

May 12, 1953

J. E. GORDON ET AL.
METHOD OF PRODUCING A METAL FACING
ON HARDENABLE MATERIAL
Filed Feb. 21, 1949

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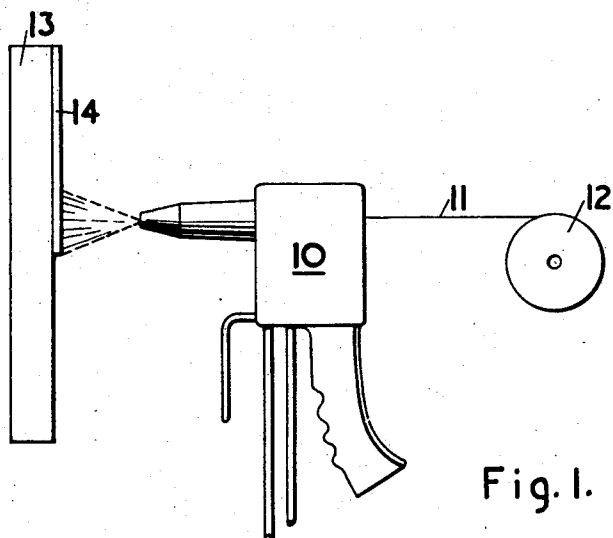


Fig. 1.

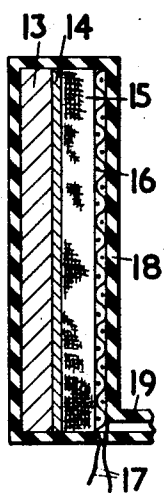


Fig. 2.

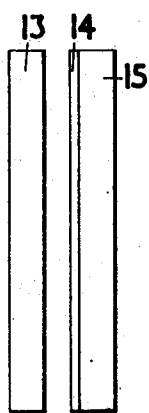


Fig. 3.

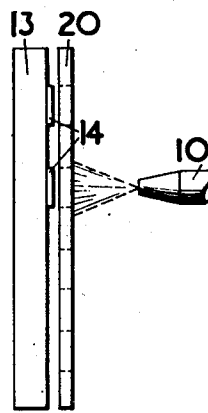


Fig. 4.

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UNITED STATES PATENT OFFICE

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Application February 21, 1949, Serial No. 77,646
In Great Britain February 23, 1948

7 Claims. (Cl. 154-96)

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This invention relates to the provision of metal facings on materials.

According to the invention, a metal facing is produced by depositing a porous metallic layer on a hard, substantially continuous form surface, pressing a hardenable material into contact with the porous metallic layer, causing or allowing the hardenable material to harden and subsequently separating the now metal-faced hardened material from the form surface. The expression "substantially continuous" is used in connection with the form surface to indicate a surface which is substantially free from interstices into which the metallic layer could become keyed.

The porous metallic layer on the form surface may conveniently be produced by spraying and material upon which the metallic facing is eventually provided may be any suitable hardenable material, such as plaster, cement or a resinous material, which can be caused to key into the interstices of the metallic layer. The hardenable material should not be one which will itself react with the metal in a manner to produce undesirable results or one the hardening of which requires the use of a material which will so react.

When the deposition of the porous metallic layer is achieved by spraying, certain limitations are desirable or essential. The production of a porous, fine grained layer is facilitated by the use of a metal of relatively low melting point and latent heat and the form surface must be of a hardness sufficient to ensure that it is not to any appreciable extent pitted by the impact of the particles of molten metal which are flung against it.

Examples of processes in accordance with the invention are illustrated by the accompanying drawings, in which—

Figure 1 is an elevational view illustrating the deposition of a metallic layer on a form surface by spraying.

Figure 2 is a view similar but in section illustrating the moulding of a layer of resinous material in intimate contact with the metallic layer.

Figure 3 is a view similar to that of Figure 1 illustrating the separation of the hardened, metal-faced resinous material from the form surface and

Figure 4 is a similar view illustrating the deposition of a patterned metallic layer on the form surface.

In the first step of the process illustrated by Figures 1 to 3, an oxy-hydrogen gun 10 is used to melt zinc wire 11, drawn from a supply 12, and

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spray molten zinc particles on to a highly polished stainless steel form surface 13, as shown in Figure 1. The production of a fine-grained layer 14 of zinc on the stainless steel surface is facilitated by pre-heating the latter to about 100° C. and moving the gun fairly rapidly over the surface to prevent excessive local heating thereof; the gas controls of the gun are so set that a hot flame is obtained and the compressed air control is adjusted to give a high turbine speed and a relatively low spraying pressure. A factor which limits the desirable thickness of the zinc layer is the mechanical effect due to contraction which tends to cause too thick a layer to curl and separate from the form surface; in general, a thickness in the neighbourhood of ten thousandths of an inch is appropriate.

