June 21, 1932. J. PONIATOWSKI 1,864,316

AIRPLANE PROPELLER

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Fig. 1.

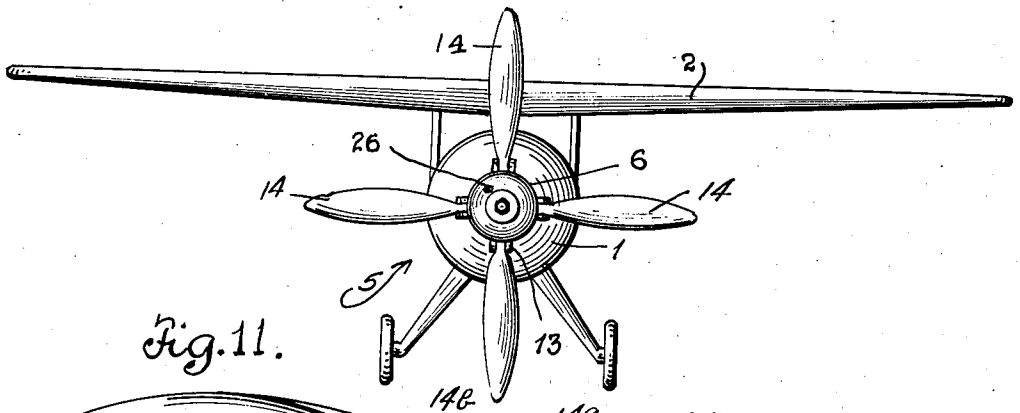


Fig. 11.

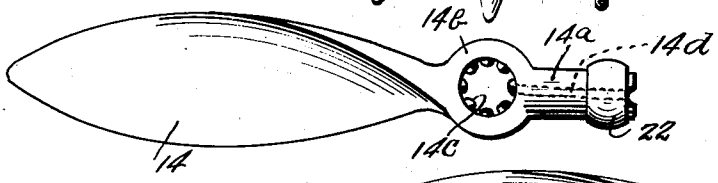


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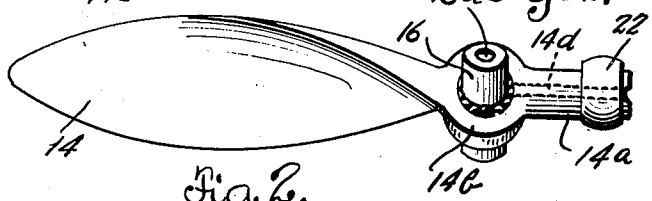
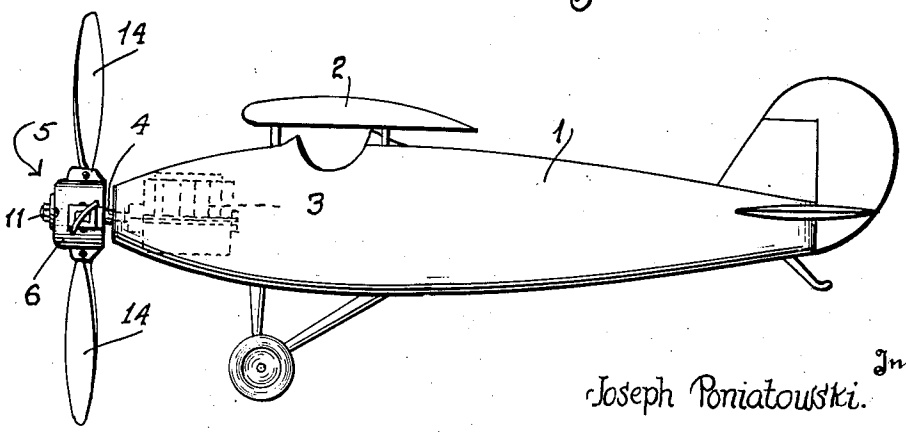


Fig. 2.



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Fig. 3.

