

(No Model.)

A. KEIM  
MINERAL PAINTING PROCESS.

No. 287,942.

Patented Nov. 6, 1883.

Fig. 1

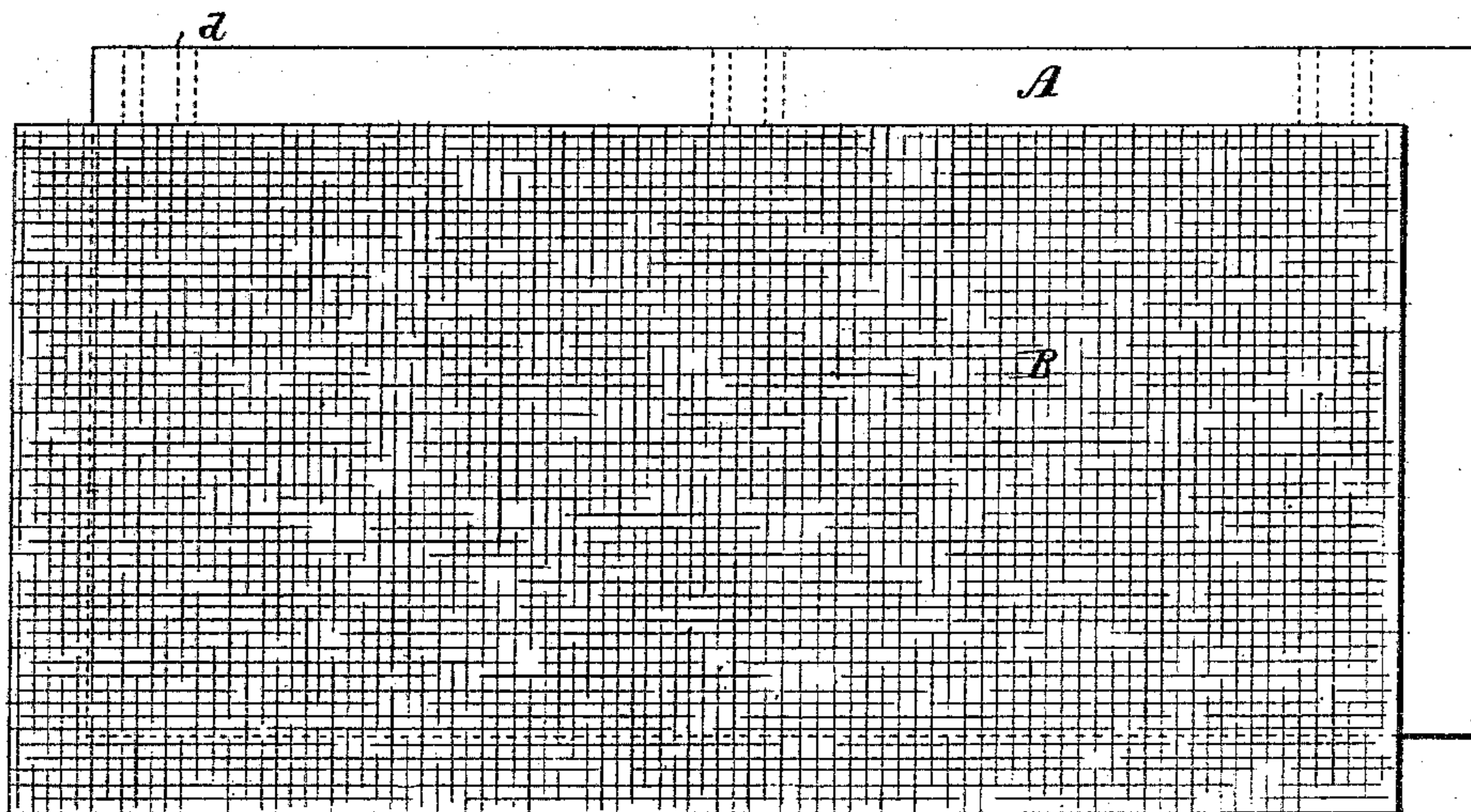
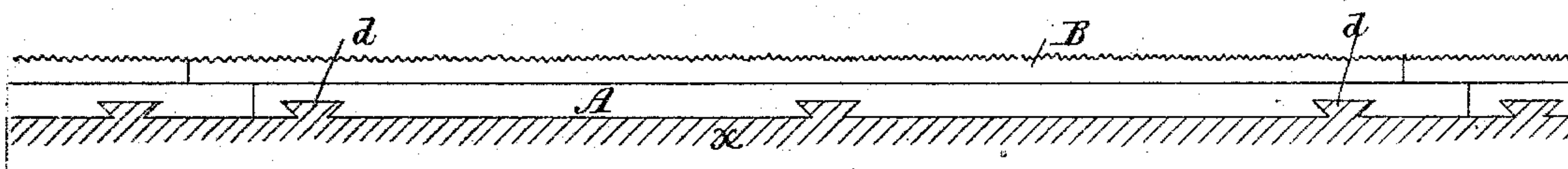


