

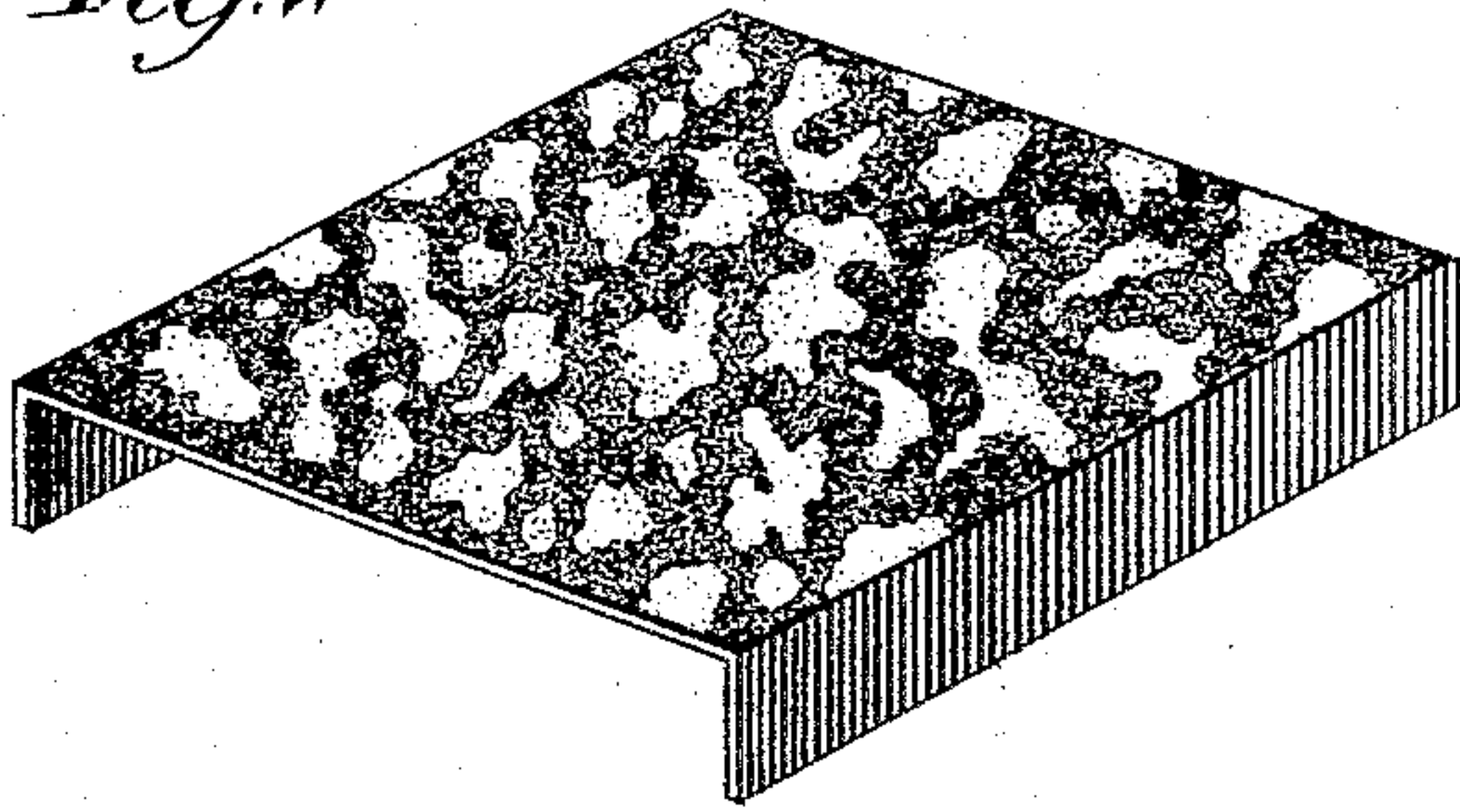
(Specimens.)