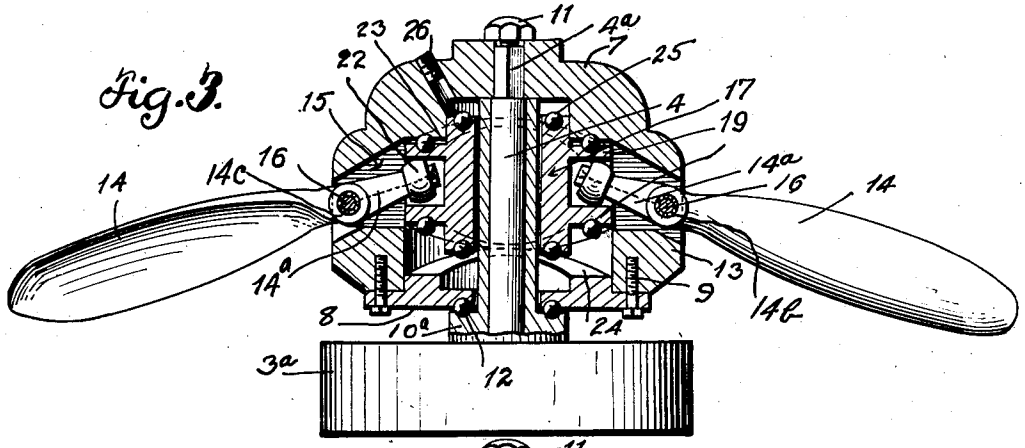


Fig. 4.

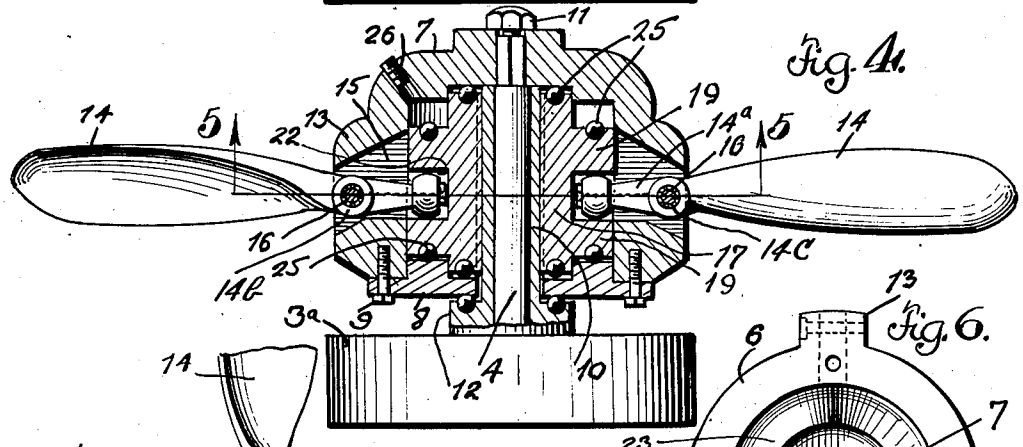


Fig. 5.

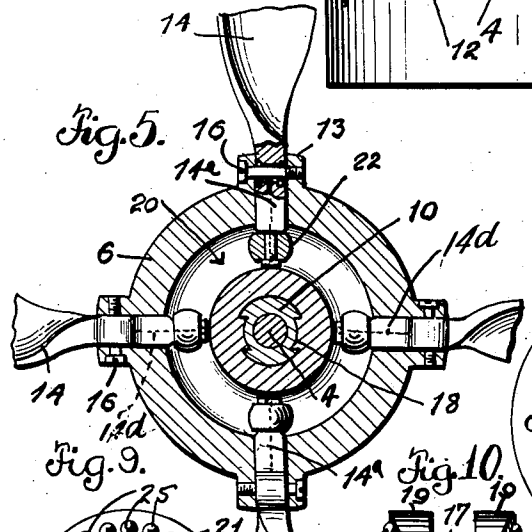


Fig. 6.

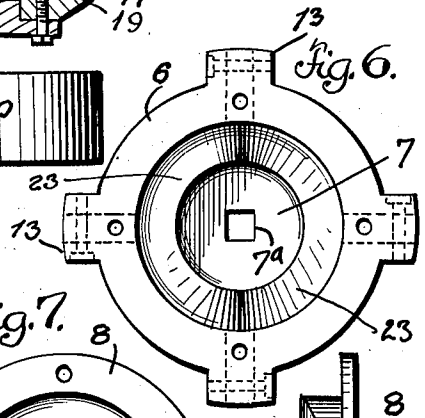


Fig. 7.

