

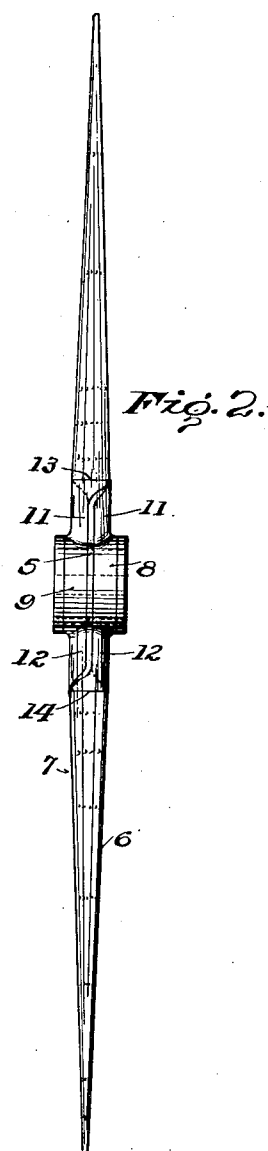
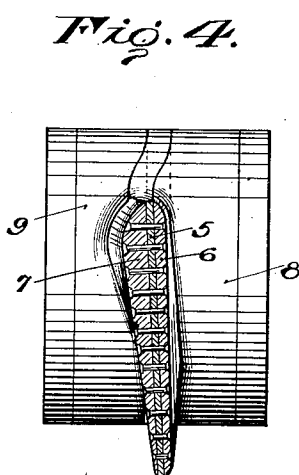
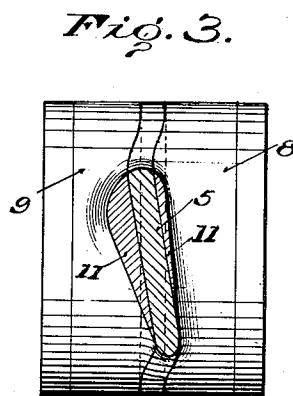
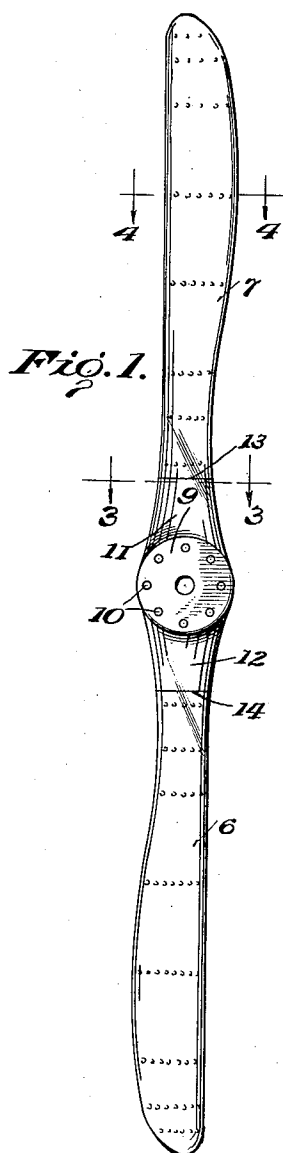
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PROPELLER

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PROPELLER

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5 Claims. (Cl. 170—159)

This invention relates to propellers and more particularly to propellers of the type which are adapted for use on aircraft.

It is an object of the present invention to provide a novel propeller which may be advantageously used in aircraft installations.

Another object of the invention is to provide a novel propeller construction employing a plurality of laminated members suitably secured together.

Still another object is to provide a laminated propeller, a novel construction including a metal member coextensive with each of the propeller blades.

A further object is to provide in a laminated propeller having a metal member disposed centrally of each blade, novel means for constructing such blades to form an aerofoil section.

A still further object is to provide a novel propeller construction combining lightness in weight with simplicity of construction and wherein few parts are required, thus enabling the same to be manufactured at comparatively low cost.

The above and other novel features of the invention will appear more fully hereinafter from the following detailed description when taken in connection with the accompanying drawing. It is to be expressly understood, however, that the drawing is for purposes of illustration only and is not to be taken as a definition of the limits of the invention. Reference will be had for the latter purpose to the appended claims.

In the drawing, wherein like reference numerals refer to similar parts through the several views:—

Fig. 1 is a front view of a propeller constructed in accordance with the present invention;

Fig. 2 is a side view;

Fig. 3 is a view partly in section taken on line 3—3 of Fig. 1; and

Fig. 4 is a view similar to Fig. 3 taken on line 4—4 of Fig. 1.

