

No. 615,663.

Patented Dec. 6, 1898.

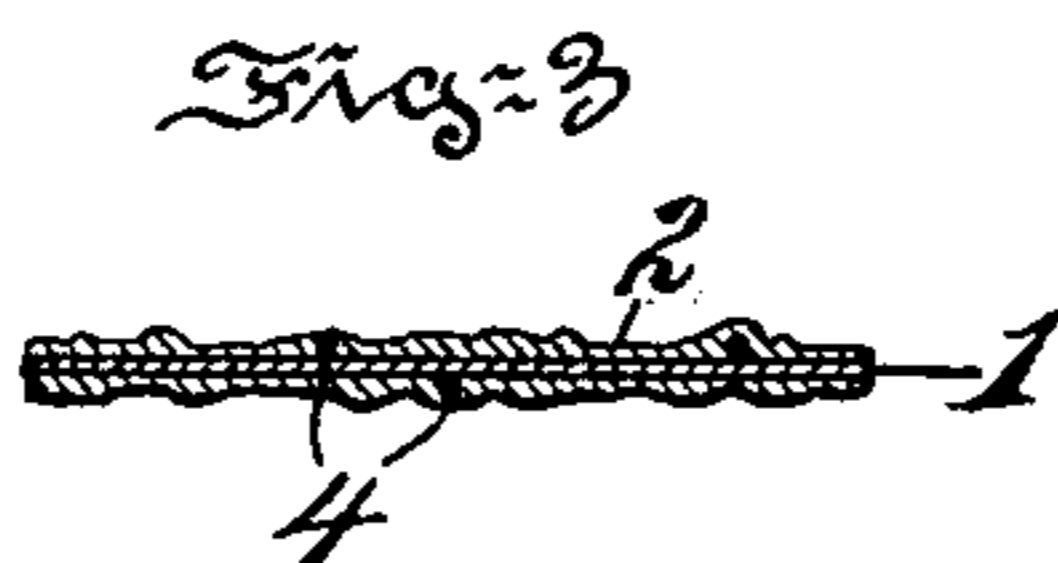
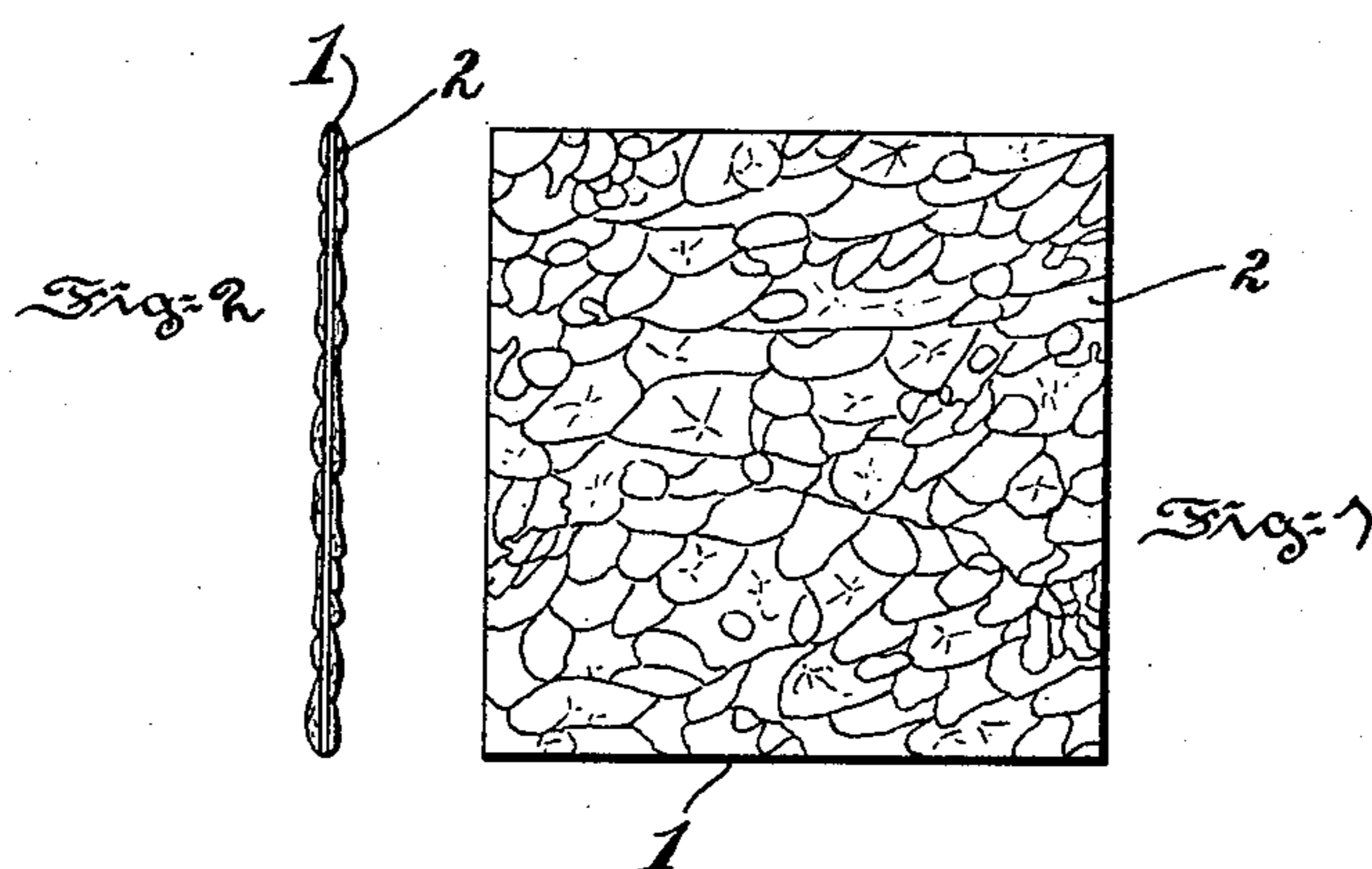
G. H. CLAMER.

