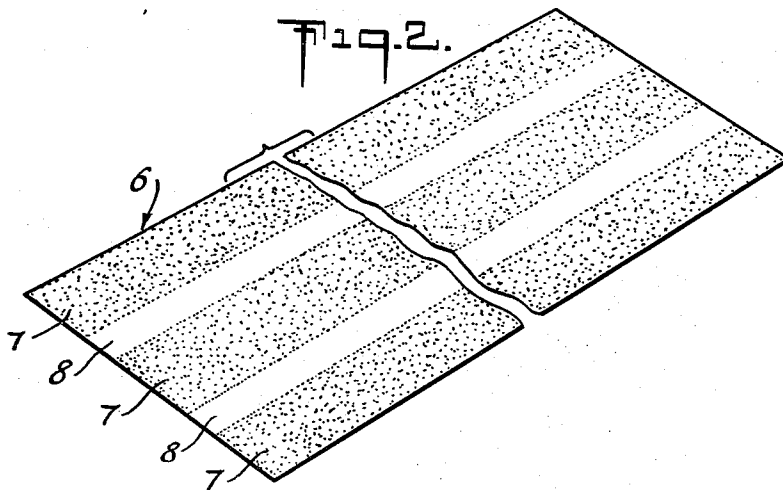
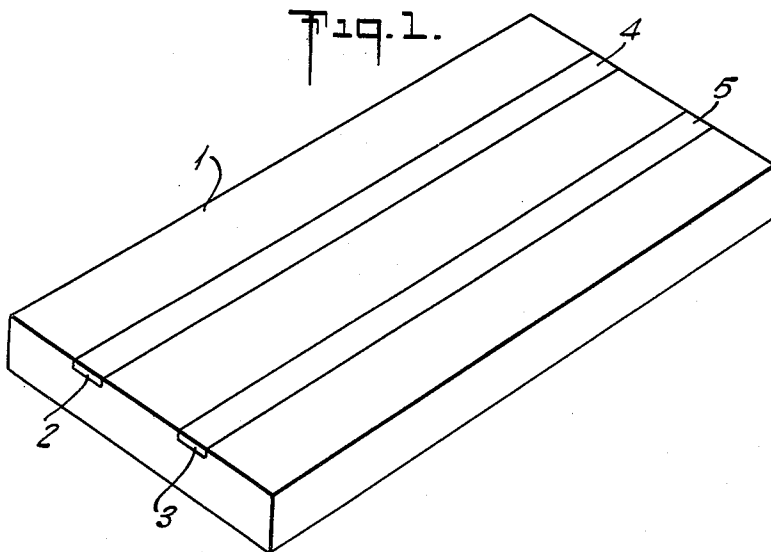


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DECORATIVE ALUMINUM PRODUCT

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DECORATIVE ALUMINUM PRODUCT

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This invention relates to the art of making rolled or extruded products, of aluminum or aluminum alloys, having surfaces rendered decorative by reason of the fact that different portions of them reflect light differently, giving a novel and pleasing effect. The uses to which the material having such surfaces can be put are numerous. As illustrative, it may be mentioned that the invention is useful in making the material from which decorative trim and articles of jewelry can be fabricated; at the other extreme, the product of the invention can take the form of large ornamental panels suitable for use in the building trades.

One method of making the product involves preselecting, say, two pieces of aluminum of different composition, that is, different in the matter of light-reflectivity after anodizing. One of the pieces, of lesser area than the other and of any desired shape or pattern, is then metallurgically bonded to the other so as to produce a smooth composite surface exhibiting both pieces. That composite surface is then anodized, the latter step serving to bring out the different reflectivities of the two pieces. In the bonding of the one piece to the other, the preferred method is to use a thinner piece for the piece of lesser area and embed it in the other or base piece by rolling, whereby a smooth composite surface is readily obtained.

In the accompanying drawings, Fig. 1 is a perspective view of a form of the invention in one stage of production; and

Fig. 2 is a similar, broken out view of the finished state of the same form.

As will be understood, the decorative effects are almost limitless in that the piece of lesser area (referred to herein as the pattern piece) can be of any conceivable outline and, of course, any number of such pieces can be bonded to the larger piece. Also, the surface treatment and finish can be varied considerably by color and otherwise, according to the particular effect desired and the following more detailed description is to be understood as being illustrative of preferred, advantageous procedures.

