Sept. 22, 1925 1,554,326

A. BLACK

AEROFOIL CONSTRUCTION

Filed June 15, 1920

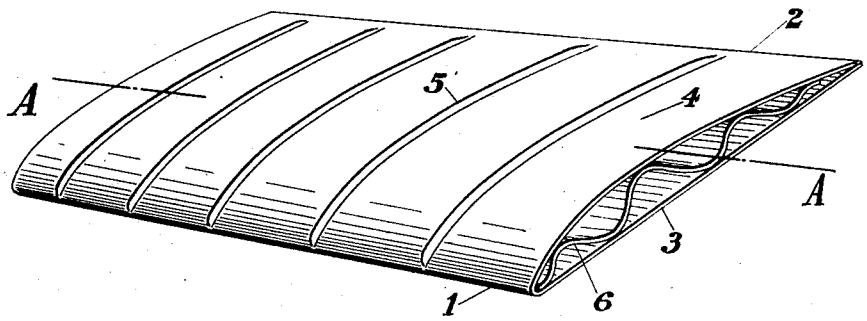

Fig. 1

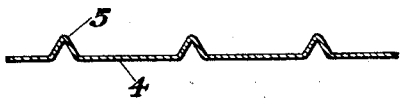

Fig. 2

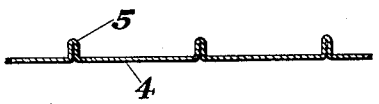

Fig. 3

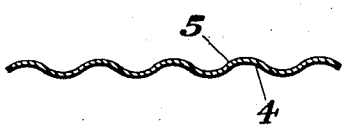

Fig. 4

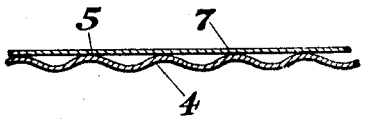

Fig. 5

Inventor

Archibald Black

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UNITED STATES PATENT OFFICE.

ARCHIBALD BLACK, OF BROOKLYN, NEW YORK.

AEROFOIL CONSTRUCTION.

Application filed June 15, 1920. Serial No. 389,090.

To all whom it may concern:

Be it known that I, ARCHIBALD BLACK, a citizen of the United States of America, residing at 1069 East 12th Street, Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Aerofoil Constructions, of which the following is a specification.

My invention relates to the construction of aerofoils such as are used for supporting surfaces, controlling surfaces or stabilizing surfaces in aerial vehicles.

Until now the method of constructing such aerofoil surfaces has been to construct a framework, usually of wood or metal, and to cover said framework with a flexible material, said material usually being a textile. The desired tautness of surfacing material is at present obtained by applying the material in such manner that a tensile stress is developed therein, enabling such flexible surfacing material to present a surface to the air which retains only approximately its original form when pressure is applied thereto.

In accordance with my invention I employ an internal member of rigid sheet material extending from side to side and from the front to the rear edges of the aerofoil and having corrugations or ribs extending longitudinally of the aerofoil. This internal member takes the place of the usual internal aerofoil structure and supports the surfacing or covering material. In the preferred form and in order to maintain substantially the desired form or curvature of such surfacing material metal, plywood, or other like material may be employed, and I propose to create a stiffness therein by the use of corrugations, or ribs, running preferably in a fore and aft direction, but which may be run in any other direction in accordance with the particular design. It is obvious that the said corrugations or ribs may be located on the exterior or interior side of the surfacing material and may be made in the surfacing or may be made separately and attached thereto, without departing from the principle of my invention.

A further object of my invention is to provide a means of construction by which the manufacture of an aerofoil surface may be facilitated by the use of surfacing material, and members to resist the bending stresses, which are adaptable to manufacture by stamping or pressing to the desired form.

Figure 1 shows a part of an aerofoil embodying my invention. Figure 2 shows a section through the surface of this aerofoil on the line A—A. Figures 3, 4 and 5 show sections similar to that shown in Figure 2, but using alternative methods of construction.

Referring to Figure 1, the leading edge of this aerofoil is indicated by 1, while the trailing edge is indicated by 2. 3 and 4 represent the lower and upper surfaces, the method of construction of one being substantially the same as that of the other, if desired. The surfacing material is provided with corrugations or ribs, 5. For the resisting of bending stresses, independently of, or in conjunction with, the surfacing material, I provide a ribbed or corrugated member or members, 6, running preferably, but not necessarily, across the direction of the corrugations or ribs in the surfacing material. I fasten the surfacing material to said member, or members, 6, in such manner that a complete structure is formed.

Although Figure 2 represents my preferred construction I have shown Figures 3, 4 and 5 in order to illustrate some of the modifications of my invention which may be made without substantially departing from the principles thereof.

In Figure 3 the surfacing material 4 is provided with ribs 5 which may be located on the inner or outer surface of 4, as may also be done in the case of Figure 2.

In Figure 4 I show surfacing material 4 provided with corrugations 5.

In Figure 5, corrugations 5 are used in the main surfacing material 4 and an outer surface material 7, is applied thereto to present a substantially smooth surface to the air.

Having thus described my invention I claim as new and desire to secure by Letters Patent:

1. An aerofoil comprising an internal rigid corrugated sheet member, and rigid surfacing material supported upon such member and having strengthening ribs extending in a direction substantially at right angles to the corrugations of the internal member.

2. An aerofoil comprising an internal rigid member of sheet material corrugated

in a direction transversely to the direction of motion, and rigid surfacing material ribbed upon its external surface and mounted upon the said rigid member, the ribs extending substantially in the direction of motion.

3. An aerofoil comprising an internal rigid member of longitudinally corrugated sheet material, and rigid surfacing material mounted upon the internal member and having strengthening corrugations formed in the surfacing material and extending in a direction substantially at right angles to the corrugations of the internal member.

In testimony whereof I affix my signature.

ARCHIBALD BLACK.