Nov. 26, 1935. O. F. A. E. GRUMPELT 2,022,562

PROPELLER

Filed Aug. 31, 1934

Fig. 1

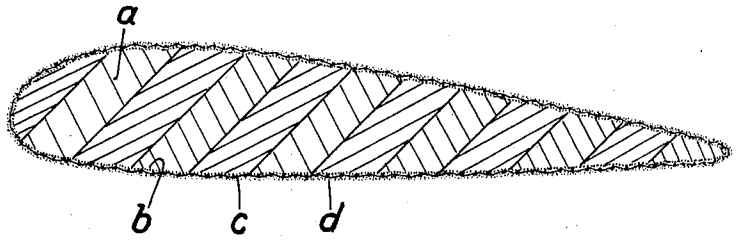
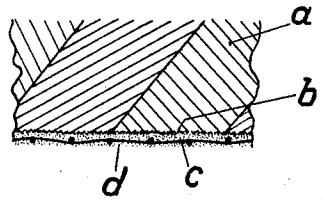


Fig. 2



Inventor:
O. F. A. E. Grumpelt,
By E. F. Neuderoth
Atty

Patented Nov. 26, 1935

2,022,562

UNITED STATES PATENT OFFICE

2,022,562

PROPELLER

Oskar Fritz Amandus Emil Grumpelt, Hamburg, Germany, assignor to the firm Grumpelt Propellerbau Gesellschaft mit beschränkter Haftung, Flughafen, Hamburg, Germany

Application August 31, 1934, Serial No. 742,339
In Germany October 13, 1930

3 Claims. (Cl. 170—159)

This invention relates to a process of sheathing a propeller blade of wood, and to a sheathed propeller produced by said process.

It has previously been proposed to cover certain parts of a propeller, particularly the edges of the blades, with a protective coating of metal, In this connection metal layers of different kinds were secured, for example, bolted, to parts of the propeller. For various reasons these known arrangements do not satisfy requirements.

It has been further proposed to provide protective coatings which extend over the entire surface of the blades, such coatings consisting, for example, of a layer of metal applied by spraying.

Further, it has been proposed to provide for air screws protective coatings composed of metal wire fabric. In the case where smoothing of the surface of the wire fabric was required, the meshes of the fabric were filled in, for example, by inserting metal or artificial masses, by pressing, spraying, soldering or the like, into the meshes.

These known arrangements are open to the objection that with the direct application of the wire fabric to the wood and subsequent spraying of the metal coating through the fabric it is not possible to obtain an entirely homogeneous covering. Further, these arrangements do not offer sufficient protection against moisture. In consequence of the different coefficients of expansion of wood and metal, the metal fabric does not cling sufficiently closely to the surface of the wood, so that fissures and crevices are produced between the wood and the wire fabric, which fissures are in part attributable to the evaporation of moisture, and in part to the formation of cracks, etc., in the metal mass subsequently pressed in or sprayed. If a crack is formed in the outer metal covering produced according to the methods heretofore known, moisture penetrates beneath this crack and spreads beneath the metal covering and so leads to rotting of the wood structure of the propeller.

These drawbacks are overcome by the present invention which consists in first spraying a metal base layer on to the wooden blade, then applying thereto and fixing an envelope of wire fabric covering the entire surface of the blade, then spraying on a coating covering the fabric envelope and penetrating the same up to the metal base layer, and then grinding the whole to the exact blade form.

In this way there is obtained the result that the protective metal sheath adheres as a whole to the propeller to be protected, as not the wire fabric but the sprayed-on metallic coating comes directly in contact with the wood. Further, the protective metallic coating has such a hold that the wire fabric cannot come away from the propeller notwithstanding the different coefficients of expansion of wood and metal.

The metal fabric can be readily and easily stretched on and adapted to the blade form, so that a tightly fitting envelope is provided.

In the accompanying drawing Fig. 1 is a transverse section of a blade of a propeller according to the invention. Fig. 2 is a detail view to a larger scale.

The propeller blade proper is preferably formed of plies *a* of wood, in which the grain is oppositely directed in adjoining plies, as in multiple-ply wood.

The process of applying the protective covering is performed as follows:—first, metal, for example, light metal, is sprayed in a thin metal base layer *b* over the entire propeller blade, the metal penetrating more or less deeply into the wood; then an envelope *c* of metal fabric is stretched over the entire surface of the blade, the fabric penetrating more or less deeply into the metal base layer which has been first sprayed on to the wood, particularly when the fabric is tightly stretched over the blade. Then the fabric is covered with a coating *d* which covers the fabric and penetrates the same up to the metal base layer. When the fabric envelope *c* is fully embedded, the whole is ground to the exact blade form and polished. Any reasonably light metal is satisfactory for both the base and fabric envelope. For example, I can use with success the zinc, bronze, copper or aluminum, or other suitable material, suggested at page 1, lines 95–97 of the U. S. patent to Luense, #1,261,141.

The envelope *c* has sufficient tensile strength to give a firm hold to the covering and to impart sufficient capacity for resistance to changes of temperature. It is preferably fixedly connected with the propeller by means of cramps or other fastening means, whereby the correct seating of the fabric after its stretching over the wooden blade is ensured.

I claim:

1. A process of sheathing a propeller blade of wood consisting in first spraying a metal base layer on to the blade, then fixing to the blade an envelope of wire mesh fabric covering the entire surface of the blade, then spraying on a coating covering said envelope and penetrating the meshes of said envelope up to said metal base

layer, and then grinding the whole to the exact blade form.

2. A sheathed propeller of wood comprising wooden blades, a base layer of metal adhering to the wood, envelopes applied to said blades and covering the entire surface thereof, and an outer coating of metal covering said envelope and penetrating said envelope up to the metal base layer.

3. A sheathed propeller of wood comprising wooden blades, a base layer of metal adhering to the wood, envelopes applied to said blades and covering the entire surface thereof, an outer coating of metal covering said envelope and penetrating said envelope up to the metal base layer, and fastening means aiding in securing the envelopes to the propeller.

OSKAR FRITZ AMANDUS EMIL GRUMPELT.