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METAL SURFACE

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This invention relates to metal surfaces. The invention is particularly directed to imparting texture, patina, and like effects to metallic surfaces such as surfaces of the non-corrosive or stainless steels, chromium plated metals and the like, which normally have no oxide film or at least none visible to the eye and are therefore limited in popularity because of their harsh, blank and shiny metallic appearance.

It is an object of the invention to provide a metal surface which stands up permanently and requires no polishing, and which at the same time has permanent texture, patina and shading effects to whatever predetermined extent may be desired. A further object is to provide such a surface having any desired permanent pattern effect.

The surfaces to be treated may be smooth, continuous surfaces, without relief, or may be of three-dimensional relief configuration, and it is an object of the invention to provide, on articles of incorrodible metallic character having relief configuration, an appearance of contrasted brilliance on the high or exposed parts and of darkness and shading in the recessed parts similar to that which is obtained by aging and polishing of relief design articles made of silver, brass or other oxidizable metals.

It is a particular object of my invention to provide an article with relief configuration surface which shall have the same sort of graduated brilliance and darkness as aged, polished silver, and which will keep this attractive appearance permanently without requiring the usual recurrent polishing.

According to my invention one takes a body of stainless steel, chromium plated metal, or any other substantially stainless metallic substance, and applies upon the surface of same a partial coating of minute spots of metal which can be stained or oxidized, such as silver, for example. These spots may be applied in any of a great many ways, for example, by means of a conventional Schoop gun, by spattering through a screen, by making very light dots with spot welding apparatus, or by roughening the surface by abrading, grinding, sandblasting or etching and then plating the surface in such a way that the plating is applied only to the roughened spots, or in other ways. The spacing can be close together or far apart, the spots can be circular, irregular, bar-shaped, linear, or of other form, and they can be arranged irregularly, or in any desired predetermined pattern effect. The spots may be so sparsely applied that each one is surrounded by an open space of the foundation metal, or they

may be so generously applied that they all overlap each other, leaving only minute apertures between them through which the foundation metal can be seen. In practice the arrangement will generally be somewhere between these extremes, with some but not all of the spots overlapping. Whatever the particular arrangement, the foundation surface of stainless metal is provided with an open-work plating of oxidizable metal applied thereon, the particles of applied metal and the visible areas of foundation metal each being too small to be separately visible on ordinary inspection in use, whereby the surface has an appearance of a tone intermediate the appearance of the two metals. The greater the distance from which the surface is to be viewed the larger the spots may be, just so long as they are small enough to give a general tone effect to the eye. Circular spots on magnification resemble coins, scales or discs spaced apart on the foundation surface.

The term "metal" as used in the claims is intended to designate briefly not only pure metals but alloys, mixtures, and other metallic substances.

Such a surface may be made up in many unique attractive effects, not only by varying the proportion of stainless surface which is covered by the spots and by varying the shape of the spots but also by arranging the spots in patterns. For instance, this method of treating the surface is adaptable to having a stencil interposed when the spots are being applied, giving any desired pattern to the finished surface.

When an article has been produced in this way it may be handled as the finished product at that stage, in which case the spots of silver or other oxidizable metal will oxidize slowly from atmospheric exposure. Alternatively an article so produced can be given an oxidizing or other staining treatment at the factory in which case its appearance is permanent and unchanging from the time it leaves the factory.

Whether the oxidation is from the gradual action of the atmosphere or from a treatment at the time of manufacture, the surface remains brilliant where the stainless metal is exposed, and darkened from oxidation at the spots of oxidizable metal on the surface.

The final result is a permanent, resistant article having a softened, textured surface which may range from almost black through gun-metal color to complete brilliancy, and from very low to very high light reflection depending on the choice of oxidizable metal, on how large a proportion and which part of the surface is constituted by oxidiz-

able metal, and also on whether the original surface is or is not relieved. This treatment is particularly effective in the manufacture of metal doors, fixtures, wall surfaces and mouldings, bars, display counters, and the like, for either indoor or outdoor service, and can be applied to various other articles.

For relief design articles such as trays, pitchers, goblets, ash trays, ornamental panels, etc., this method of surfacing can be used to give all the beauty of tone belonging to articles made of solid oxidizable metal or covered with a continuous plating of oxidizable metal.

Moreover as this type of plating is worn off with handling and polishing it keeps its attractive appearance, for the dark tone of the recessed spotted parts blends gradually into the brilliancy of the raised parts due to the spots being worn off individually and irregularly. In contrast an article of stainless metal covered with a continuous plating of silver shows sharply defined edges between the parts where the plating remains and where it is worn off, which spoils its appearance.

Furthermore it is in the purview of my invention to apply a partial coating of spots of silver or other relatively soft oxidizable metal to a stainless steel article having relief design, oxidize the spots, and then buff the article so as to completely wear off all or most of the spots of softer metal on the high parts and leave all or most of those in the recessed parts. This treatment gives a finished article graduated from brilliant high lights to dark recesses, which will keep this appearance permanently without any polishing. The oxidizing may be done either before or after the buffing.