Fig. 2



Attest:

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# UNITED STATES PATENT OFFICE.

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## MINERAL PAINTING PROCESS.

SPECIFICATION forming part of Letters Patent No. 287,942, dated November 6, 1883.

Application filed May 9, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, ADOLPH KEIM, a citizen of the German Empire, residing at Munich, in the Kingdom of Bavaria, have invented certain new and useful Improvements in a Mineral Painting Process, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention consists in a mode of preparing foundations and paints for mural painting, and in treating paintings, as fully described hereinafter, to insure their preservation.

The invention, which is applicable in the first place to rendering both portable and fixed—i. e., stationary—paintings weather-proof, and in the second place to rendering paintings of all descriptions absolutely unalterable, consists under the former or first head of four operations or manipulations, which are taken up in their turn, to wit:

*The production of the prime ground and of the painting-ground.*—A new dry wall-surface not yet plastered, or an old wall-surface cleaned of all plaster, is cast or covered with common mortar of good quality, consisting of slaked lime, washed quartz-sand, infusorial earth, and water, so as to make all joints, uneven spots, and rough parts smooth. Whenever water is mentioned in this specification it is understood to mean distilled or filtered rain-water. The best proportion of infusorial earth to sand in the above mortar is as one to six, by measure. After this cast has set for one day, it is thoroughly moistened, and then the painting-ground is put on to a depth not exceeding two millimeters. This ground consists of four parts of pure white quartz-sand, three and a half parts of infusorial earth, and one and a half parts of thick lime paste. When dry, it is brushed over twice with a solution of silicated hydrofluoric acid, and then impregnated three or four times with silicate of potash, chemically pure, and completely saturated with silicic acid. At the first and second impregnations the silicate of potash should have a consistency of 12° Baumé, or a specific gravity of 1,090; at the third and fourth, a consistency of 18° Baumé. Each time before a new layer is applied the preceding one must have dried completely.

In order to remove the salts soluble in water, which crystallize out during the drying, the surface must be well and repeatedly washed before being painted on. A dry wall-surface composed of sound material, which is to serve as the prime ground for a painting, is rare in new buildings, and even rarer in old ones; but it occurs quite often that old, damp, rot-infected places are to be painted on, and for such instances the following supplementary manipulation is intended to secure durability to the paintings on such defective walls. The first step is to remove the causes of the dampness of the walls, and to prevent the further spread of the rot. The surface of the wall, cleaned of all of its old coating, its joints being scraped out to the depth of one centimeter, is exposed for some days to the air to get dry. It is then carefully swept, and covered with an extremely thin watery mortar, consisting of one and a half parts of cement, two parts of pure quartz-sand, and a half a part of powdered manganese, to such a degree of thickness that plates of clay, made expressly for the purpose, can be pressed onto the same and held there. The surfaces of these should be well leveled by a straight-edge. In this operation not more mortar should be used than is absolutely necessary for the purpose. These plates of clay are represented in the accompanying drawings, forming part of this specification, in which Figure 1 is a face view, and Fig. 2 is a side view. The plates should be made of a good porous clay, in any desired sizes and thickness. If one size is made, say, twenty by forty centimeters, the other may be five millimeters less in each dimension, or nineteen and a half by thirty-nine and a half centimeters. Into the larger plates, A, are cut grooves *d* on one side. The smaller plates, B, are ribbed or roughened on one side. After having been thoroughly dried, all the plates are glazed or cemented on one side and then placed in pairs one upon the other, with their glazed surfaces in contact, and in such a manner, as shown in the drawings, Fig. 2, that their edges do not coincide, but expose their glazed surfaces to the extent of, say, about two centimeters. The plates are baked in this position, and, united by the glazing or cement, they form one plate. It is the grooved side



