PATENT SPECIFICATION

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Complete Specification Accepted: Oct. 9, 1941.

COMPLETE SPECIFICATION

Improvements in Hollow Bodies and Methods of Manufacturing the same

I, ETTORE BUGATTI, a subject of the King of Italy, of 46, Avenue Montaigne, Paris, (Seine) France, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

The present invention relates to the manufacture of hollow bodies, especially hollow parts of aircraft, which consist of an inner box structure, which is adapted to absorb strains, and an outer covering of a readily shaped resistant material of small weight, especially balsa wood, which covering is put on the box structure, and has as its object the improvement of the said manufacture.

According to the invention, a covering of balsa wood or the like, consisting of a single part or a plurality of separate parts and having a shape corresponding to that of the box structure, is put on the latter which is bounded, at least in one section direction, by a polygonal profile with straight sides and then, after being put on the box structure, the outside of the covering is treated in such a manner by shaving-removing or scraping means (by planing, grinding, pumicing or the like) that the outside has a continuously curved profile in the section direction in which direction the inside has a polygonal profile.

Other features of the invention will be hereinafter disclosed.

Embodiments of the invention are illustrated by way of example in the accompanying drawings, in which :

Figures 1 and 2 are partial diagrammatic views of part of an aeroplane fuselage constructed by the means according to the invention, these Figures representing two successive stages in the construction.

Figure 3 is a section through an aeroplane wing also constructed in accordance with the invention.

Referring to Figures 1 and 2 of the drawings, the box structure hereinbefore referred to is constructed by fixing on joists or frames 1, laths or veneer elements 2, the arrangement of which between two adjacent joists constitutes a generated surface.

This box structure is then covered, for example, by means of adhesive, with a thick layer 3 of balsa wood which is then externally sculptured. To this end parts 3^1 of excess thickness are removed, for example, by planing, sand papering or by any other suitable means. Thus, by successive eliminations of material and trueing the external surface of the covering 3, the latter is brought to the desired shape. A fuselage is thus obtained in which the interior wall is constituted by developable surfaces and in which the external wall may be brought to assume any predetermined shape. This external wall might for example be given the shape of a non-developable surface, in which case the fuselage will generally have variations of thickness along a single generatrix, in contradistinction to the result obtained in the case of hollow or cellular elements of balsa wood made by moulding.

The fuselage is advantageously completed by fixing to the layer 3 of balsa wood, for example by adhesive, a covering 4 which may be constituted for example, by a fairing or canvas cover or by strips of veneer sufficiently thin and narrow to conform perfectly to the external surface of the layer of balsa wood even although this surface is not developable.

Thus a fuselage is obtained which has the advantage of being both light and strong and is relatively simple and economic to construct.

It will be understood that means such as have been particularly described above may be used to construct a hollow or cellular aeroplane element other than a fuselage for example for constructing a thick wing with a wing flap or aileron.

In the latter case, as illustrated by Figure 3, protecting plates having surfaces of substantially plane form may be supported on longitudinal members 1^1 of the wing or of the aileron, and may be constructed for example as veneers.

Furthermore, there is provided on these surfaces a thick layer 3 of balsa wood which is ultimately sculptured so as to conform to the profile shape to be given to the wing. The complete assembly may

[*Price* 1/-]

then be covered by a superficial covering 4.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is :—

1. A method of manufacturing hollow bodies, especially hollow parts of aircraft, which consist of an inner box structure, which is adapted to absorb strains, and an outer covering of a readily shaped resistant material of small weight, especially balsa wood, which covering is put on the box structure, characterised by the feature that a covering of balsa wood or the like, consisting of a single part or a plurality of separate parts and having a shape corresponding to that of the box structure, is put on the latter which is bounded, at least in one section direction, by a polygonal profile with straight sides and then, after being put on the box structure, the outside of the covering is treated in such a manner by shaving-removing or scraping means (by planing, grinding, pumicing or the like) that the outside has a continuously curved profile in the section direction in which direction the inside has a polygonal profile.

2. A hollow body, especially an aircraft part, manufactured by the method according to claim 1, characterised by the feature that there is put on a box structure, which is adapted to absorb strains and which has, at least in one direction of the cross-section, a polygonal profile bounded by straight lines, a covering of balsa wood or the like which consists of a number of parts and the internal wall of which has a shape that corresponds to the external shape of the box structure and is polygonal in at least one direction of its cross-section, and the external wall of which has, in the same direction of the cross-section, a profile which is bounded by a continuous curve.

3. A hollow body, especially an aircraft part, according to claim 2, the box structure of which consists of joists or frames and protecting plates which connect the joists or frames, characterised by the feature that the said plates have cross-sections which are bounded in at least one direction by straight lines and that the balsa wood forming the covering rests with its whole surface on the said plates.