A. J. VOLLRATH.  
ENAMELING IRONWARE.

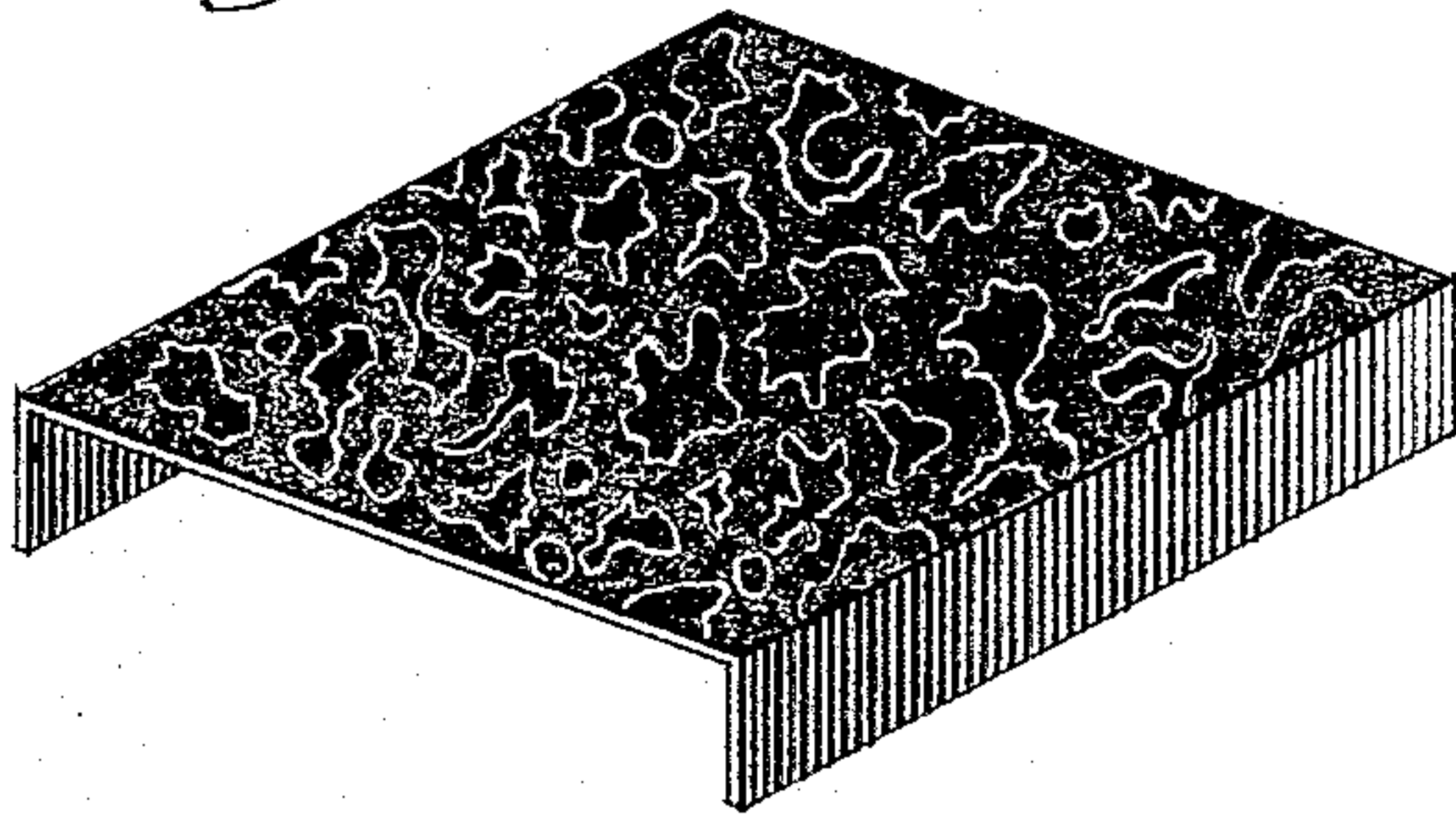
No. 515,507.