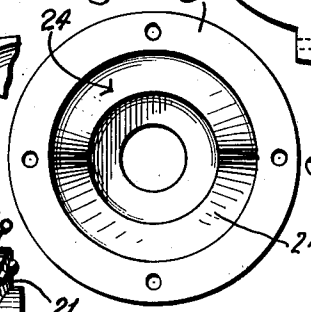


Fig. 8.

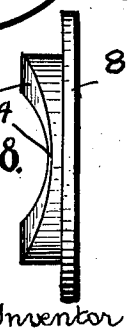


Fig. 9.

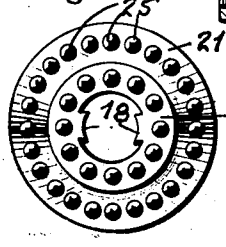
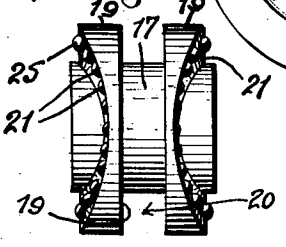


Fig. 10.



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UNITED STATES PATENT OFFICE

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AIRPLANE PROPELLER

Application filed February 20, 1931. Serial No. 517,339.

This invention relates to certain new and useful improvements in airplane propellers.

The primary object of the invention is to provide an airplane propeller which may also be used for other types of aircraft that is constructed and operated in a manner to increase the lifting power thereof, i. e., a propeller of the type herein disclosed having inherently embodied therein increased power and being capable of causing an airplane to rise more quickly in the air.

Another object of the invention is to provide an airplane propeller embodying a head or housing in which the propeller blades are pivotally mounted with devices in the head or housing operatively engaged with the latter and the inner ends of the pivoted propeller blades to cause the propeller blades to swing forwardly and backwardly upon their pivotal mountings during rotation of the head or housing to add increased force and lifting power to the propeller.

A still further object of the invention is to provide a propeller blade assembly in aircraft propulsion means wherein the blades are so mounted as to cause them to travel at a greater rate of speed and to embody increased power so that the aircraft will rise more quickly from the ground and during flight.

With the above and other objects in view that will become apparent as the nature of the invention is better understood, the same consists of the novel construction, combination and arrangement of parts to be hereinafter more specifically described and then claimed.

In the accompanying drawings which show the preferred embodiment of the present invention and to which reference is had by like characters designating corresponding parts throughout the several views,

Figure 1 is a front elevational view of an airplane equipped with the propeller forming the subject of this invention,

Figure 2 is a side elevational view,

Figure 3 is a longitudinal sectional view of the head or housing of the airplane propeller showing the propeller blades pivotally mounted in the head or housing and the cam device for effecting pivotal or forward and backward swinging movements of the propeller blades, the blades being illustrated at their limits of pivotal movement to the rear,

Figure 4 is a longitudinal sectional view, similar to Figure 3 showing the pivotally mounted propeller blades moved to their limits in a forward direction by the cam device in the head or housing,

Figure 5 is a cross sectional view taken on line 5—5 of Figure 4 showing the annular groove in the nonrotating shiftable cam member into which the inner ends of the pivoted propeller blades extend,

Figure 6 is a bottom plan view of the head or housing of the propeller with the interior mechanism removed to show the double cam wall or track in the bottom of the head,

Figure 7 is an inner face view of the cover plate for the head or housing showing the double cam circular track,

Figure 8 is an edge elevational view of the cover plate,

Figure 9 is an end elevational view of the double cam member,

Figure 10 is a side elevational view of the cam member,

Figure 11 is a side elevational view of one of the propeller blades showing the antifriction means therein, and

Figure 12 is a perspective view of one of the blades and bearing pin therefor.

The airplane propeller may be associated with aircraft of any character, Figures 1 and 2 illustrating a monoplane including a fuselage 1 provided with a wing 2 and housing a motor 3 having a drive shaft 4 designated in general by the reference numeral 5.