LEAD COATING FOR METAL SURFACES.

(Application filed Jan. 24, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:
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E. H. Gilligan

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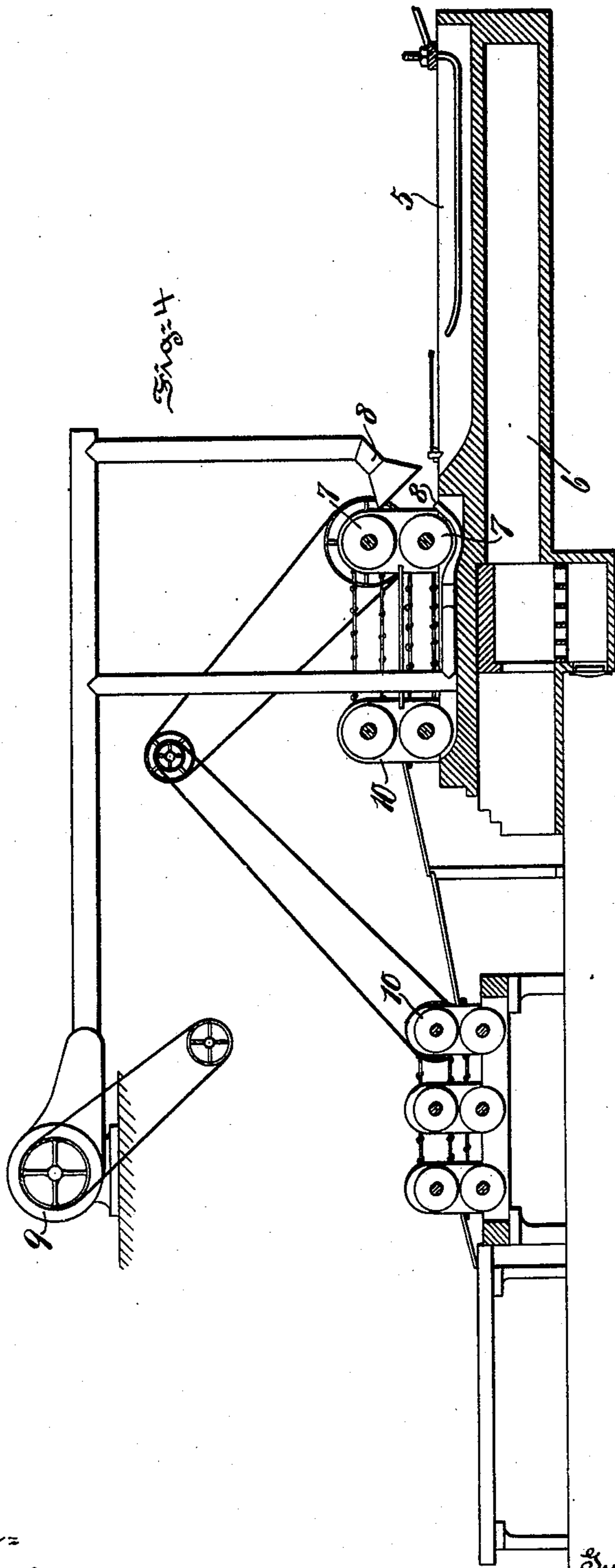
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UNITED STATES PATENT OFFICE.

