing members.

2. In a propeller the combination comprising a pair of spindles having their ends disposed adjacent each other, a sleeve secured to one spindle and provided with a recess, a pair of nuts disposed in the recess, one nut being secured to the second spindle and one nut being secured to the sleeve, and friction-reducing means disposed between the nuts.

3. In a propeller, the combination of a hub, a pair of spindles carried by said hub for rotation therewith and rockable relatively thereto, cooperating means carried by said spindles for connecting their inner ends together to permit independent rocking thereof, a pair of slidable governing members disposed at right-angles to said spindles, and connecting means between said spindles and governing members, adapted to rock the spindles during sliding movement of the governing members.

In testimony whereof I have signed my name to this specification.

GEORGE LANZIUS.