4. A method of manufacturing hollow bodies, substantially as set forth herein.

5. Hollow parts of aircraft, substantially as herein described with reference to Figures 1 and 2 or to Figure 3 of the accompanying drawings.

Dated this 16th day of August, 1939.

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Fig. 1.

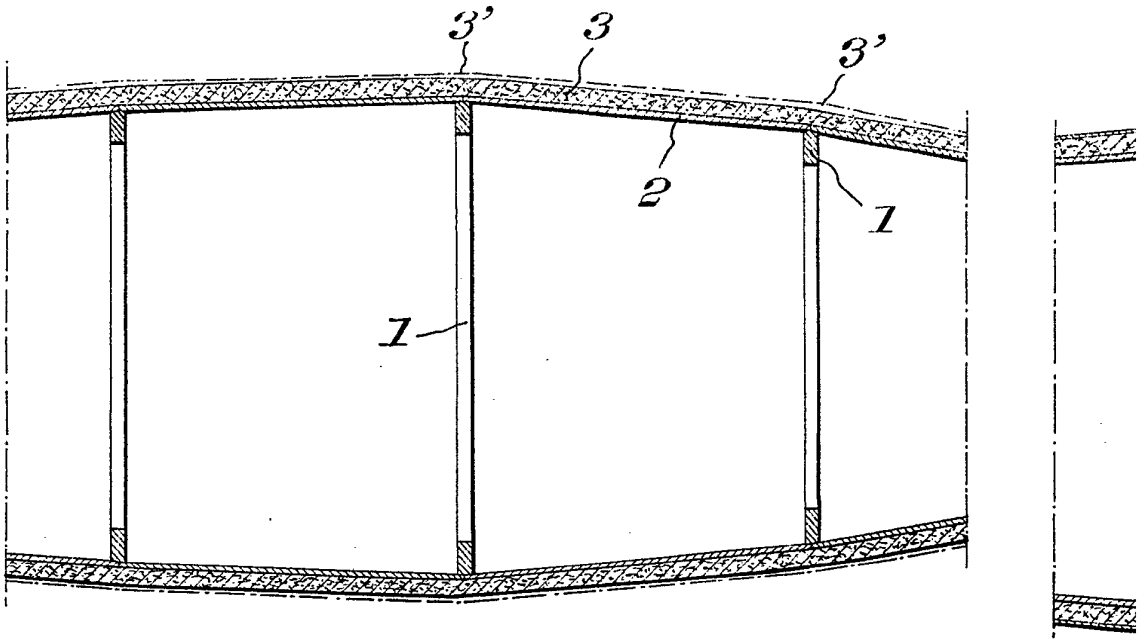

Fig. 3

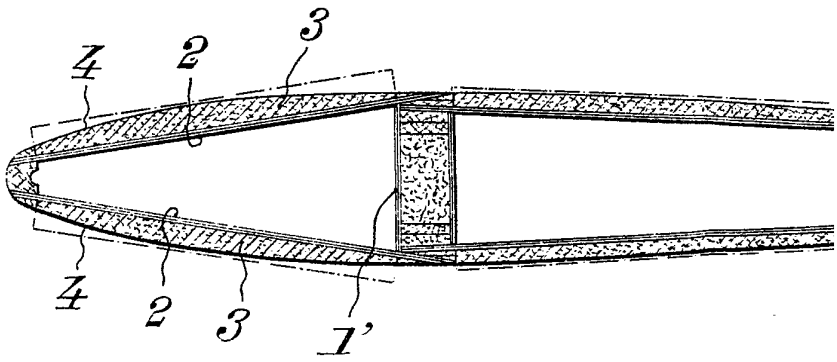

Fig. 2.