In the next step, illustrated by Figure 2, a felt 15 of asbestos fibre impregnated with a thermosetting resin (e. g. a partially polymerised phenol-form aldehyde condensation product) is placed in contact with the layer 14 and a layer 16 of cellular material is placed in contact with the felt; electrical heating elements, the leads of which are shown at 17, are incorporated in the cellular material. The whole is then placed in a rubber bag 18, which is sealed and then evacuated by way of a connection 19. Whilst the felt is pressed against the metallic layer, heat is applied, as necessary to effect curing of the resin, by the electrical heating elements and gases evolved in the curing process are withdrawn by way of the connection 19, such withdrawal being facilitated by the presence of the cellular material 16.

During the moulding process illustrated by Figure 2, the resinous material intimately associated with the porous zinc layer penetrates and becomes keyed into the interstices thereof, with the result that the zinc will adhere strongly to the moulded and hardened felt. When the rubber bag is removed, the metal-faced, hardened felt may be easily separated from the steel surface, as illustrated by Figure 3.

In a second example of a process in accordance with the invention, a porous zinc layer is produced on the stainless steel form surface as previously described and illustrated and the porous layer is painted with a partially polymerised polyester resin (e. g. that known under the trade name Marco 21C) catalysed by mixing it with 10% of its weight of a solution comprising 10% by weight of lauroyl peroxide catalyst in a suitable resin monomer. Glass fibre cloth impregnated with the same partially polymerised catalyzed resin is then laid in contact with the painted surface and

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cured under suitable conditions of temperature and pressure: the curing cycle employed should start from cold with gradual warming until the gel stage is reached, in order to prevent the formation of bubbles. At the completion of the curing process, the metal-faced hardened resinous material may be easily separated from the form surface as described above with reference to Figure 3.

Where a discontinuous or patterned facing is required on the finished article, an appropriately discontinuous metallic layer may be formed on the form surface during the first step. Thus, for example, when the deposition of the layer is by spraying, a stencil may be used, as indicated at 20 in Figure 4, the stencil being slightly spaced from the form surface to avoid damage to the metallic layer upon removal of the stencil.

Metal facings produced in accordance with the invention may be polished in any suitable manner, for example by light buffing, and the metal-faced material may be used for a variety of purposes.

Examples of applications of the invention are the production of cheap, light mirrors and cases in which an electrically conducting surface is required on an insulating material, for instance in connection with radio aerial systems for aircraft. In particular, the invention is of very useful application in cases where two dimensional curvature is required, as in the production of metal-faced moulds.

We claim:

1. A method of producing a metal facing on hardenable material comprising depositing a porous metallic layer on a hard, substantially continuous form surface, placing hardenable material in contact with the metallic layer, applying pressure to the hardenable material during hardening thereof to thereby force portions of said hardenable material into pores of said metallic layer during said hardening step and subsequently separating the metal-faced hardened material from the form surface.

2. A method of producing a metal facing on hardenable material comprising spraying a layer of metal on to a hard substantially continuous form surface in such a manner that the layer is porous, pressing hardenable material into contact with the said porous layer, portions of said hardenable material thereby entering the pores of said layer, effecting hardening of the hardenable material during the pressing and subsequently separating the metal faced hardened material from the form surface.

3. A method of producing a metal faced article comprising spraying molten zinc particles on to a heated smooth metallic form surface to form a porous metallic layer thereon, pressing res-

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inous material against the porous surface to cause portions of said resinous material to enter the pores of said surface, curing the resinous material and subsequently separating the cured metal-faced resinous material from the form surface.

4. A method of producing a metal-faced article comprising spraying molten metal particles on to a substantially continuous form surface to form a porous layer thereon, moulding a thermosetting resinous material while it is pressed in contact with the porous layer so that the resin enters the pores thereof, and subsequently separating the metal-faced resinous article from the form surface, the gases evolved during the curing of the resinous material being removed by suction by way of porous material pressed into contact with that face of the resinous material which is remote from the metallic layer.

5. The method of producing a metal surface having a thick backing of insulating material which includes depositing on a form surface a discontinuous thin layer of metal, the discontinuities being small pores in the metallic layer, pressing a surface of a hardenable insulating material into firm contact with one face of said metallic layer while said material is plastic thereby forcing portions of said material into said pores, hardening said insulating material, and separating the metal faced insulating surface from said form surface.

6. The method of claim 1 in which said hardenable material is of a type that is porous and which emits gas when subjected to hardening treatment, said method including the step of applying suction to that surface of said material opposite the one in contact with said metallic layer during the hardening of said material.

7. The method of claim 5 in which said hardening step occurs simultaneously with said pressing step.

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