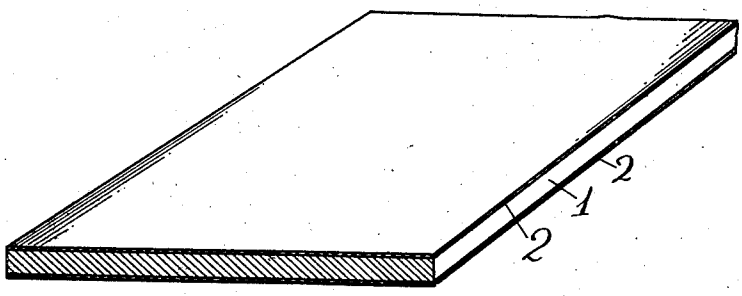
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VENEER PLATE OF ALUMINUM ALLOY

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VENEER PLATE OF ALUMINUM ALLOY

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1 Claim. (Cl. 29—181)

This invention relates to an improved veneer plate which consists of an inner plate of aluminum alloy containing zinc and having very high tensile strength and an outer plate, covering each side of the inner plate, of aluminum alloy, containing 0.5–4% of zinc and 0.1–1% of chromium. The object of this invention is to obtain a perfectly noncorrodible aluminum veneer plate by means of an increased electric solution pressure of the outer plates, compared with that of known coating materials.

In the figure, 1 indicates the inner plate and 2 the outer plates.

As is well known, ordinary aluminum alloy plates can be protected from corrosion by coating them with pure aluminum or some aluminum alloys, but some of them containing high percentage of zinc and having high tensile strength, cannot thoroughly be protected from corrosion by known coating materials especially at a cut edge or the like where the inner plate is exposed to air because the electric solution pressure of the coating materials is less than that of the inner plate and these coating materials do not work satisfactorily.

After a long series of experiments and tests in reference to the effect of various elements on the electric solution pressure of aluminum, it has been discovered that the addition of zinc and chromium in proper amounts greatly increases the electric solution pressure of the aluminum alloy and increases its noncorrosive characteristic, so that an inner plate coated with this new material can be thoroughly protected from corrosion even at a cut edge. This invention accordingly provides the coating material of an aluminum alloy containing 0.5–4% of zinc and 0.1–1% of chromium.

A plate of 1 mm, in thickness made of a known coating material and the other made of this new coating material were soaked in 3% salt water and were examined as to their electric solution pressure, with the result that their electric solution pressures were 0.8504 volt and 0.9838 volt, respectively, and it is clear from the above test that the electric solution pressure of the new material is much larger than that of the known aluminum alloys having high tensile strength like E alloys and Sander's alloys, as they are generally in the neighbourhood of 0.92.

A further examination was conducted to determine the non-corrosive characteristic of these coating materials in the following manner: two kinds of test pieces of a known coating material and this new material were subjected to proper heat treatment before the test, and they were cut into two pieces making them four in all. One set of cut pieces of the two materials was soaked in 6% salt water mixed with 10% in volume of 3% oxygenated water for two days, and the other set of the cut pieces was left exposed to the air. The result of the test of these two sets of test pieces as to their strength and elongation are given in the following table.

	Known coating material		New material	
	Tensile strength	Elongation	Tensile strength	Elongation
	Kg./mm.²	*Per cent*	*Kg./mm.²*	*Per cent*
Before corrosion	15.5	22.0	9.3	26.9
After corrosion	15.5	20.3	9.3	26.0
Percent decrease due to corrosion	0	7.7	0	2.6

From the above experiments, it is evident that the addition of zinc and chromium to aluminum or aluminum alloys, greatly increases the electric solution pressure of the coating material, which is effective for protecting the inner plate from corrosion. To put it in other words, the test above mentioned demonstrates that an inner plate of a veneer plate coated with the new material can be well protected from corrosion due to the large electric solution pressure and the noncorrodible characteristic of the coating material, so that the veeneer plate of the present invention is peculiarly well suited as a material for aircraft construction and the like.

To manufacture the coating material of this invention, an intermediate alloy consisting of aluminum and chromium should first be prepared, and this alloy should be added to molten aluminum or aluminum alloy, to which zinc is further added. Then, the ingot of this alloy should be rolled into a plate of required thickness, which is used for coating an inner plate thereby producing a non-corridible veneer plate, the aim of this invention.

What we claim is:

A duplex metal plate comprising an intermediate layer composed of an aluminum base alloy containing a high percentage of zinc and having a high solution pressure, said inner layer being provided with coating plates composed of 0.5 to 4% zinc and 0.1 to 1% chromium, the balance being aluminum.

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