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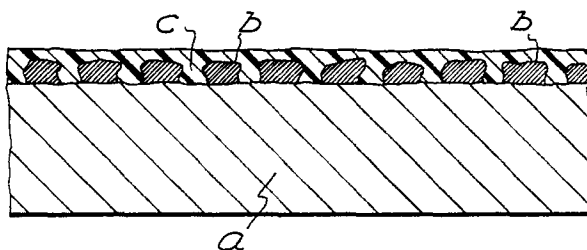
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(54) A method of coating a metal surface so as to render it non-stick and abrasion-resistant.

(57) In order to achieve a non-stick surface which is significantly harder wearing than hitherto, metal surface *a* is sand or shot blast and stainless steel or molybdenum is applied thereto so as to cover not less than 65% and not more than 90% thereof and provide a pervious intermediate substrate *b* having a micro-crenellated surface. Thereafter, a primer coat is applied to penetrate pervious layer *b* and finally a top coat, consisting primarily of a nonstick agent *c*, such as P.T.F.E, is applied so as to form a matrix of stainless steel or molybdenum impregnated with and covered by the non-stick agent.



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A METHOD OF COATING A METAL SURFACE SO AS
TO RENDER IT NON-STICK AND ABRASION-RESISTANT

This invention relates to a method of coating a metal surface so as to render it non-stick and abrasion-resistant.

A known method of applying a non-stick coating
5 to the metal surface of an article includes the steps of preparing the surface in conventional manner to receive a sprayed coating of molten metal, spraying over said surface a coating of stainless steel or molybdenum to provide a continuous and
10 impervious micro-crenellated intermediate surface

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with microscopic preminences and interstices,
abrading said intermediate surfaces to remove any
surface film such as oxide, applying a coating of
a non-stick agent to the abraded surface and sinter-
5 ing or curing the coating so as to provide a firmly
bonded complete covering to the sprayed metal coating.

In the above method, the metal spray is applied
to provide an impervious coat on top of which a
layer of a non-stick agent, usually P.T.F.E.
10 (polytetrafluoroethylene), is applied. Due to the
application of the metal spray, the finished coating
lasts longer than a coating of P.T.F.E. applied
directly onto the base metal. Nevertheless, in time,
the P.T.F.E. coating is worn away from the surface of
15 the sprayed-on metal layer and the non-stick property
of the surface diminishes.

An object of the present invention is to provide
an improved method of applying a non-stick coating
to a metal surface whereby the coating lasts consider-
20 ably longer than hitherto.

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With this object in view, the present invention provides a method of coating a metal surface so as to render it non-stick and abrasion-resistant characterised in that the stainless steel or molybdenum b is sprayed onto the metal surface a so as to cover not less than 65% and not more than 90% thereof so that the intermediate substrate is pervious, and in that, prior to application of the non-stick agent, a primer coating is applied to penetrate the intermediate substrate so that a matrix of stainless steel or molybdenum b impregnated with the non-stick agent c is formed on the metal surface a.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a sectional elevation of a shot blasted metal surface;

Fig. 2 is a similar section after application of a steel or molybdenum coating; and

Fig. 3 is a similar section to that shown in

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Fig. 2 after the application of a coating including a non-stick agent to form an impregnated matrix.

In a preferred method in accordance with the invention a base metal surface a to be rendered
5 non-stick is firstly shot or sand blasted (Fig. 1). Stainless steel or molybdenum is flame sprayed onto the base metal surface a so as to cover not less than 65% and not more than 90% of the metal surface a and provide a pervious intermediate substrate b
10 having a micro-crenellated surface (Fig. 2). The thickness of the pervious substrate b is, for example, between 0.025 and 0.050 mm.

Once the intermediate pervious substrate b has cooled, a primer of sufficiently low viscosity
15 to penetrate said pervious layer is applied thereto and air or oven dried at about 120°C to 150°C and allowed to cool. The primer may be aqueous-based or resin-based, the latter being used whenever a non-corrosible final non-stick surface is required.
20 A suitable aqueous-based primer would be 10 parts P.T.F.E. to 1 part pigment and a suitable resin-based

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primer would be 20 parts resin to 24 parts pigment. It will, however, be appreciated that these are only examples and many other mixtures or solutions of differing composition may be useful.

5 After the primer has dried and cooled, a second or top coat, consisting primarily of a non-stick agent such as P.T.F.E. or T.F.E./H.F.P. (Tetrafluoroethylene/polyhexafluoropropylene), is applied there-
over and stored at temperature of 200°C to 450°C for
10 twenty to thirty minutes. A suitable top coat for use after an aqueous-based primer is 16 parts P.T.F.E. to 1 part pigment and a suitable top coat for use after a resin-based primer, when a non-corroding surface is required, is 13 parts P.T.F.E. to 11 parts
15 P.E.S. (polyethyl sulphone).

The non-stick agent c is able to penetrate right through the pervious substrate b to the metal surface a. Fig. 3 illustrates the resultant matrix of stainless steel or molybdenum b impregnated and
20 coated with non-stick agent c upon the original metal surface a. This coating lasts considerably

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longer, i.e. is much more resistant to wear, than any
previously known non-stick coating.