GUILLIAM H. CLAMER, OF PHILADELPHIA, PENNSYLVANIA.

LEAD COATING FOR METAL SURFACES.

SPECIFICATION forming part of Letters Patent No. 615,663, dated December 6, 1898.

Application filed January 24, 1898. Serial No. 667,685. (No specimens.)

To all whom it may concern:

Be it known that I, GUILLIAM H. CLAMER, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Lead Coating for Metal Surfaces and Method of Making the Same, of which the following is a specification.

10 Objects of my invention are, first, to provide a coating essentially of lead adhering to and covering a metal surface whereby the same is caused to present an appearance which may be described as frosted, ripple-
15 marked, or crystalline and which is an acceptable substitute for the characteristic appearance of metal surfaces coated with a naturally-crystalline metal, as zinc, and at the same time to improve the wearing quality
20 of the coated article, and, second, to provide an expeditious and comparatively inexpensive method of producing such a lead coating upon metallic surfaces.

To these ends my invention consists in a
25 coating essentially of lead having form or structure and characterized by a crystalline appearance and adhering to and covering the metallic surface of a base or body, in contradistinction to a structureless or amorphous
30 coating characterized by a smooth tin-like and shiny appearance.

My invention further comprises the process of producing an adherent and covering coating essentially of lead having form or structure which consists in applying to a metal
35 surface a coating of lead containing a small proportion of phosphorus, such as would naturally be amorphous or structureless, and then imparting form or structure to such coating by the combined action of wind, cold, and
40 gravity.

The nature, characteristic features, and scope of my invention will be more fully understood from the following description, taken
45 in connection with the accompanying drawings, forming part thereof, and in which—

Figure 1 is a view illustrating the appearance presented by a lead-coated object embodying my invention diagrammatically and
50 as well as it is possible to do so in a line-draw-

ing. Fig. 2 is a diagrammatic and exaggerated edge view of the same. Fig. 3 is a sectional view, hereinafter referred to; and Fig. 4 is a view, partly in section and partly in elevation, of apparatus by means of which
55 my improved method may be practiced.

Referring to Figs. 1 and 2, 1 is a body, base, or object which may be of any size and shape and of which the surface is of metal. 2 is a coating essentially of lead covering and adhering to the metallic surface of the base, body, or object 1 and characterized by form or structure, in contradistinction to amorphism. An amorphous or structureless coating essentially of lead has heretofore been applied
60 to a metal surface and presented a smooth tin-like appearance; but this coating 2 of my invention has form and is at least in part crystalline or may be ripple-marked, or both, and therefore imparts to the object a novel
65 appearance, which may be described as frosted. Such an appearance is very desirable, because, among other things, it is intrinsically attractive and also imparts to the object a close resemblance to galvanized iron,
70 and this for the following reasons is quite remarkable: An admixture of phosphorus and lead will upon slow cooling crystallize, provided the phosphorus is present in sufficient
75 quantity—for example, more than six or eight ounces of phosphorus and one hundred
80 pounds of lead. However, if the phosphorus exceeds approximately two ounces to one hundred pounds of lead the material will not cover other metals dipped into a fused bath
85 of it. It is known that phosphorus with or without arsenic is used in the production of an efficient lead coating. However, to permit of covering the phosphorus must be used in comparatively small proportions, not sufficient
90 to change the amorphous character of the lead, so that the coating of lead is amorphous, not dense, and presents a smooth appearance. I use phosphorus in the small proportion of, for example, two ounces to one
95 hundred pounds of lead with or without arsenic, and I also use tin, bearing in mind that the coating will not adhere properly unless I employ at least about eight ounces of tin to
100 one hundred pounds of lead and two ounces

of phosphorus. Of course more tin may be used, but it is comparatively expensive, and if used in excess would be detrimental, because it would produce a coating which would be corroded. The described coating is comparatively thick and dense, and is therefore durable. Since the structure or form which imparts the described appearance is produced at least in part by the application of cold, as will be hereinafter more fully described, the following improvement is effected: Should dust or hard particles of extraneous matter adhere to the base or body which is to be coated, then the lead in slow cooling would tend to draw away from them, thus leaving minute openings, through which dampness would enter and cause the body to rust. However, the effect of the application of cold is to cause the lead coating to set before it has time to shrink away from such particles, so that the coating overlies the same, and the defect above referred to is obviated.

