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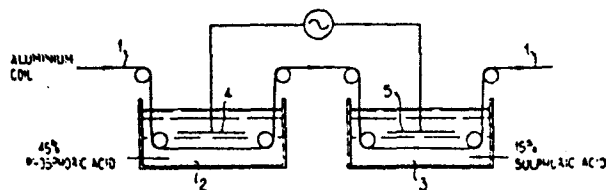
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54 **A process for the anodic treatment of a continuous web of aluminium foil, foil so obtained and its application as a lithographic printing plate.**

57 Aluminium web (1) is passed through a first bath (2) containing phosphate ions and a second bath (3) containing sulphate ions and is anodised by passing alternating current between electrodes (4, 5) immersed one in each bath. The product is especially suitable for use as a base for a presensitised lithographic printing plate.



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TITLE MODIFIED

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TREATING ALUMINIUM

This invention relates to the anodic treatment of foil of aluminium (including its alloys) in continuous web form. Primarily, but not exclusively, it is concerned with the pre-treatment of aluminium foil that is subsequently to be coated with photosensitive material to make a presensitised lithographic printing plate.

Aluminium foil for this purpose is almost always anodised, generally using a bath based on sulphuric acid, though phosphoric acid is used by at least one manufacturer. Sulphuric acid gives a hard, adherent and abrasion-resistant coating, but there are problems in getting satisfactory adhesion of some attractive sensitive coatings (for example polyvinyl cinnamate among negative-working coatings and orthoquinone diazide sulphonate-based resists amongst positive-working coatings). Phosphoric acid anodising gives much better adhesion with these and some other coatings, but the anodic coating is much softer and tends to abrade away during printing to an extent that may limit the number of copies that can be taken off the plate.

In some cases aluminium foil that has been anodised in sulphuric acid has been treated subsequently with phosphoric acid, and this has been found to give a useful improvement in adhesion while retaining part of the advantages of the use of sulphuric acid for

anodising, but this prevents obvious difficulties in control of the operation.

The invention is based in part on the realisation that anodic oxidation takes place at the surface of the metal, not of the coating, and that it will not of itself destroy the existing exposed surface of the coating.

In accordance with the invention, a continuous web of aluminium foil is passed through a first bath containing phosphate ions and a second bath containing sulphate ions and is anodised by passing alternating current between a first electrode immersed in the first bath and a second electrode immersed in the second bath.

The phosphate and sulphate ions may be the only anions present to any substantial extent in the respective baths, but the presence of other anions that are inert or that modify, rather than radically alter, the effect of the treatment may be present. In particular the presence of minor amounts of sulphate in the phosphate bath and/or of phosphate in the sulphate bath is not excluded. We prefer that the associated cations should be wholly or mainly hydrogen ions, but neutral or alkaline salt solutions may be suitable in some cases.

The method of the invention avoids the need for rectification equipment and yet allows both positive and negative half-cycles to be used in anodising; because of the superior combination of good adhesion and abrasion resistance, only thin coatings are required for lithographic printing plates, and this avoids any significant difficulty from migration of dye when a coloured sensitive coating is used to obtain a visible image on development.

Example .

The accompanying drawing shows the distinctive part of apparatus for the manufacture of printing plates in accordance with the invention.

Aluminium foil web is continuously advanced
5 through the apparatus, and is first slurry-grained in the usual way, etched in a bath comprising 5g/l sodium hydroxide and 5g/l sodium gluconate at 20°C, dwell time in the bath being four minutes; then washed in de-ionised water for four minutes; and then treated
10 for four minutes in a bath containing 22.5g/l of a brightening agent sold under the designation "Aluminux no. 1 Etch" at 20°C and again washed in de-ionised water for four minutes.

Referring now to the drawing, the web 1 is
15 now passed through a first bath 2 containing 45% ortho phosphoric acid and a second bath 3 containing 15% sulphuric acid. Each bath is at 20°C and the dwell time is 4 minutes in each bath. Alternating electric current is supplied to two inert electrodes 4 and 5,
20 one immersed in each bath, the web 1 providing the electrical connection between the two baths. The current density, referred to the area of web (one side) facing the electrode in each bath, is 200 A/m² at 21 V.

25 After washing in de-ionised water for a further four minutes, a bright and very hydrophilic anodised finish is obtained, which can be coated with conventional photolithographic coatings to give a plate with an excellent combination of coating adhesion
30 and abrasion resistance (press life). Using a proprietary positive-working lithographic resist comprising a resin sensitised with the 2, 4 dihydroxy-benzophenone ester of 1, 2, 5 diazo naphthol sulphonic acid and coloured with a blue dye yields presensitised
35 plates that were in a satisfactory condition after

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exposure at 35° to a relative humidity of 85%:
conventional sulphuric acid anodising of comparable
thickness gave a plate that became unusable after about
two weeks.

It is believed that the benefits of the
invention are attributable partly to modification of the
pore structure of the anodic oxide coating and partly to
the incorporation into the coating of small quantities of
phosphate ions.

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CLAIMS

1. A method of anodically treating a continuous web of aluminium foil comprising passing it through a first bath containing phosphate ions and a second bath containing sulphate ions and anodising it by passing
5 alternating current between a first electrode immersed in the first bath and a second electrode immersed in the second bath.
2. Anodised aluminium foil anodised by the method claimed in Claim 1.
- 10 3. A method of making a presensitised lithographic printing plate comprising anodising a continuous web of aluminium foil and subsequently applying a lithographic photosensitive coating to it, characterised in that the web is anodised by the method claimed in Claim 1.
- 15 4. A presensitised lithographic printing plate made by the method claimed in Claim 3.

