UNITED STATES PATENT OFFICE.

HENRY MICHAEL STEINTHAL, OF SCARBOROUGH, COUNTY OF YORK ENGLAND.

ART OF MANUFACTURING FLOOR-CLOTHS.

SPECIFICATION forming part of Letters Patent No. 420,632, dated February 4, 1890.

Application filed July 5, 1889. Serial No. 316,595. (No model.)

To all whom it may concern:

Be it known that I, HENRY MICHAEL STEINTHAL, floor-cloth manufacturer, a subject of the Queen of Great Britain, residing at Scarborough, in the county of York, England, have invented certain new and useful Improvements in the Art of Manufacturing Floor-Cloths or other Surface-Coverings, of which the following is a specification.

My invention relates to the art of manufacturing floor-cloths or other surface-coverings, and to the use in such manufacture of solid paint caused to adhere to the face of the canvas or other foundation in contradistinction to the use of liquid paint printed upon the face of the foundation. It has reference, in short, to the manufacture of tesselated floor-cloths or surface-coverings, the tesseræ of which consist of solid paint.

My invention consists in the combination of a series of steps or processes whereby the desired result—that is to say, the manufacture of tesselated floor-cloths or surface-coverings, the face of which is composed of tesseræ of solid paint—is attained.

In manufacturing the solid paint to be used in the first step of my process the paint should be made from whiting, linseed-oil which has been boiled at a temperature of above 620° Fahrenheit, and such colored earths or pigments as may be necessary to produce the color or shade required. In making this paint it is important to employ whiting of the nature of that obtained from the London chalk-basin, as I have found that other whiting is not to be relied upon to give a satisfactory result. The whiting should be reduced to an impalpable powder and be well dried. The whiting and linseed-oil with such colored earths or pigments (also reduced to impalpable powder) as may be used are thoroughly incorporated into a homogeneous mass in a jacketed masticator heated, preferably, by superheated steam. It is not practicable to give even approximate proportions of the ingredients. The proportion of colored earths or pigments employed will depend upon the depth of the color required in the paint, and the proportion of the whiting should be such that when the incorporation is complete the mass will be of about the consistence of putty. As it is at first in too sticky or adhesive a state for the first step, it must be kept for a month or longer so as to age. After this aging it is tougher, and it possesses a certain amount of elasticity.

The steps or processes which constitute the combination are as follows: First, the rolling or spreading of a solid paint, of the character hereinbefore described, into sheets of a thickness of about one-sixteenth of an inch (more or less) upon zinc plates or "pads" or other suitable flat holding-surface; second, the cutting of these sheets of solid paint into geometrical or other figures or tesseræ; third, the stripping of these tesseræ or pieces from the plates or surface upon which they are held; fourth, the affixing of these tesseræ of different colors and forms in accordance with the prescribed design upon suitably-prepared canvas or other foundation; fifth, the submitting of the tesseræ on the canvas or other foundation to very powerful direct vertical pressure, the effect of which is to permanently secure the tesseræ to the foundation by in a manner forcing them through the interstices, whereby they become, as it were, riveted to the foundation; sixth, the drying of the floor-cloth composed of these tesseræ and their foundation.

In carrying out the first step of the process—that of rolling or spreading a solid paint into sheets upon zinc plates or other holding-surface—it is preferably effected by means of a machine invented by me, and which forms the subject of another application for patent, Serial No. 316,594, filed by me July 5, 1889. The sheets thus spread on their holders should before being submitted to the second step or process be partially dried, and this is preferably effected by hanging them for twelve hours or more in a drying-chamber at a high temperature, and then for twelve hours or more at ordinary temperature.

The second step—that of cutting the sheets of solid paint into geometrical or other figures or tesseræ—is effected in a manner analogous to that in which a pastry-cook cuts out designs from a sheet of dough, and is preferably performed by means of a press, upon the table of which the sheet of paint on

its plate or holder is placed, and on which it is cut into tesseræ by cutters carried by a rising and falling plunger.

