

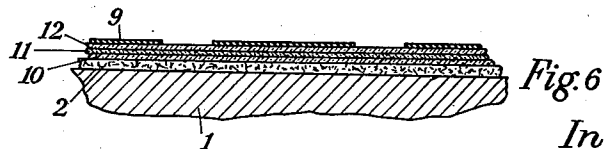
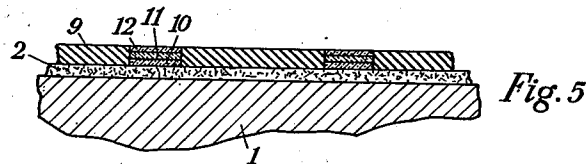
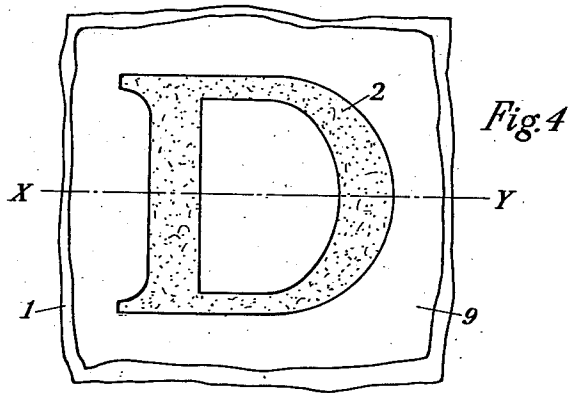
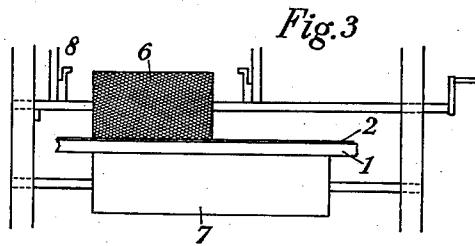
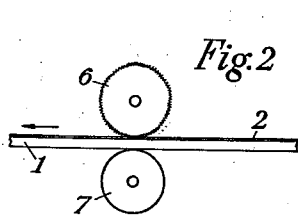
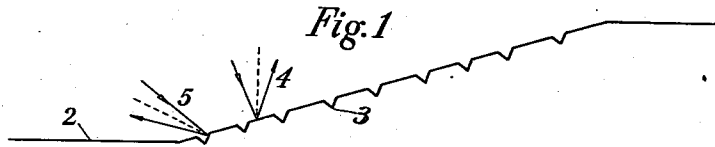
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REFLECTING SIGN OR SIGNAL

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UNITED STATES PATENT OFFICE

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REFLECTING SIGN OR SIGNAL

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16 Claims. (Cl. 40—135)

The present invention relates to signs or signals, and more particularly to reflector signs or signals such as are used on roads etc., for giving warnings to traffic or pedestrians, or for any other suitable use either in daylight or in artificial light.

I have already described in my French Patent No. 744,808 a method of manufacturing signs or signals of the above type, according to which a backing plate, preferably of metal, is covered with a reflecting layer of a metal in the crystalline form, such as a deposit of zinc obtained by galvanization under heat. The signs, letters or designs comprising the signal are then formed on this reflecting layer by means of a coating or layer of an opaque material or substance so that they appear either bright on a dark background or dark on a bright background. Such a signal or sign is plainly visible at night as well as during the day, due to the scintillation of the metallic crystals which reflect in all directions the light proceeding from any luminous source, the crystals forming as it were small mirrors acting in a great number of different planes.

However, it has been found that the good visibility of the signs does not last owing to the tarnishing of the metallic crystals used (zinc, tin, aluminium etc.) under the action of the air and different weather conditions. It has already been attempted to overcome this tarnishing by covering the surface of the crystals with colourless or sometimes coloured protective varnish. However, it has also been found that the varnish adheres badly to the crystals, as the polished surfaces of the latter do not lend themselves to a good adherence of the varnish. Moreover, most varnishes, particularly when they are coloured, are attacked in time by the metallic crystals and lose their clearness and flexibility.

In order to ensure the adherence of the varnish to the surface of the crystals, it has been endeavoured to make this surface grainy or rough by a sand jet treatment or by the action of a chemical agent, but all the attempts hitherto made on these lines have not solved the problem; in particular, the above treatments have always been found to dirty and tarnish the crystalline surface instead of preserving the desired brilliance thereof.

One object of the present invention is to overcome the above difficulties and to provide a sign or signal of the above type which has the advantage that the exposed parts of the reflecting crystalline metallic surface are maintained sub-

stantially unaltered and bright under all conditions.