Patented Feb. 27, 1894

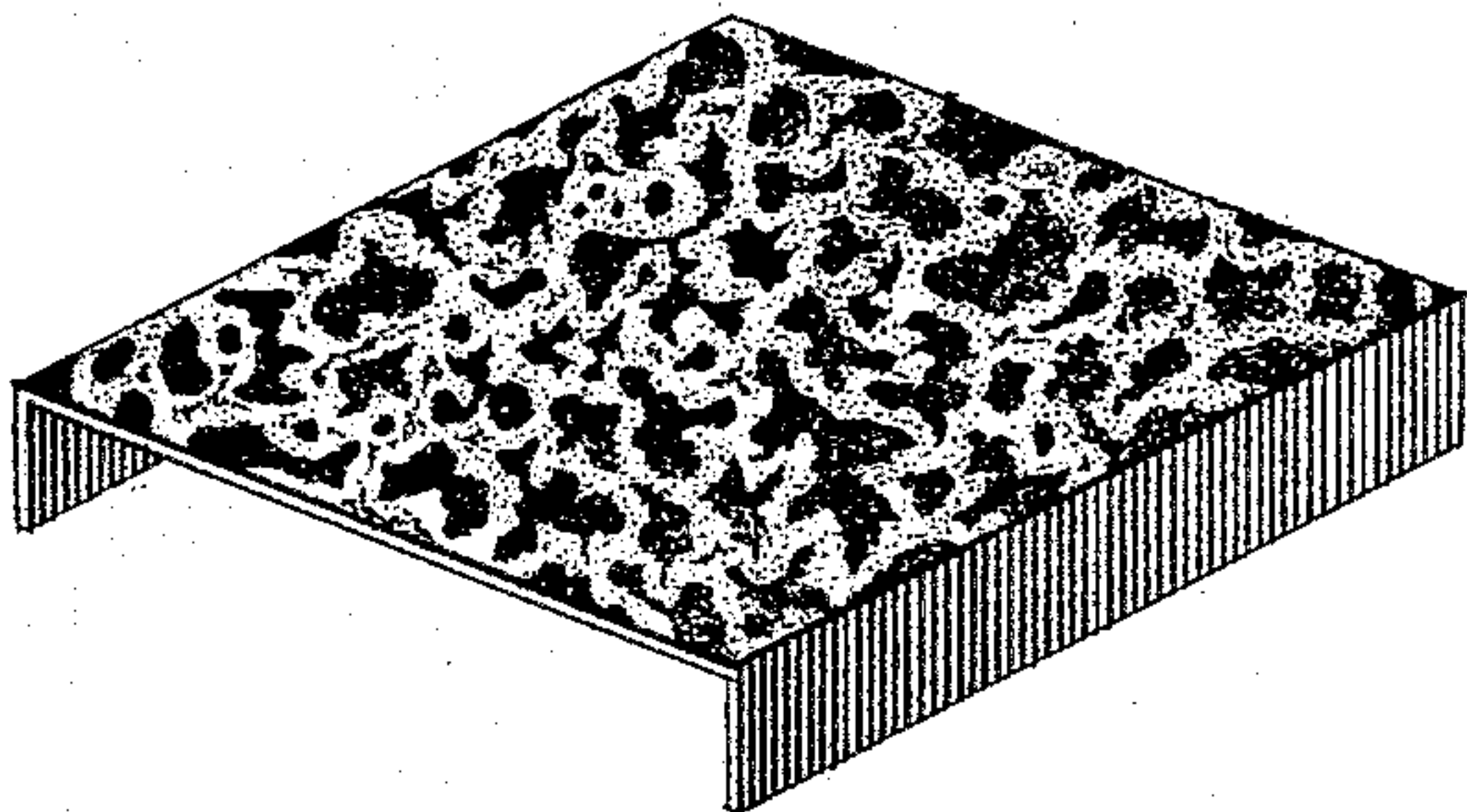
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses:

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# UNITED STATES PATENT OFFICE.

ANDREW J. VOLLRATH, OF SHEBOYGAN, WISCONSIN.

## ENAMELING IRONWARE.

SPECIFICATION forming part of Letters Patent No. 515,507, dated February 27, 1894.

Application filed January 21, 1893. Serial No. 459,109. (Specimens.)

*To all whom it may concern:*

Be it known that I, ANDREW J. VOLLRATH, a citizen of the United States, residing at Sheboygan, in the county of Sheboygan and State of Wisconsin, have invented a new and useful Improvement in Enameling Ironware, of which the following is a specification.