The details of construction of the propeller 5 are shown in Figures 3 to 10 and in said figures the motor 3 is diagramatically illustrated as at 3^a for the operation of the shaft 4. The airplane embodies a head or housing 6 closed at its forward end by the wall 7 with the inner open end closed by a removable cover plate 8 retained in position by the screws 9 entering the side wall of the housing 6 as illustrated. A stationary cylindrical bearing 10 extends through a central opening in the cover plate 8 and is located

axially within the housing 6 and provides a bearing for the drive shaft 4. The outer end of the drive shaft 4 has a keyed end 4^a of polygonal formation in cross section and extends through the opening 7^a of like configuration provided centrally of the end wall 7 of the housing with the terminal end of the shaft threaded for the reception of a cap nut 11 or similar device for securing the housing 6 to the drive shaft 4, it being noted that the inner portion of the stationary bearing 10 is annularly enlarged as at 10^a outwardly of the cover plate 8 with bearing balls 12 interposed between the bearing enlargement 10^a and cover plate 8.

The side wall of the housing 6 is provided with a plurality of equi-distantly spaced outwardly directed bosses 13, each having an opening therein extending to the interior of the housing to provide for the mounting of propeller blades 14. Each propeller blade is pivotally mounted to swing in forward and rearward directions in the slotted opening 15 and is provided with a bearing 14^b to receive the pin 16 extending between the side walls of the boss 13, the inner end 14^a of the propeller blade extending into the housing 6. As shown in Figures 11 and 12, the bearing 14^b is provided with a circular roller or ball race 14^c to reduce friction on the pin 16 and the inner end 14^a of the propeller blade 14 has an axial oil passage 14^d to furnish lubricant to the anti-friction race 14^c. The ends of the pins 16 also have lubricant receiving pockets 16^a.

A shiftable non-rotative cam member within the housing 6 is engaged with the inner ends 14^a of the propeller blades 14 to cause the propeller blades to move upon their pivot pins 16 during rotation of the housing 6, the cam device comprising a collar 17 inclosing the stationary bearing 10 and having a sliding spline connection 18 therewith, the collar 17 carrying a pair of spaced rings 19 having adjacent plane faces defining a channel or groove 20 while the outer faces of the rings 19 are formed with cam faces 21. The inner ends 14^a of the propeller blades carry roller bearings 22 extending into the groove 20 between the rings 19. The inner face of the end wall 7 of the housing 6 is provided with a circular cam track 23 and the inner face of the cover wall 8 of the housing carries an inwardly directed annular cam track 24, the cam tracks 23 and 24 being engaged with the cam faces 21 on the rings 19, bearing balls 25 being disposed between the cam tracks and faces and also between the ends of the collar 17, and the end wall 7 and cover wall 8 of the housing. Lubricant is supplied to the bearing surfaces through the filler opening 26 in the outer end of the housing 6.

From the above detailed description of the invention it is believed that the construction and operation thereof will at once be apparent, it being understood that when the head or housing is rotated for the customary operation of the propeller blades 14, the devices associated with the propeller blades and housing effect pivotal movement of the propeller blades upon the pins 16 which adds power to the propeller blades and increases the lifting force thereof so that the airplane may rise more quickly in the air when so directed by the usual elevator devices. The housing 6 is rotated by its key connection 4^a and 7^a with the drive shaft 4 of the motor and as the bearing element 10 is stationarily mounted, the cam tracks 23 and 24 effect sliding movement of the cam member 17 which moves the propeller blades upon their pivot pins 16, it being understood that the inner ends of the propeller blades are freely rotatable in the annular channel or groove 20 between the cam rings 19.

While there is herein shown and described the preferred embodiment of the invention, it is nevertheless to be understood that minor changes may be made therein without departing from the spirit and scope of the invention as claimed.

I claim:

Airplane propulsion means comprising a rotatable housing, a power shaft keyed in the housing, a non-rotative bearing in the housing for the shaft, a cam member splined on the bearing and carrying end thrust bearings, a pair of spaced annular ring members surrounding the cam member and having cam faces at their outer sides, a cam member on the inner face of the opposite ends of the housing cooperating with the cam faces on the ring members and propeller blades pivoted in the housing with their inner ends positioned between the spaced ring members whereby the blades are moved on their pivot during rotation of the housing.

In testimony whereof I affix my signature.

JOSEPH PONIATOWSKI.