A second object of the invention is to provide a method of increasing the reflecting power of metallic crystals forming a reflecting surface on an opaque backing material, particularly when such reflecting surface is used in a sign or signal of the above type.

Another object of the invention is to provide a method of increasing the adherence of a protective transparent layer to a reflecting crystalline metallic surface, without decreasing, but even increasing at the same time, the reflecting power of the latter, particularly when the said crystalline surface is used in a sign or signal of the above type.

A further object of the invention is to provide a protective coating for the reflecting crystalline metallic surface which is not susceptible to chemical attack by the said metallic surface or impaired by atmospheric conditions.

Another object of the invention is to provide a protective coating for the reflecting crystalline metallic surface which protective coating may be coloured without the said coloured coating coming into contact with the crystalline metallic surface or the atmosphere.

The invention will be more clearly understood from the following description given by way of example with reference to the accompanying drawing of preferred embodiments thereof. In the drawing:

Fig. 1 represents the surface of a reflecting metallic crystal treated according to the invention.

Figs. 2 and 3 represent means which may be employed in the treatment of the surface of the crystal of Fig. 1.

Fig. 4 represents a portion of a reflector sign according to the invention having a design formed thereon.

Figs. 5 and 6 illustrate two preferred embodiments of reflector signs according to the invention.

As shown in Fig. 1, it has been found according to the invention that the reflecting power of a metallic crystalline surface and the adherence offered thereby to a layer of a transparent substance, such as a varnish, can be increased, before the application of the said layer of varnish to the crystal, by means of a fine pricking or picotting of the surface of the crystal. In Fig. 1, 2 is the surface of one of the metallic crystals and 3 represents the picotting formed thereon according to the invention. The picotting is preferably

effected by finely pricking the crystalline surface before varnishing, this pricking being effected by means of fine points only slightly penetrating into the crystal so that their effect is not visible to the naked eye and does not appear to alter in any way the polish of the crystal or decrease its reflecting power.

The picoting may be effected in any suitable manner desired. In some cases it may be done by means of a punch member having a number of very fine points thereon, and which is operated by mechanical or pneumatic means. However, it has been found advantageous to make use of a steel roller, the surface of which is provided with fine points by close milling. This is shown in Figs. 2 and 3, which represent a side elevation and a section respectively. A backing plate 1, preferably of metal, having a top layer 2 of metal in the crystalline form, is passed between the closely milled roller 6 and the feed roller 7, these rollers being mounted and adjusted in the known manner of sheet metal rolling machines, and the close milling of the roller 6 produces on the surface 2 a network of minute cavities or picots. The roller 6 is preferably mounted in a flexible bearing 3 so as to compensate for the irregularities in the treated surface. It will be understood, however, that the arrangement of Figs. 2 and 3 is only shown by way of example.

It has been found that if the picoting is effected in the manner above described by means of fine steel points which may be, and preferably are, of pyramidal shape, such as those produced by close milling on the steel roller 6, or of any other suitable shape, the brilliance of the metallic crystals is not materially decreased when the crystal is observed from the front, as at 4 in Fig. 1, or within a field of view of about 120°; while if the crystalline surface is observed obliquely as at 5 in Fig. 1, or if the luminous rays graze the surface, the very small faces of the cavities formed by the picoting will also reflect the light received from different directions and render visible portions of the surface which would otherwise be dark and invisible. Contrary to what might have been expected, the reflecting power of the crystal is therefore improved and increased by the picoting, and the invention has thus the advantage that not only may a protective coating of varnish or other suitable substance spread thereover be more firmly held on the surface of the crystal, but also the reflecting power and the field of vision are materially increased.

Once the above picoting has been effected, the crystalline surface may then be covered with the protective coating of varnish or other suitable substance. Preferably, this is of an homogeneous, flexible and adhesive nature, and is spread over the crystalline surface in thin, fluid layers, which are successively dried. In particular, it is proposed to use according to the invention a special transparent varnish having a base of synthetic resins, the saturated molecules of which can only fix very little oxygen and which therefore do not prolong in the atmosphere their polymerization and their hardening as is the case of the varnishes hitherto employed. Such a varnish can now be obtained in commerce and in addition to the above qualification is important in its use for the purposes of the present invention in that metallic crystals, and particularly those of zinc, are catalysts for the oxidation and cracking of varnishes, but due to the special nature of the varnish used according to the invention, it remains indefinitely flexible, and its adherence to the

crystalline surface, ensured at the outset by the picoting, also subsists indefinitely. Finally, the varnish used according to the invention does not undergo any chemical action on the part of the subjacent metallic crystals, which chemical action might be capable of altering its transparency and flexibility.