Referring now to the drawing, a propeller embodying the principles of the present invention is illustrated therein, as comprising a blade member 5 which preferably may be formed of metal, to each face of which there are affixed filler members or laminations 6 and 7, so shaped as to form with the member 5, a solid propeller blade having an aerofoil section.

According to the present invention, the metal member 5 is preferably thickest adjacent its central or hub portion, the thickness gradually decreasing toward either end in order to efficiently withstand the various forces imposed on the pro-

PELLER during operation, and at the same time to provide a light construction. The member 5, after having been trimmed to assume a proper plan form, may be placed between suitable dies and each end portion axially twisted in order to obtain the proper pitch or angle of incidence. Interchangeable hub members 8 and 9 are thereafter fitted to either side of the central portion of member 5 and are suitably secured thereto as by means of bolts, not shown, holes 10 being provided for the reception of such bolts.

Preferably, each hub member is provided with integrally formed ears 11 and 12, which extend laterally from either side of the hub, the outer ends of said ears being indicated at 13 and 14. Each hub member is shaped in such a manner as to conform snugly to the twisted central portion of the member 5, as illustrated in Figs. 2 and 3.

In order to form each blade portion of member 5 so that the same will have an aerofoil section, laminations may be secured thereto. As shown, these laminations, 6 and 7, which are preferably made of metal, are each exteriorly shaped in such a manner as to form when riveted or otherwise secured to each blade portion of the member 5, a finished blade of aerofoil section, such construction being particularly adaptable in instances of aircraft use.

It is to be noted that the central blade member 5 is fixedly secured to the hub while the exterior laminations are secured to the blade member and independently of the hub. This construction permits of ready removability of one or both of the outer filler members or laminations without the necessity of disassembling the hub.

There is thus provided by the present invention a novel propeller employing a construction wherein the blades thereof are built up from a single metal member suitably twisted in order to possess the proper pitch or angle of incidence. By employing the additional outer laminations which coact with the central member to form a blade of aerofoil section, a simple and inexpensive construction is secured which while very sturdy and rugged is also exceedingly efficient in operation. It is here pointed out that should the occasion arise, either of the outer laminations may be easily removed and another replaced, which feature is particularly advantageous in cases of aircraft wherein slight damage to one face of a blade might otherwise necessitate replacement of the entire blade.

While there has been illustrated and described a single embodiment only of the invention, it is to be expressly understood that the same is not

- limited to that shown but may be incorporated in other forms. For example, though it has been stated in the specification that the outer laminations are preferably of metal, the same may be constructed of other suitable material such as wood. It is also pointed out that any suitable number of these outer laminations may be employed if desired. It is also to be understood that the central blade member may be made in two pieces, if desired, rather than in a single piece, in which event the inner ends of each piece may be secured to the hub in any suitable manner. Various other changes may be made in the details of construction and arrangement of the parts, without departing from the spirit of the invention, as well understood by those skilled in the art. Reference will, therefore, be had to the appended claims for a definition of the limits of the invention.
- 20 What is claimed is:
1. A built-up metallic propeller comprising a metal blade member substantially coextensive with the propeller and axially twisted from the central portion toward both ends, a hub member on either side of the central portion of said blade member, means for securing said hub members directly to said blade member, metallic blade members co-acting with each side of the twisted portions of the first named blade member to form therewith a blade of aerofoil section, and means for securing the blade members to the first named metal blade member independently of the hub members.
 2. A propeller comprising a metal member of decreased thickness from its central portion toward both ends and providing a pair of blade members, the plane of each blade member being angularly disposed with respect to the plane of rotation, a pair of detachable hub members directly secured to the central portion of the metal member, and a pair of filler laminations secured to either side of said blade members and substantially coextensive therewith to form blades of aerofoil section.
 3. A built-up metallic propeller comprising a metal member forming a pair of blade members, each blade member being axially twisted to attain the desired pitch, a hub member directly secured to either side of the central portion of the metal member, and a plurality of metallic laminations affixed to each blade member independently of the hub members and conforming to the shape of the blade members, the exterior of such laminations being so shaped as to form with each blade member a finished blade having an aerofoil section.
 4. The method of constructing a metallic propeller which comprises axially twisting a flat metal blade member, securing a hub member directly to either side of the central portion of said member, laminating the end portions of said first-named member, and shaping said portions to form blades of aerofoil section.
 5. A propeller comprising an elongated flat metal member, laminations secured to the end portions of said member, and hub members secured to the central portion of said member, said hub members having projections thereon co-operating with said laminations to form a smooth outer surface, said hub members being secured to said metal member independently of the laminations.

VINCENT BENDIX.

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