The next step—that of stripping the tesseræ or pieces from the plates to which they are still adherent—can be effected by a hand-knife or by any suitable machine. I preferably employ for the purpose a stripping-machine invented by me, and which forms the subject of another application for patent, Serial No. 316,594, filed by me July 5, 1889. The tesseræ stripped off should be sorted into their various forms.

The next step is that of affixing the tesseræ in different colors and forms in accordance with the prescribed design upon a canvas or other foundation. I preferably employ for this purpose heavy jute canvas previously prepared by running it through a trough of liquid paint composed of raw linseed-oil and red oxide of iron. The canvas in passing through the trough gets a coating equal to, say, from twelve to sixteen coats of ordinary paint; but notwithstanding this thick coating the canvas still retains interstices. Before the tesseræ are affixed to this prepared canvas the paint on the latter must be allowed to dry and the outline of the pattern to be formed by the tesseræ should be printed on the canvas. This canvas may be of any required length and width; but the dimensions generally adopted are sixty feet by six feet. The tesseræ are laid in accordance with the prescribed design upon the prepared canvas, and, being slightly pressed down by hand, adhere to the canvas. When the canvas has been filled up, it is ready for the next step. This next step can be effected by any suitable press capable of producing a very powerful direct vertical pressure of, say, five tons to the square inch; but I preferably employ a press invented by me, and which forms the subject of another application for patent, Serial No. 316,597, filed by me July 5, 1889. The pressure should be exerted upon a limited length—say one foot of the cloth at one time—the cloth being moved forward a corresponding distance after each pressure, so as to bring another portion into position. It is important that the pressure be not only very powerful, but a direct vertical pressure effected by a reciprocating plunger. Anything of the nature of a rolling pressure must be avoided, because it would cause the tesseræ to shift endwise of the cloth and seriously impair the accuracy of the pattern. The result of the powerful direct pressure is that the tesseræ are in a manner forced through the interstices of the canvas and become, as it were, riveted thereto. They are thus permanently secured.

The last step is that of drying the floor-cloth. This I preferably effect by a method or process invented by me, which I reserve the right of patenting hereafter, and which consists in submitting the floor-cloth to the action of constant streams of heated air mixed with a regulated supply of oxygen, whereby the floor-cloth is very rapidly dried and seasoned. In carrying out this method I hang the piece of floor-cloth horizontally as regards its length, but vertically as regards its width, in a drying room or shed which has openings at its highest point fitted with exhausters. I produce heated air in chambers that are preferably external to the drying room or shed by means of suitable stoves, preferring what are known as "convoluted" stoves, and I mix with the heated air, which must not be burned, a regulated amount of oxygen gas, the proportion being about from two to four per cent. This oxygen may be derived from any suitable source—such, for example, as black oxide of manganese or permanganate of potash, as is well understood. I admit the mixture of heated air and oxygen in continuous streams to the lower part of the drying-room, and these streams rise vertically in contact with both the face and back of the floor-cloth, their ascent being insured or facilitated by the exhausters. They escape at the top of the room through the openings already described, so that they do not come in contact with the fabric again. The oil in the fabric becomes rapidly oxidized, and the solidification and drying of the cloth are greatly accelerated without in any way making it brittle or otherwise deteriorating it. I find it best to conduct this drying operation at successive stages of temperature, the temperature in the first stage being normal, say 60° Fahrenheit, that in the second stage at 80°, that in third stage 120°, and that in the fourth and final stage 140°. The duration of each stage will average about three weeks, and will be reduced or prolonged as the progress of the drying operation may upon examination dictate.

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

The improvement in the art of manufacturing floor-cloth, which consists of the following steps: first, rolling or spreading a solid paint of the character herein described in thin sheets upon suitable flat holders; second, cutting the sheets into geometrical or other figures or tesseræ; third, stripping these tesseræ from their holders; fourth, affixing these tesseræ of different colors and forms in accordance with a prescribed design upon a prepared canvas or other foundation; fifth, submitting the tesseræ on their foundation to powerful direct vertical pressure, and, sixth, drying the floor-cloth composed of these tesseræ and their foundation, all substantially as hereinbefore set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HENRY MICHAEL STEINTHAL.

Witnesses:

CHARLES STEWART WARDELL,

ARTHUR SLEIGHTHOLM.