E. HUTCHINSON.

AEROPLANE PROPELLER.

APPLICATION FILED FEB. 13, 1917.

1,237,340. Patented Aug. 21, 1917.

Fig. 2.

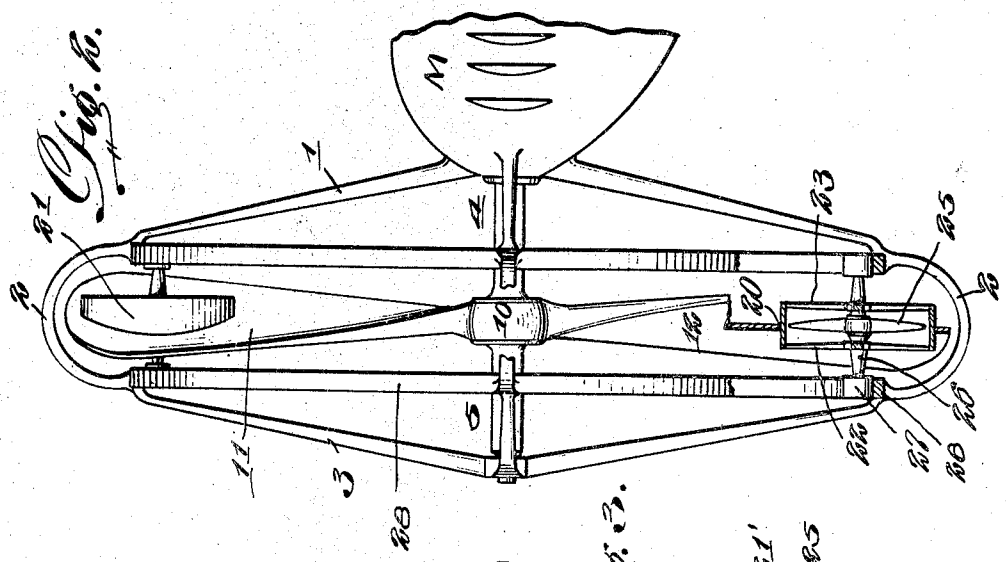

Fig. 3.

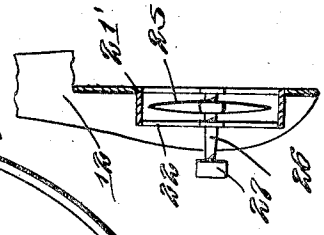

Fig. 1.

WITNESSES

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AEROPLANE-PROPELLER.

1,237,340. Specification of Letters Patent. Patented Aug. 21, 1917.

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To all whom it may concern:

Be it known that I, EDGAR HUTCHINSON, a citizen of the United States, residing at Clio, in the county of Wayne and State of Iowa, have invented new and useful Improvements in Aeroplane-Propellers, of which the following is a specification.

This invention relates to impellers, and more especially to that type thereof known as propellers having inner and outer blades; and the object of the same is to produce a special form of propeller for use particularly on aeroplanes.

The invention consists in disposing within each blade or fluke of the main propeller a smaller or subsidiary propeller arranged within a casing, and causing the rotation of these smaller propellers by the rotation of the main propeller; and the invention consists specifically in the details for carrying out this general idea. Reference is made to the following specification, and to the drawings herewith and in which—

Figure 1 is an elevation of this propeller complete,

Fig. 2 is a side view partly broken away, and

Fig. 3 is a sectional detail showing a slight modification.

Attached to the front end of the flying machine herein indicated by the letter M, is a cage which may well consist of a spider made up of four inner arms 1 radiating from the machine; arches 2 at their outer ends, and four outer arms 3 converging from the arches in the shape of an outer spider. Sleeves 4 and 5 project from the centers of the spiders toward each other and form bearings for a main shaft 6 which is journaled through the sleeves and extends through the inner spider to the engine within the machine end and not necessary to illustrate herewith.

The main propeller consists of a hub 10 fastened on the main shaft 6 between the inner ends of the sleeves 4 and 5, and blades or flukes 11 and 12 radiating from said hub and with their outer ends revolving within the arches as this propeller is driven by the main shaft 6. I have shown but two blades in the accompanying drawings, but would not be limited in this respect, as the number and pitch and exact disposition of said blades is of no moment to the present invention.