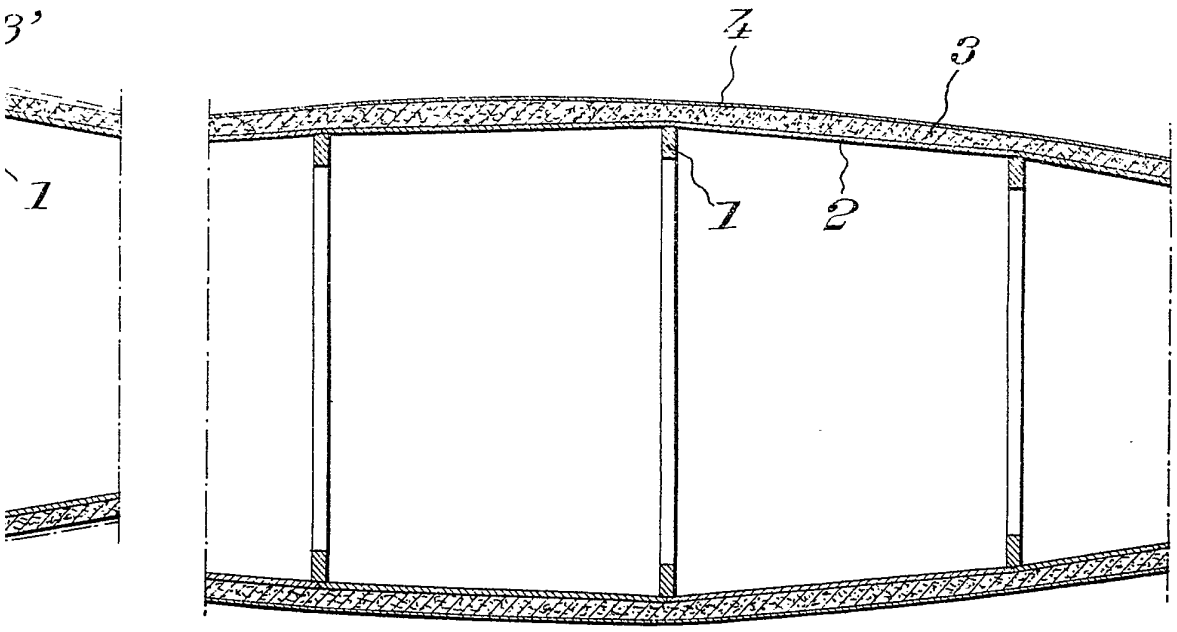

Fig. 3

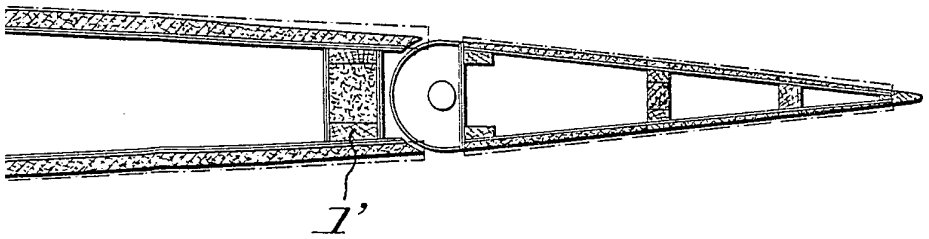

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Fig. 1.

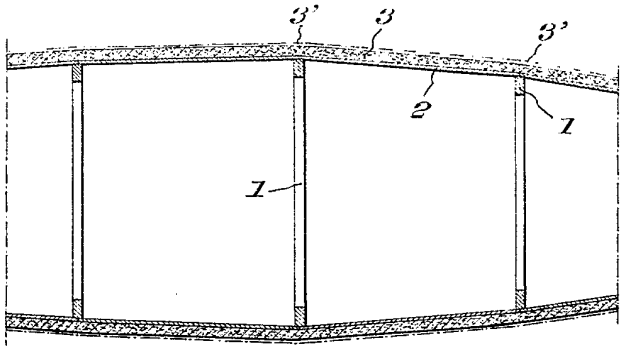


Fig. 2.

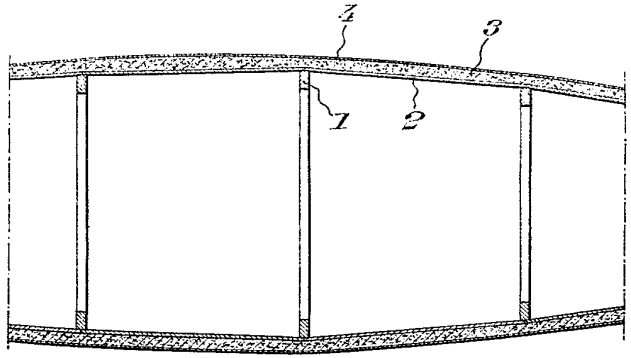
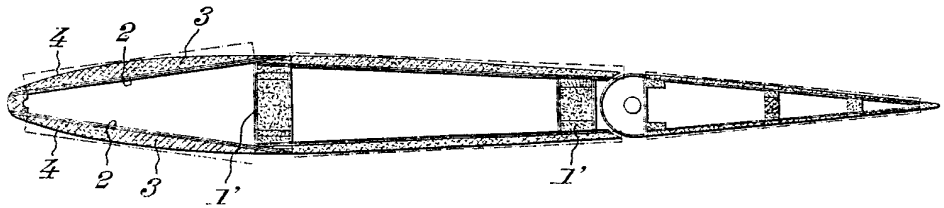


Fig. 3



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