My invention relates to an improvement in enameled iron ware, and more particularly to an improvement by which a novel and beautiful appearance may be given to enamel while preserving the requisite thinness, continuity and adhesiveness thereof. As is well known, a primary essential in all enameled ware, particularly that in the form of cooking vessels, is that the enamel shall completely cover the metal surface, and that it shall be of substantially uniform thickness so as to present the least possible tendency to fracture or cracking by reason of the differential expansion and contraction of the surface; and that it is also an essential requisite that the enamel of uniform thickness shall be comparatively thin and shall present a smooth and glossy appearance to the eye. In the present stage of the enameling art perfect success seems to be attained in the matter of giving to the product a thin, uniform and glossy enameled surface, which adheres tenaciously to the metal which it coats. The field for invention is largely directed to the variation in the characteristic pattern, whether in colors or otherwise, which is to be given to the enamel surface. Thus, until a few years ago, almost all thinly enameled iron ware, whether of wrought or cast iron, had a plain surface or one of uniform color, blue, brown, violet, white or gray. Subsequently there was introduced and extensively sold upon the market so-called mottled ware, or granite or agate ware, which is ware in which the enamel coating is given a variegated appearance by reason of the discoloration of the enamel by oxidation of the metallic base in the act of drying, the discoloration being made to appear more prominently by reason of the fusing of the enamel in the muffle. Subsequently the so-called marbleized enameled ware was developed, wherein a wavy or veined appearance is given to the surface of the enamel, which is still perfectly smooth to the touch, by a manipulation or shaking of the

vessel after the wet surface enamel has been applied, and also the so-called coagulated ware, which is what the name implies. Subsequently there was produced and extensively sold so-called speckled enamel, in which a variegated appearance is produced by causing specks of contrasting color to appear throughout the surface of the enamel. In all these species of enameled ware, which are recognized in the trade as involving different commercial characters, the enamel proper is substantially the same. That is to say, all are specimens of thin, uniform, adhesive enamel entirely covering the metal surface, the difference between them being due to the differences in the resulting appearance to the eye, and the different processes involved in producing the difference in appearance. It has been claimed that the so-called granite or agate iron ware, by reason of utilizing the oxidation of the metallic base, adheres more closely to the iron than where this oxidation is not utilized, but aside from this difference, the difference is solely one of appearance.

The present invention is, like those named, directed to an improvement in the appearance of the enamel, and may be used with any well known enameling process for the purpose of giving continuity, uniformity and adhesiveness to the glaze coating.

The result aimed at, and secured by the process hereinafter described, is an enameled iron ware showing upon its surface irregular circumscribed spaces of the general color of the intermediate coating, the circumscribing lines of greater or less width being produced of enamel of a color or in a condition to contrast with the color of the intermediate coating. These spaces thus circumscribed are of diversified shapes and dimensions, and by preference cover the whole of the enamel surface, but may, in accordance with my invention, cover only a part thereof, or be more sparsely distributed over the surface. The effect obtained is to be carefully distinguished from the effect obtained by a process which involves the spattering upon the unfused enamel surface of carbonate of soda or equivalent, producing spots of approximately uniform character, dimension and shape over such part of the surface as is treated, the spots being lighter at the center than at the circum-



ference by reason of the light color given to the enamel at the center by the spattered material.

The product of the process hereinafter described, which product forms the subject matter of the present invention, is not necessarily lighter in the center of the spot than toward the circumference thereof, but on the contrary presents the circumscribing line of a different color from the center by reason of the presence of enamel producing the circumscribing lines. In the ware with which the present improvement is contrasted, the circumscribing lines are produced by the absence rather than the presence of line producing enamel.

In the drawings, which are a fair illustration of the product, but as will readily be apparent, are not to be taken as an accurate copy thereof,—Figure 1 represents a plate having the enamel applied thereto for producing the characteristic effect before being subsequently treated and fused. Fig. 2 is a representation of a plate having the enamel applied thereto and then treated in the manner hereinafter described to prepare it for the fusing muffle, and Fig. 3 is a representation of a sheet of enameled ware, treated by my improved process, after it has been fused in the muffler.