Use of silver on stainless steel is merely an illustrative example. The invention extends to the formation of a metal surface in the manner outlined above by applying spots of any oxidizable metal onto a surface of any non-oxidizable metal. The former might be of silver, lead, aluminum, brass, or any of a great many others. Furthermore, the darkening or coloration of the applied metal can be brought about by other means than oxidation, as by chemical reactions which will not affect the foundation metal at all, or at least not affect it in the same way, or it can even be by the selective absorption of dyes. For example, aluminum spots can be sprayed onto a polished surface of stainless steel and the whole dipped in a vegetable dye which would color the aluminum particles while having little or no effect on the stainless steel.

Where I use the expression "oxidizable metal" in the claims I mean a metal which merely upon prolonged exposure to the atmosphere will undergo a surface reaction which visibly and noticeably alters the appearance of its surface, as for example in the case of silver, brass, and copper, whose surfaces become darkened by oxidation upon prolonged exposure to the atmosphere.

Where I use the expression "stainless metal" or "non-oxidizable metal" in the claims I mean a metal which merely upon prolonged exposure to the atmosphere will not undergo any surface reaction which visibly and noticeably alters the appearance of its surface, as for example stainless steel or chromium.

Moreover many of the advantages here outlined could be achieved by reversing the process and applying an open-work plating of stainless steel or other non-oxidizable metal, onto a foundation surface of oxidizable metal, such as alu-

minum, with the applied particles and the visible areas of foundation metal each being too small to be separately visible on ordinary inspection in use.

Articles in accordance with my invention are relatively inexpensive, and, in addition to having an attractive appearance of the same sort as a silver surface, this kind of surfacing does not break down as ordinary plating does. The separate spots may wear off individually but will not peel off like a continuous plated surface may do. This is because the individual spots of silver or the like are so small that the differences in electric potential and coefficients of expansion are infinitesimal for each spot and have no cumulative effect since the spots in general are not joined.

While my new articles do not require polishing, they can be polished or rubbed up when desired, the polishing being without substantial effect on the incorrodible surfaces while having the normal effect on the surface spotting.

It is to be understood that the scope of my invention is limited only by the appended claims and is not confined to the examples which I have given above to illustrate and explain the invention.

I claim:

1. An article of manufacture having a foundation surface of stainless metal and an open-work plating of oxidizable metal applied thereon, the particles of applied metal and the visible areas of foundation metal each being too small to be separately visible on ordinary inspection in use whereby the surface has an appearance of a tone intermediate the appearance of the two metals.

2. An article of manufacture having a foundation surface of oxidizable metal and an open-work plating of stainless metal applied thereon, the particles of applied metal and the visible areas of foundation metal each being too small to be separately visible on ordinary inspection in use whereby the surface has an appearance of a tone intermediate the appearance of the two metals.

3. An article of manufacture having a foundation surface of one metal and an open-work plating of another metal applied thereon, the particles of applied metal and the visible areas of foundation metal each being too small to be separately visible on ordinary inspection in use whereby the surface has an appearance of a tone intermediate the appearance of the two metals, one of said metals being oxidizable and the other stainless.

4. An article of manufacture having a foundation surface of stainless steel and an open-work plating of silver applied thereon, the particles of applied silver and the visible areas of foundation stainless steel each being too small to be separately visible on ordinary inspection in use whereby the surface has an appearance of a tone intermediate the appearance of the two metals.

5. A relief configuration article of manufacture having a foundation surface of stainless metal and an open-work plating of oxidizable metal on the recessed portions thereof, the particles of applied metal and the visible areas of foundation metal in such recessed portions being each too small to be separately visible on ordinary inspection in use whereby such recessed portions have an appearance of a tone intermediate the appearance of the two metals, the

most exposed portions of the foundation surface being free from applied metal.

5 6. Process of imparting permanent patina to a metal surface comprising applying thereto particles of a second metal, too small to be separately visible on ordinary inspection in use, in an open-work arrangement breaking up the remaining exposed surface of the foundation metal into areas too small to be separately visible on
10 ordinary inspection in use, one of said metals being non-oxidizable and the other being oxidizable.

7. Process of imparting permanent patina to a non-oxidizable metal comprising applying there-
15 to particles of an oxidizable metal, too small to be separately visible on ordinary inspection in use, in an open-work arrangement breaking up the remaining exposed surface of the non-oxidizable metal into areas too small to be separately visible on ordinary inspection in use.
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8. Process of imparting permanent patina to stainless steel comprising applying thereto particles of silver, too small to be separately visible on ordinary inspection in use, in an open-
25 work arrangement breaking up the remaining exposed surface of the stainless steel into areas

too small to be separately visible on ordinary inspection in use.

9. Process of producing a permanently var-
toned article comprising applying minute
particles of oxidizable metal, too small to be sepa- 5
rately visible on ordinary inspection in use, to a relief configuration article of non-oxidizable metal in an open-work arrangement breaking up the remaining exposed surfaces of the non-oxidizable metal into areas too small to be sepa- 10
rately visible on ordinary inspection in use, and buffing the article to the extent of completely removing the oxidizable metal from the most exposed portions of the surface.

10. Process of producing a permanently vari- 15
toned article comprising applying minute particles of silver, too small to be separately visible on ordinary inspection in use, to a relief configuration article of stainless steel in an open-
work arrangement breaking up the remaining ex- 20
posed surfaces of the stainless steel into areas too small to be separately visible on ordinary inspection in use, and buffing the article to the extent of completely removing the silver from the most exposed portions of the surface. 25

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