The application of the varnish according to the invention is preferably effected in a plurality of layers, for example in three successive layers. It is a feature of the invention, that the first may be colourless and serve to ensure the adherence to the metallic crystals by being spread over the latter and penetrating into the small cavities formed by the picots. The second may be colourless or coloured, as desired, and serve to give rigidity to the whole of the transparent coating, whilst the third may be colourless and serve to protect the preceding coloured layer. It will be noted that according to the invention the second coloured layer is isolated by means of layers of transparent colourless varnish from the crystalline metal and from the atmosphere at the same time, so that its perfect conservation is ensured. It will also be noted that the three layers, being of the same nature, will have the same coefficient of expansion and will therefore remain well adherent amongst themselves. In the case where one of the protective layers need not be coloured, the number of the layers may be reduced.

The above features of the invention are illustrated in Figs. 4, 5 and 6 applied to the making of a reflector sign.

Fig. 4 illustrates the metal backing plate 1 of the sign on which the picoting of Fig. 1 has been effected and any suitable design (letter, word, numeral etc.) formed on the picoted crystalline surface by covering portions of the latter with an opaque material or substance 9, preferably fluid and spread thereover, leaving the uncovered portions of the crystalline surface 2 in the form of the letter D, illustrated by way of example. It will be obvious that the design, letter or the like, could also be formed by covering up portions of the crystalline surface with the material or substance 9 in such a manner that the latter forms the design, letter, etc. against a background of uncovered crystalline metal.

Figs. 5 and 6 are sections taken long the line X—Y of Fig. 4. In Fig. 5, 1 is the metal backing plate of the sign, 2 the crystalline surface and 9 the opaque material, such as opaque paint or varnish, spread over portions of the crystalline surface 2, the uncovered portions of which form the letter D. Only over the uncovered portions of the crystalline surface 2 are spread the layers of protective varnish 10, 11 and 12. 10 and 12 are colourless transparent layers, whilst the intermediate layer 11 is a coloured layer.

In Fig. 6, three layers of transparent varnish 10, 11 and 12 are spread over the entire surface of the metallic crystal, and the opaque layer 9 is spread over portions of the upper layer of varnish 12, to produce the required design thereon.

It will be understood, however, that these embodiments are given by way of example and that the invention is only limited by the prior art and the scope of the appended claims.

I claim:—

1. A reflector sign, comprising a backing plate, a reflecting layer of metal in crystalline form thereon, the surface of said crystalline metal being provided with fine picots substantially in-

visible to the naked eye, and a layer of opaque material covering portions of said crystalline surface to produce a design thereon by contrast of the uncovered reflecting crystalline portions against the background of opaque material.

2. A reflector sign, comprising a backing plate, a reflecting layer of metal in crystalline form thereon, the surface of said crystalline metal being provided with fine picots substantially invisible to the naked eye, and a layer of opaque material covering portions of said crystalline surface to produce a design thereon by contrast of the portions of opaque material forming the design against the background of uncovered reflecting crystalline metal.

3. A reflecting device, comprising a sheet of metal in the crystalline form, the surface of which crystalline metal is provided with fine picots substantially invisible to the naked eye, and at least one layer of a transparent substance spread over said crystalline surface and entering into the cavities formed by said picots so as firmly to adhere thereto.

4. A reflecting device, comprising a sheet of metal in the crystalline form, the surface of which crystalline metal is provided with fine picots substantially invisible to the naked eye, a first layer of a transparent colourless substance spread over said crystalline surface and entering into the cavities formed by said picots so as firmly to adhere thereto, a second layer of transparent coloured substance superposed on said first colourless layer, and a third layer of transparent colourless substance over said coloured layer.

5. A reflector sign comprising a backing plate, a reflecting layer of metal in crystalline form thereon, the surface of said crystalline metal being provided with fine picots substantially invisible to the naked eye, a layer of opaque material covering portions of said crystalline surface to produce a design thereon, and at least one layer of transparent varnish over the uncovered portions of said crystalline surface and entering into the cavities formed by said picots so as firmly to adhere thereto.