To produce the product illustrated and described, I proceed as follows:

The primary purpose of the present invention, as already appears, is the production of a peculiar and novel marking upon the ware; and the process herein described for this purpose may be carried on by splashing or otherwise applying upon the bare iron, or upon the bare iron having a coating of adhesive wash, such as water glass, the spots of enamel paste, then removing the interior of the spot or splash, leaving the margin, and then coating with an enamel either with intermediate fusing or without intermediate fusing, and then fusing the product thus coated; I prefer, however, to proceed as follows:—A coating of enamel is applied, dried and fired or fused upon the article, this coating being given by preference a color in any of the usual ways. Where the product is enameled cast iron, it is usual to apply a ground or foundation coating, very thin and usually colorless, and this may be practiced in employing the process forming this invention with articles of cast iron. It is not usual, however, to apply a ground coating to sheet metal ware, although this may be done. Upon the surface thus obtained there is spattered in any convenient way a wet paste comprising any one of the usual mixtures, and preferably, though not indispensably, of a color contrasting with the color of the first coat,—by which term "first coat," however, is not to be understood the ground or foundation coating commonly employed in enameling cast iron, but what has hereinbefore been described as the intermediate enamel. The spattered enamel paste is allowed to dry, and is then

brushed or rubbed slightly with a sponge or brush, when it is found that the enamel within the marginal portion of each splash or spot comes off readily, while the enamel defining the boundary or margin of the spot remains adherent to the first coating, and can be removed only with harder rubbing, or with washing. After the brushing operation described, the article is placed in the muffle, where it is subjected to the usual temperature of 1,000° to 1,500° Fahrenheit for several minutes, and then permitted to cool. The resulting product has the peculiarly novel and beautiful appearance indifferently illustrated in Fig. 3. The surface may be further variegated by employing enamels of different colors for the markings. I find it desirable before spattering contrasting enamel paste upon the enameled surface to coat this surface thinly with an adhesive substance of any suitable kind, such as gum arabic in solution, or water glass, sometimes called soluble glass, composed of two parts of soda and one part of silica, melted together, and dissolved in hot water. The adhesive substance being placed upon the surface, the enamel subsequently spattered thereon adheres in greater quantity when subjected to the rubbing or brushing action referred to, so that the circumscribing lines are wider and present a shading effect by reason of being more intense in color at the edge. The resultant effect is, however, substantially the same as where no adhesive coating is applied. Owing to certain objections well known to enamellers to the use of gum arabic in enameling, I prefer to use as the adhesive coating water glass which, more over, produces when subjected to the action of the muffle a coating of glaze, and I hereinafter lay especial claim to the use of this particular substance in this connection. Instead of being applied as a coating, the adhesive substance may be mixed with the enamel to be spattered.

The present invention is to be carefully distinguished from one which employs in the production of the characteristic circumscribed spaces of color, contrasting with the color of their circumscribed lines, a substance in itself not an enamel, and which though capable of being absorbed into the enamel, is necessarily a foreign substance.

It is characteristic of my invention that the effect is obtained exclusively with the use of enamel, and for this reason is easier to obtain and much more economical to practice than one employing foreign substances.

What I claim as new, and desire to secure by Letters Patent, is—

1. The process of producing enameled iron ware which consists in first applying and fusing upon the iron ware a coating of enamel, then spattering on the surface obtained an enamel paste, then drying the paste, then brushing the surface to remove the enamel from the interior of the spot, and then fusing, substantially as described.



2. The process of producing enameled iron ware which consists in applying to an enameled iron surface an adhesive coating, spattering upon said coating an enameling paste, 5 drying, brushing the surface to remove the interior of each spot, and then fusing, substantially as described.

3. The process of producing enameled iron ware which consists in applying to an enameled surface water glass, spattering upon said surface an enamel paste, drying, brushing or 10 rubbing the surface to remove the dried enamel from the interior of each spot, and then fusing, substantially as described.

4. The process of producing enameled ware 15 which consists in first applying to the ware a coating of enamel of uniform color, applying to the surface thus obtained water glass, spattering upon the surface enamel paste of a color to contrast with the enamel coating, drying, 20 removing by brushing or rubbing the enamel from the interior of each spot, and then fusing, substantially as described.

ANDREW J. VOLLRATH.

In presence of—

J. N. HANSON,

W. N. WILLIAMS.