T. F. HAMILTON.
SHEATHING FOR AEROPLANE PROPELLERS.
APPLICATION FILED OCT. 31, 1918.
1,404,849. Patented Jan. 31, 1922.

WITNESSES:

INVENTOR

THOMAS F. HAMILTON

BY

ATTORNEYS.
THOMAS F. HAMILTON, OF MILWAUKEE, WISCONSIN.

SHEATHING FOR AEROPLANE PROPELLERS.


Application filed October 31, 1918. Serial No. 260,489.

To all whom it may concern:

Be it known that I, THOMAS FOSTER HAMILTON, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Sheathings for Aeroplane Propellers, of which the following is a specification.

My invention relates to improvements in airplane propellers, and it consists in the constructions, combinations and arrangements herein described and claimed.

An object of my invention is to provide a novel construction in airplane propellers, whereby the metal sheathing is prevented from buckling due to the flexing of the propeller blade when driven at a high speed, and also whereby the accumulation of water especially at the outer extremity of each blade tip is prevented.

Other objects and advantages will appear in the following specification, reference being had to the accompanying drawing in which—

Figure 1 is an elevation of a propeller blade, showing the customary form of sheathing.

Figure 2 is an elevation of the same blade, illustrating the application of the improved sheathing.

Figure 3 is a longitudinal section on the line 2-2 of Figure 2.

Figure 4 is a cross section on the line 4-4 of Figure 3, and

Figure 5 is a detail view illustrating the manner of fastening the sheathing plates together.

In order that the purpose of the invention may be more fully understood, the customary manner or sheathing the end of a propeller blade is shown in Figure 1. Here the metallic sheathing 1 is applied to the tip and leading edge of the blade 2, by any suitable fastening means such as generally indicated at 3.

This metal sheath 1 is usually made of brass, copper or Monel metal and is intended to protect the tips of the propeller blades from water spray, sand and various foreign particles. Propellers that are driven by the modern high-power engines, invariably flex at the outer tips to a certain extent.

This flexure of the tips is unavoidable and in fact is to some extent desirable. It has been demonstrated in practice that a good portion of the propeller blade, including approximately two-thirds of the length of the leading edge, is subject to abuse by the elements. It is to protect the propeller blades from such abuse, that the metal sheath is made use of.

Owing to the fact that the wood will flex and return to its normal position, while the metal of the sheath will flex but will not return to its normal position, serious and dangerous vibrations are set up due to the buckling of the metal sheath under the circumstances named above. The consequent unbalancing of the propeller is furthered to a still greater degree by the admission of water between the sheath and propeller blade. Now having the existing defects in sheathed propeller blade constructions in mind, attention is directed more particularly to the invention which is designed to overcome those defects.

In Figure 2, the improved sheathing consists of a plurality of plates 4. These are applied in the overlapping arrangement illustrated at a number of places at 5 in Figure 4. In Figure 2, the dotted line 6 indicates the outline of the sheathing on the chamber side of the blade. By comparing Figures 2 and 4, it will be observed that the sheathing on the plane side of the blade extends in a little farther than it does on the chamber side.

The sheathing plates are fastened together, and to the wood of the blade, by any suitable fastening means such as rivets or screws 7.

It is to be observed in Figure 5 that the openings, in the plate beneath the overlapping part of the companion plate, are made either larger in diameter as indicated in one instance at 8, or in the shape of a slot as indicated at 9.

Even though the sheathing plates are fastened together as just described, and also fastened to the propeller blade by other means 10 between the plate joints, there is still room for movement of one plate with respect to the other by reason of the loose joints illustrated in Figure 5.

The looseness of the joints as well as the inclination thereof as well illustrated in Figure 2, enables the throwing out of water as it seeks the outer periphery under the influence of centrifugal force. It is deemed an obvious modification, to make the joints in other shapes than shown, without the necessity of making an illustration in the drawing.
It can now be understood how the improved sheathing overcomes the common defects of propeller blades previously noted. The sheathing plates 4 will follow the wooden blade in all degrees of flexure, sufficient room for relative movement being fully provided.

It may be stated in conclusion that the invention may be applied to the propellers of any type of aircraft such as aeroplanes, hydro-aeroplanes, flying boats, dirigible balloons and any other type of land and water vehicles which may be propelled by an airscrew.

The customary manner of securing the fastenings 3 in Figure 1, is to solder the same in place. This same principle is applied in joining the laps at the periphery of the blade as at 5 in Figure 4. The lapped joints 5 are loose as already explained, so as to permit the freedom of movement.

While the construction and arrangement of the sheath is that of a generally preferred form, obviously modification and changes may be made without departing from the spirit of the invention or the scope of the claims.

I claim:

1. A propeller blade, a plurality of sheathing plates applied to the tip and to the camber and plane sides of the blade along the leading edge, the joints of the plates overlapping and disposed at an inclination toward the periphery of motion of the blade, said joints being staggered on the respective sides of the blade, said plates having registering openings at the joints, the openings in the concealed parts being made larger than the ones above; fastening means passing through the joints into the blade, holding the plates together but enabling slight movement of the plates, and other fastening means for fastening the plates to the blade.

2. A sheathing for propeller blades comprising in combination a plurality of relatively short plates or sections having overlapping edges, said plates being formed to receive the leading edge of the propeller blade, and means for holding down the overlapping edges of said plates.

3. A sheathing for propeller blades comprising in combination a plurality of relatively short plates or sections having overlapping edges, said plates being formed to receive the leading edges of the propeller blade, and means for holding down the overlapping edges of said plates while permitting relative movement between the overlapping and underlying edges.

4. A propeller blade, a plurality of sheathing plates applied to the tip and to the camber and plane sides of the blade along the leading edge, the joints of the plates overlapping, said plates having registering openings at the joints, the openings in the concealed parts being made larger than the ones above; fastening means passing through the joints into the blades, holding the plates together but enabling slight movement of the plates, and other fastening means for fastening the plates to the blade.

THOS. F. HAMILTON.