6. A reflector sign comprising a backing plate, a reflecting layer of metal in crystalline form thereon, the surface of said crystalline metal being provided with fine picots substantially invisible to the naked eye, a layer of opaque material covering portions of said crystalline surface to produce a design thereon, a first layer of transparent colourless varnish over the uncovered portions of said crystalline surface, a second layer of transparent coloured varnish superposed on said first colourless layer, and a third layer of transparent colourless varnish over said coloured layer.

7. A reflector sign comprising a metal backing plate, a reflecting layer of zinc crystal thereon, the surface of said crystal being provided with fine picots substantially invisible to the naked eye, a layer of opaque material covering portions of said zinc crystal to form a design thereon, and at least one layer of a transparent varnish over the uncovered portions of said zinc crystal so as to penetrate into the cavities formed by said picots and firmly adhere thereto, said varnish having a base of saturated synthetic resins.

8. A reflector sign comprising a metal backing plate, a reflecting layer of zinc crystal thereon, the surface of said crystal being provided with fine picots substantially invisible to the naked eye, a layer of opaque material covering portions of

said zinc crystal to form a design thereon, a first layer of transparent colourless varnish over the uncovered portions of said zinc crystal so as to penetrate into the cavities formed by said picots and firmly adhere thereto, a second layer of coloured transparent varnish over said first layer, and a third layer of transparent colourless varnish over said coloured layer, the varnish of said three layers having a base of saturated synthetic resins.

9. A reflecting device, comprising a backing plate, a reflecting layer of metal in crystalline form thereon, the surface of said crystalline metal being provided with fine picots substantially invisible to the naked eye, and at least one layer of a transparent varnish over said crystalline surface and entering into the cavities formed by said picots so as firmly to adhere thereto and protect said reflecting crystalline surface from tarnishing.

10. A reflecting device, comprising a backing plate, a reflecting layer of metal in crystalline form thereon, the surface of said crystalline metal being provided with fine picots substantially invisible to the naked eye, and at least one layer of transparent varnish having a base of saturated synthetic resins spread over said crystalline surface and entering into the cavities formed by said picots so as firmly to adhere thereto and protect said reflecting crystalline surface from tarnishing.

11. A reflector sign comprising a backing plate, a reflecting layer of metal in crystalline form thereon, the surface of said crystalline metal being provided with fine picots substantially invisible to the naked eye, at least one layer of transparent varnish covering the whole of said crystalline surface, and a layer of opaque material over said varnish and covering portions of said crystalline surface so as to produce a design.

12. A reflector sign, comprising a backing plate, a reflecting layer of metal in crystalline form thereon, the surface of said crystalline metal being provided with fine picots substantially invisible to the naked eye, a first layer of transparent colourless varnish covering the whole of said crystalline surface, a second layer of transparent coloured varnish superposed on said first colourless layer, a third layer of transparent colourless varnish over said coloured layer, and a layer of opaque material over said last colourless layer, covering portions of said crystalline surface so as to produce a design.

13. As an article of manufacture, a sheet of metal having a reflecting surface formed thereon by a layer of another metal in crystalline form, said reflecting crystalline surface being provided with very fine picots which are substantially invisible to the naked eye and do not decrease the brilliance of said crystalline surface when observed at a distance, and at least one layer of a transparent substance spread over said crystalline surface and entering into the cavities formed by said picots.

14. As an article of manufacture, a sheet of metal having a reflecting surface formed thereon by a layer of another metal in crystalline form, said reflecting crystalline surface being provided with very fine picots which are substantially invisible to the naked eye and do not decrease the brilliance of said crystalline surface when observed at a distance, a design formed on said crystalline surface by covering portions thereof with a layer of opaque material, and at least one layer of a transparent sub-

stance covering the free portions of said crystalline surface and entering into the cavities formed thereon by said picots.

- 5 15. As an article of manufacture, a sheet of metal having a reflecting layer of zinc crystal thereon, the surface of said zinc crystal being provided with fine picots which are substantially invisible to the naked eye and do not decrease the brilliance of said crystalline surface when observed at a distance, and at least one layer of a transparent varnish spread over said crystalline surface and entering into the cavities formed by said picots.

16. As an article of manufacture, a sheet of metal having a reflecting layer of zinc crystal thereon, the surface of said zinc crystal being provided with fine picots which are substantially invisible to the naked eye and do not decrease the brilliance of said crystalline surface when observed at a distance, a design formed on said crystalline surface by covering portions thereof with a layer of opaque material, and at least one layer of transparent varnish covering the free portions of said crystalline surface and entering into the cavities formed thereon by said picots.

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