As is well known, what is sold commercially as aluminum contains one or more impurities; also, of course, numerous aluminum alloys are available, and the present invention makes use of the fact that the light reflectivity of these various aluminum products, after anodizing, varies according to the composition. In general, the higher the percentage of aluminum, the greater the reflectivity of the anodized surface, although it has been found that there is an outstanding exception to this generality in that the degree of reflectivity is not affected substantially by the presence of magnesium. Thus, a composition consisting of 98% aluminum and 2% magnesium is found to have a somewhat higher degree of reflectivity, after anodizing, than one containing 99% aluminum and 1% copper. Any of the other elements, however, such as silicon, manganese, iron, can be present as so-called impurities or alloying agents in the alumi-

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num and are useful for the purposes of the invention. For an extremely high degree of light reflectivity after anodizing, aluminum which is 99.99% pure is commercially available.

For economy's sake, the larger or base piece of aluminum is preferably the one having the lower or lowest degree of reflectivity, that is, having the lower or lowest aluminum content but where the cost is not material or the difference is not substantial, the arrangement can, of course, be reversed.

The bonding of the pattern piece or pieces to the base is preferably effected at the mill, where the base stock is available in slab or billet form and where after the pieces have been bonded to form a unit, they can be rolled or extruded to final or more nearly final form. For convenience herein, rolling or extruding are referred to as mechanical reducing operations. The pattern pieces do not need to be of sheet form. For example, short lengths of rod or wire of the one selected aluminum and in a desired pattern arrangement can be pressed into a hot slab of the other selected composition and thereafter the resulting unit mechanically reduced to its desired final thickness, as by rolling; or, if such pattern pieces are pressed into an extrusion billet and the composite thereafter reduced by extrusion, the finished product will exhibit more or less marble-like effects, due to the flow of the pattern pieces. The extruded product may thereafter be cold drawn, depending upon the contemplated end use.

The composite stock may then be cleaned, as by washing with an alkaline solution, brushing or the like, as may be necessary, and/or treated in a standard brightening bath. The composite surface is then anodized and sealed by any standard sealing method. As stated above, the anodizing brings out the different light reflectivities of the different compositions and also, as will be understood, the sealed oxide coating serves to make the surface durable.

It has also been discovered that, for certain uses, particularly effective results can be achieved by dyeing the anodized surface. Gold and other metallic shades give particularly striking effects. The dye can be sealed in the coating by immersing the article in a standard sealing solution.

The following alternative procedure for the production of an ornamental panel is further illustrative.

Referring to the drawings, a slab 1 of what is known in the trade as 2S aluminum alloy can be used for the base piece and it may be, say, 4" thick, 24" wide and 48" long. It will be assumed that the "pattern" is to consist of two strips extending from end to end of the wide face of the base piece. In that face of the slab, in this instance, two spaced recesses or grooves 2, 3 are milled, say, 2" wide and 1/8" deep. The grooved surface is then cleaned, as by brushing, and into the grooves are fitted two strips 4, 5 of high purity aluminum, say, 99.99% pure. The composite slab is heated to a temperature of 600-700° F. and then hot rolled. A single pass effects a metallurgical bond between the components. By continued hot rolling, the 24" slab is brought to a thickness of say, 1/4" and a length of 64". Thereafter it can be cold rolled to reduce it to the desired final thickness, which may be of the order of .032". Cut to appropriate panel lengths, the product is then treated in any suitable commercial brightening bath. The panel is then rinsed, anodized, rinsed, dyed, rinsed and sealed. In the result, there is produced a panel 6 (Fig. 2) of which the original base piece surfaces 7 exhibit reflectivity of the order of 60% of that of a silvered mirror and the "stripes" 8 exhibit reflectivity of the order of 80%. The effect is highly ornamental.

Wherever in the specification or claims, reference is made to the fact that the pattern piece is of lesser area than the base piece, it will be understood that the intended comparison is between the areas of the pieces before the one is superimposed upon the other and bonded to it. In other words, it will be clear that of the finished composite surface, the area of the base piece which remains exposed might be of lesser area than the exposed surface of the pattern piece or pieces.