that is pressed onto the mortar  $x$ , the latter entering the grooves, so that when it is dry the plate cannot be removed from it except in pieces. The ribbed front of the plates offer a sufficiently large surface for the painting-ground. The manner in which the plates are placed one upon the other breaks joints between the layers and prevents the possibility of any humidity penetrating through the lower joints of the plates, where they are set together, as the free places are in each instance covered by the overlapping part of the upper and outer plate. The upper joints, formed by the circumstance that the upper plate is set at one side, as shown, or is five millimeters smaller than the lower one, and of which the glazing of the lower plate forms the ground, are then filled up with a thick cement made of oak-tar, asphaltum, turpentine, and powdered manganese. This cement is then melted in with a hot soldering-iron so far that only half the depth of the joint is filled up. The melting in, however, is done only after the plates have thoroughly dried in position—say for a day or two. Then, with a rather thin mortar, consisting of three parts of washed quartz-sand, two parts of marble-sand, two parts of caustic lime, one part of infusorial earth, and one part of pulverized marble, the remaining portion of the joints is well filled up, and the surfaces of the plates smoothly finished. On this level the painting-ground already described is laid on, and the manipulation finished, as specified.

*The purification and preparation of the colors.*—The first condition is that the materials from which the colors are made be always of the same quality, as this regulates the quality of the additions also. Only the purest mineral colors, free from any artificial admixtures and adulterations, and containing no substances destructible by heat, must be employed. Well fitted for use are zinc oxide, artificially-prepared iron oxides, all barytes and artificial mineral colors free from sulphuric acid, Naples yellow, cadmium-yellow, orange of chrome, cobalt-blue, ultramarine-blue, cobalt green, ultramarine-green, oxide of chrome, hydrated oxide of chrome, chrome-red, ultramarine-red, German black, bone-black, &c. In fixing a painting the colors should suffer no change of shade in consequence of the strong alkaline nature of the fixative, and should be freed from all substances soluble in water and in potash lye, or subject to decomposition by soluble glass. To prevent such a change, and to so purify the colors, they are finely powdered and mixed with a certain quantity, according to their chemical properties, of dilute soluble glass, well saturated with potassa, in which they are digested for some time. Then follows dilution with water and addition of carbonate of ammonia in sufficient quantity to eliminate all the silicic acid contained in the soluble glass. The colors, mixed most intimately in this way with hydrate of

silica in extremely fine particles, are then washed out with warm water and receive an addition of a sufficient quantity of freshly-precipitated hydrate of alumina and magnesia until one hundred parts, by weight, of hydrate of silica dried at  $100^{\circ}$  Reaumur contain forty parts of hydrate of alumina and eighteen parts of hydrate of magnesia. Both of these latter hydrates are also assumed to be dried at that temperature. Furthermore, different quantities of fluor-spar, zinc oxide, pulverized marble and glass, manganese, and carbonate of baryta may be added to the colors, according to their chemical natures. The mixtures thus obtained are powdered to the finest degree in a stone mill.

*The preparation of the fixative.*—Two liters of chemically-pure silicate of potash, one of caustic ammonia, one hundred grams of caustic potash, and one hundred and twenty of pulverized marble are heated together in an air-tight pot in a water bath during six hours. It is then slowly cooled off and the liquid poured off and kept in well-closed glass jars or bottles, ready for use.