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CLAIMS

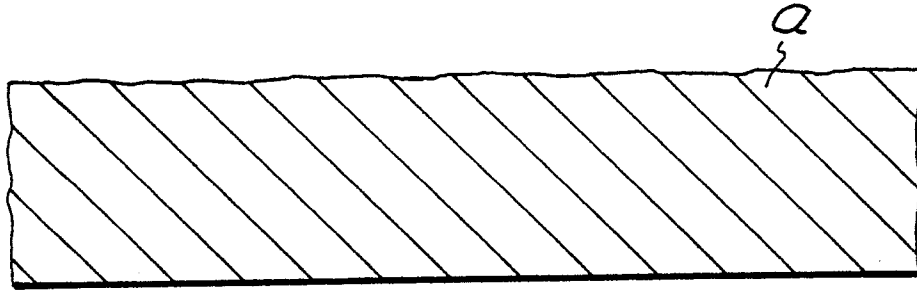
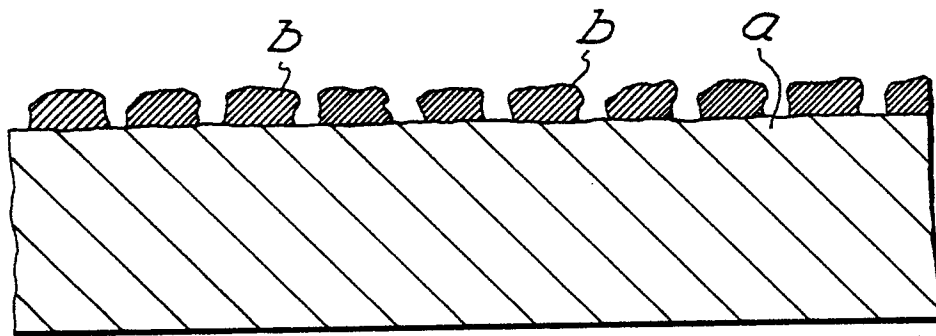
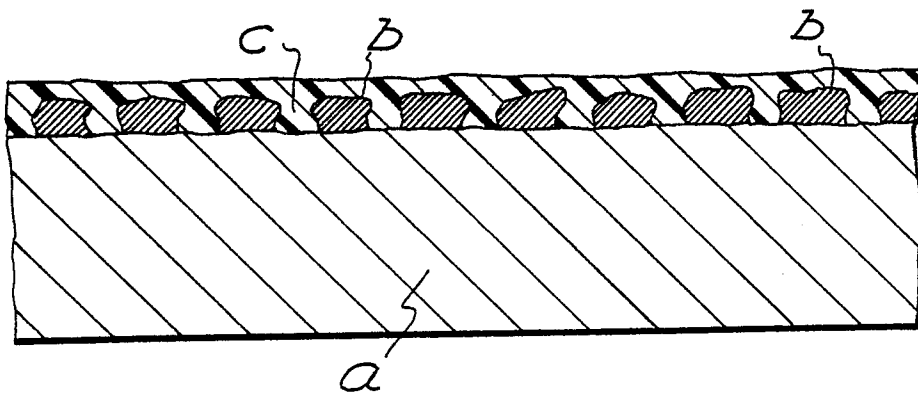
1. A method of coating a metal surface to render it non-stick and abrasion-resistant comprising the steps of preparing the surface in conventional manner to receive a coating of molten metal,
5 spraying stainless steel or molybdenum onto said surface to provide an intermediate substrate having a micro-crenellated surface and applying a coating, primarily of non-stick agent, to the intermediate substrate, characterised in that the stainless steel
10 or molybdenum b is sprayed onto the metal surface a so as to cover not less than 65% and not more than 90% thereof so that the intermediate substrate is pervious, and in that, prior to application of the non-stick agent, a primer coating is applied to
15 penetrate the intermediate substrate so that a matrix of stainless steel or molybdenum b impregnated with the non-stick agent c is formed on the metal surface a.
2. A method as claimed in claim 1 wherein the
20 intermediate substrate is between 0.025 mm and 0.050 mm thick.

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3. A method as claimed in claims 1 or 2 wherein the primer coat applied to the pervious substrate is air or oven dried at 120°C - 150°C.
4. A method as claimed in any of claims 1 to 3,
- 5 wherein the non-stick agent is P.T.F.E. or T.P.E/H.F.P. and the top coat applied to the primer layer is stoved at a temperature of 200°C - 450°C.
5. A non-stick and abrasion-resistant surface coating formed by the method claimed in any preceding
10 claim.

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FIG. 1.FIG. 2.FIG. 3.



European Patent
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EUROPEAN SEARCH REPORT

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Application number

EP 83 30 1270

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Y	LU-A- 52 870 (W. KIDDE) * Claim 6; page 5, above; page 6, below *	1-4	B 05 D 5/08 B 05 D 7/16 C 23 C 7/00 B 05 D 5/00
Y	FR-A-2 114 218 (TEFAL) * Page 6, lines 10-30 *	1-4	
A	FR-A-2 055 735 (S.A.I.M.A.P.) * Page 3, line 27 - page 4, line 25 *	1, 4	
A	FR-A-1 525 920 (K. & F. TREATMENTS) * Page 1, left-hand column, below - page 3, right-hand column, above *	1, 4	
A	FR-A-2 088 574 (TEFAL) * Page 4, lines 35-40 *	1	TECHNICAL FIELDS SEARCHED (Int. Cl. 3) B 05 D C 23 C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20-07-1983	Examiner FRIDEN N.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			