Through the outer end of each blade is cut an opening 20, preferably circular, and within this opening is fixed a casing 21 which may extend completely through the blade as seen at the top and bottom of Fig. 2, or may terminate flush with the active face of the blade as shown at 21 in Fig. 3. Within this casing is a cage consisting of two spiders 22 and 23 as seen at the bottom of Fig. 2, or a single and preferably stronger spider could be employed as shown in Fig. 3, and between the spiders stands a supplemental or auxiliary propeller whose blades are indicated by the numeral 25 and whose hub is extended into a shaft 26 journaled through these spiders in any suitable manner. Attention is directed to the fact that the two auxiliary or supplemental propellers are disposed in planes exactly right-angular to the main shaft 6 so that their own shafts 26 are parallel with the main shaft, and therefore all the propellers cut the air on parallel lines. At one or both extremities of each auxiliary shaft 26 is a friction pulley 27 traveling within a band or ring forming an annular track 28 and supported by the main spider. Two of these tracks are shown in Fig. 2, but with the modification employed in Fig. 3 one might be dispensed with. The circumference of the driving pulley 27 is extremely small with reference to the circumference of the track 28, and therefore when the main propeller is rotated even very slowly the auxiliary propellers will be rotated rapidly. When the main propeller attains the speed usually given to it in driving an aeroplane, it is clear that the smaller propellers will rotate with extreme rapidity. However, this may be arranged as desired by increasing the size of the pulleys 27.

With a propeller of this construction when used on an aeroplane or flying machine, it will be clear that the main propeller has all its usual functions excepting that so much of the face of each blade as is taken up by the casing 21 does no work. If this casing projects through the blade or fluke as shown at the bottom of Fig. 2, it may interrupt the flow of air laterally across the blade as said blade turns through or cuts the air, but it is quite possible to avoid this objection by disposing the casing 21′ completely to one side of the blade as seen in Fig. 3 and inserting the smaller propeller therein so that the active face of the main blade will be clear. As the main propeller rotates, the smaller propellers are carried around with it and their

driving pulleys 27 contacting with the track 28 causes them to rotate with great rapidity, the direction of rotation being indicated by the arrows in Fig. 1. The pitch of the blades of each small propeller will of course be such as to cause it in its rotation to cut the air and assist the active faces of the blades of the main propeller in drawing the machine forward. These smaller propellers rotate within cylindrical casings of their own which it is hardly possible to supply for the main propeller on account of its size and weight, and my construction therefore has substantially all the functions enjoyed by the main propeller, and adds thereto the functions possible to a propeller within a cylindrical casing, as will be clear.

What is claimed as new is:—

1. An aeroplane propeller having an opening through certain of its blades, an auxiliary propeller mounted for rotation in said opening, and means for rotating it simultaneously with the rotation of the main propeller.

2. An aeroplane propeller having an opening through the outer end of each of its blades, a cylindrical casing fast in each opening, a smaller propeller rotatably mounted within each casing, and means for rotating all propellers in unison.

3. An aeroplane propeller having an opening through the outer end of each of its blades, a cylindrical casing fast in each opening, a smaller propeller rotatably mounted within each casing, means for rotating the main propeller by power, and means for causing the automatic rotation of the smaller propellers when the main propeller rotates.

4. An aeroplane propeller having an opening through the outer end of each of its blades, a cylindrical casing fast in each opening, a smaller propeller rotatably mounted within each casing, a friction wheel on the shaft of each small propeller, a cage inclosing the main propeller, and an annular track carried by the cage and with which said frictional wheel contacts.

5. A propeller of the class described comprising a cage consisting of outer and inner spiders, arches connecting their outer end, sleeves projecting toward each from the centers of said spiders, a main shaft journaled through both sleeves, and the propeller proper including the blades and the hub, the latter mounted on said shaft between said sleeves.

6. A propeller of the class described comprising a cage consisting of outer and inner spiders, arches connecting their outer end, sleeves projecting toward each other from the centers of said spiders, a main shaft journaled through both sleeves, a main propeller whose hub is mounted on the shaft between said sleeves and whose blades move within said arches, the blades having openings through them near their outer ends, annular tracks carried by said spiders, cages mounted in said openings, a smaller propeller disposed within each cage and with its shaft projecting to both sides of the main propeller blade, and friction pulleys on the ends of each of said shafts contacting with said tracks.

In testimony whereof I affix my signature.

EDGAR HUTCHINSON.