*The fixing of the painting.*—This is done with an atomizer furnished with an arrangement to warm the fixative in a water bath. The painting must be fixed four or five times, during which the temperature of the painting and of the surrounding atmosphere must be raised to and maintained at from  $30^{\circ}$  to  $40^{\circ}$  Reaumur by coke-stoves at a red heat, and care must be taken that the moist air constantly forming can be drawn off from time to time. After the fixing, the painting is moistened with carbonate of ammonia, and then washed with distilled water until the latter no longer shows an alkaline reaction. In order to render the face of the painting absolutely insensible to the influence of water, it may first be warmed and then impregnated with a solution of paraffine in benzole, petroleum, ether, turpentine, or similar substances. The paraffine is to act in no way as a binding medium, but simply as a preservative. For the purpose of producing portable wall-paintings, the painting-ground, instead of being put on or applied to a wall, is put on plates of glass, stone, wire, or the like, which are applied to the wall after the picture is completed. Then proceed as hereinbefore indicated.

Under the second head of the preamble of this specification paintings are rendered absolutely unalterable, as follows: They are treated, in the main, in the same manner as hereinbefore described. As a substratum, glass or other plates of which the back is covered with thin lead-foil or stone plate or mica are used, as well as wire, canvas, and wood. It is possible to employ for such paintings the common raw canvas, or canvas covered with the painting-ground for mineral painting. Still, for some purposes, it is preferable to make use of a canvas prepared in the following manner: Canvas of any suitable



strength is steeped twice in baths of gypsum-water or baryta-water, and then in a solution of silicate of potash and silicated hydrofluoric acid, and is left half an hour in each of these baths, being each time taken out and left to dry thoroughly before reimmersion. The canvas is then washed with rain-water until there is no more acid reaction. It is then smoothed out between warm iron cylinders, and finally covered on the back with a simple thin oil ground, which under certain circumstances can be applied also after the painting is finished. The painting is executed with the same colors as prescribed for wall-paintings, fixed in the same way, and washed with carbonate of ammonia. In certain cases, when the artist finds it desirable or necessary, such paintings can be continued and finished with oil-colors, and may also be primed by this method. When the painting is finished, it should be varnished with the best shellac varnish, provided no oil has been used in it; otherwise good oil-varnish is to be employed.

The advantages of the above-described method of painting easel-pictures are the following: The execution is quite as easy as by any other method, the coloring and the character of the painting are absolutely unalterable, the substrata and the ground material are indestructible, and the paintings can be cleaned without any danger, whenever it is necessary, by means of dilute acids, alkalies, and water, according to the nature of the impurities by which they have been soiled.

I do not abandon or dedicate to the public any patentable features set forth herein and not hereinafter claimed, but reserve the right to claim the same, either in a reissue of any patent that may be granted upon this application or in other applications for Letters Patent that I may make.

I do not claim, broadly, the use of silicate solutions with pigments, nor a fixative having an alkaline silicate as an ingredient thereof, as set forth in Letters Patents Nos. 15,520 and 22,878.

I therefore claim—

1. The within-described improvement in preparing foundations for mural painting, consisting in first applying a mortar-coat containing lime, sand, and infusorial earth, in then impregnating the mortar first with a solution of silicated hydrofluoric acid, then with a solution of alkaline silicate, and removing the soluble salts by washing, substantially as set forth.

2. The preparation of a foundation for mural paintings, consisting in first applying a bed of mortar and impregnating it with alkaline silicate solution, and then applying thereto paints treated to prevent the chemical action on the same of the ingredients of the foundation, substantially as described.

3. A wall-plaster or painting-ground consisting of caustic lime, quartz-sand, pulverized marble; and infusorial earth, treated by silicated hydrofluoric acid, and hardened by silicate of potash, substantially as described, and for the purposes set forth.

4. The process of preparing the colors by silicate of potash mixed with hydrate of magnesia and alumina, fluor-spar, zinc oxide, pulverized marble or glass, carbonate of baryta, and manganese, substantially as specified.

5. The fixative consisting of chemically-pure silicate of potash, caustic ammonia, caustic potash, and marble, substantially as specified.

6. The application to a wall to be painted of plates overlaid and cemented to break-joints, substantially as set forth.

7. Plates A with grooves  $d\ d$ , in combination with plates B, joined together, substantially as described, and for the purpose set forth.

In testimony whereof I affix my signature, in presence of two witnesses, this 18th day of July, 1882.

ADOLPH KEIM.

Witnesses:

EMIL HENZEL,  
A. E. BARTHEL.