In Fig. 3, 4 indicates particles which are covered over by the coating 2, as has been described.

To practice my improved process, a coating consisting, essentially, of lead must be applied to a metallic surface or surfaces. To this end the metallic base, body, or object may first have its surfaces thoroughly cleaned, for example, in the manner described in Patent No. 363,593, granted May 28, 1887, to Francis J. Clamer for a process of cleaning, preparing, and coating metal plates and other metal surfaces. A coating consisting of approximately one hundred pounds of lead, two ounces of phosphorus, and eight ounces of tin, with or without two ounces of arsenic, may be applied to the metallic surface or surfaces of the base, body, or object by immersing it in a molten bath thereof. The phosphorus produces fluidity, and the tin increases the affinity of the bath for the metal to be coated. Such a coating if simply allowed to cool upon the base, body, or surface would be amorphous or structureless and present a smooth shiny appearance. The temperature employed for the bath should be approximately 950° to 1,050° Fahrenheit. The body, base, or object having received such a coating is now subjected to the action of gravity, wind, and comparative cold in order to oppose its tendency toward amorphism by impressing upon it such form or structure as will produce the described characteristic frosted appearance. To this end the object, body, or base may be lifted or drawn from the bath, thus permitting gravity to operate upon the coating. It is also subjected to the action of comparatively cool wind. This may be accomplished in the well-known manner described, for example, in Letters Patent No. 112,588, of March 14, 1871, to J. D. Grey for coating iron with zinc, a naturally-crystalline coating. However, my process differs from such known processes in that in my process a naturally-amorphous

coating is made to take on form or structure. For example, ripple-marks are produced by reason of the fluidity of the lead coating combined with the action of gravity, cold, and wind or the phosphorus actually gives rise to crystals of phosphide of lead or tin, or both, which are mixed through the amorphous lead, whereas in them no such result is sought or attained. The described treatment also prevents undue running of the coating, which is its expected result, in contradistinction to the production of form or structure as opposed to amorphism, which is a most surprising and unexpected result. Moreover, it prevents the coating from shrinking away from particles of dust, as has been stated.

Referring to Fig. 4, 5 is a receptacle to which heat is applied by means of the furnace 6. This receptacle 5 contains the molten bath, which consists, essentially, of lead and has been above described. The rollers 7 constitute means for lifting the object—for example, a sheet of metal, as iron—out of the receptacle 5, with the result that the lead coating is subjected to the influence of gravity. 8 are means by which the coated sheet is subjected to cold blasts of air induced by the blower 9. 10 indicates means for rolling and removing the ripple-marked or crystalline-coated sheet.

My invention may be said to be based upon the discovery that the combined action of gravity, cold, and wind on a fluid adherent coating essentially of lead and known only as “amorphous” or “structureless” results in the abolition of amorphism and the production of form or structure describable as ripple-marked or partially crystalline, and the application of this discovery imparts to a lead-coated object a crystalline appearance which is an anomaly in that lead coatings, as heretofore known, present only a smooth amorphous appearance.

It will be obvious to those skilled in the art to which my invention appertains that modifications may be made in details without departing from the spirit thereof. Hence I do not limit myself to the precise mode of procedure hereinabove set forth; but,

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. As an improved article of manufacture a coating consisting of the following materials in the following proportions by weight, lead eight hundred, tin not less than four, and phosphorus not less than one nor more than eight, and presenting a crystalline appearance, as contradistinguished from amorphism, and covering a metallic base or body, substantially as described.

2. The process of producing upon a metallic base or body a coating essentially of lead presenting a crystalline or frosted appearance which consists in applying to the metallic base a coating of lead eight hundred parts by weight and tin not less than four parts by

weight containing phosphorus within the limits of one and eight parts by weight which permits of covering and tends to cause amorphism, upon slow cooling, and then producing
5 a crystalline appearance by subjecting such coating to the combined action of gravity, wind and cold.

In testimony whereof I have hereunto signed my name.

GUILLIAM H. CLAMER.

In presence of—

W. J. JACKSON,
K. M. GILLIGAN.