Essentially the same effect can be achieved also by bonding layers having different light reflectivity after anodizing, as described, but of the same area. After bonding, the resulting composite piece is reduced to desired thickness, as before, and then, by etching or machining away portions of one of the layers, a composite surface is created which, when anodized, exhibits the same type of decorative surface effect.

In applying this method, it is preferable to reduce the composite piece to a thickness not exceeding, say, one eighth of an inch. The thinner component of the composite piece can thus be reduced to thickness of no more than a few thousandths of an inch so that, when this extremely thin layer is etched or machined away to provide the desired pattern, the resulting composite surface is still substantially smooth.

It will be understood that, in applying any of these methods, the anodizing and other finishing steps can be postponed until after the composite material has been shaped or fabricated into end product form.

This is a continuation-in-part of applicant's copending application Serial No. 462,412, filed October 15, 1954, now abandoned.

In the light of the foregoing description and exemplification of the principles of the invention, the following is claimed:

1. The method of producing a decorative surface which comprises metallurgically bonding to one surface of a first piece of aluminum a pattern piece of aluminum of different composition and lesser area to form a unit having a smooth, composite surface, the compositions of the two pieces being preselected with reference to their light reflectivity after anodizing and so as to exhibit different reflectivity after anodizing, mechanically reducing the said unit and then anodizing and sealing said composite surface.

2. The method of producing a decorative material which comprises metallurgically bonding to one surface of a first piece of aluminum a pattern piece of aluminum of different composition and lesser area to form a unit having a smooth, composite surface, the compositions of the two pieces being preselected with reference to their light reflectivity after anodizing and so as to exhibit different reflectivity after anodizing, rolling the unit to a desired finished thickness, and then anodizing and sealing the said composite surface.

3. The method of producing a decorative material which comprises metallurgically bonding to one surface of a first piece of aluminum a pattern piece of aluminum of different composition and lesser area to form a unit having a smooth, composite surface, the compositions of the two pieces being preselected with reference to their light reflectivity after anodizing and so as to exhibit different reflectivity after anodizing, extruding the unit to a desired finished form, and then anodizing and sealing the said composite surface.

4. The method of producing a decorative surface which comprises rolling into the surface of one piece of aluminum a pattern piece of aluminum of lesser area and different composition to form a unit having a smooth, composite surface, the composition of the two

pieces being preselected with reference to their light reflectivity after anodizing and so as to exhibit different reflectivity after anodizing, mechanically reducing the said unit and anodizing and sealing the said composite surface.

5. The method of producing a decorative surface which comprises forming a recess in a surface of a first piece of aluminum, fitting into said recess a second piece of aluminum of different composition, the compositions of the two pieces being preselected with reference to their light reflectivity after anodizing and so as to exhibit different reflectivity after anodizing, metallurgically bonding the pattern piece to the first piece to form a unit having a smooth, composite surface, mechanically reducing the unit and then anodizing and sealing said composite surface.

6. The method of producing a decorative surface which comprises metallurgically bonding to one surface of a first piece of aluminum a pattern piece of aluminum of different composition and lesser area to form a unit having a smooth, composite surface, the compositions of the two pieces being preselected with reference to their light reflectivity after anodizing and so as to exhibit different reflectivity after anodizing, mechanically reducing the said unit and then successively anodizing, dyeing and sealing the said composite surface.

7. The method of producing a decorative surface which comprises metallurgically bonding to one surface of a first piece of aluminum a pattern piece of aluminum of different composition and lesser area to form a unit having a smooth, composite surface, the compositions of the two pieces being preselected with reference to their light reflectivity after anodizing and so as to exhibit different reflectivity after anodizing, and then anodizing and sealing said composite surface.

8. An article having a decorative surface of anodized aluminum, which comprises at least two pieces of aluminum metallurgically bonded together as a unit, one of said pieces forming a base and extending beneath the other of said pieces, said pieces being of different compositions and different light reflectivity when anodized, said unit having an anodized composite surface in which portions of both of the pieces are visible with the difference in light reflectivity of the two pieces defining a pattern on said composite surface.

9. An article having a decorative surface of anodized aluminum as defined in claim 8 wherein the anodized surface formed by the two pieces is sealed.

10. An article having a decorative surface of anodized aluminum as defined in claim 8 wherein the anodized surface formed by the two pieces is dyed and sealed.

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