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2,654,912

METHOD OF MAKING BLENDED TILE

Filed July 28, 1948

2 Sheets-Sheet 1

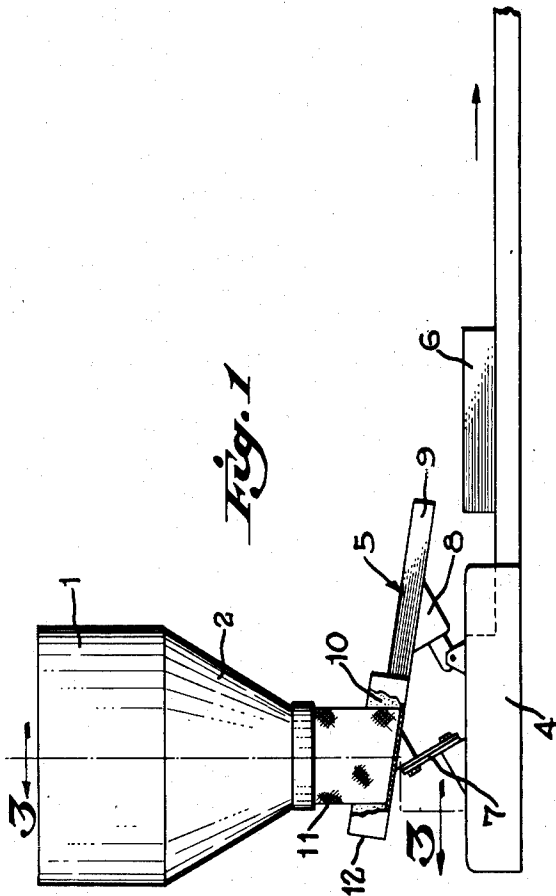
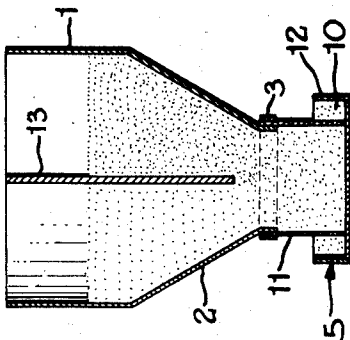
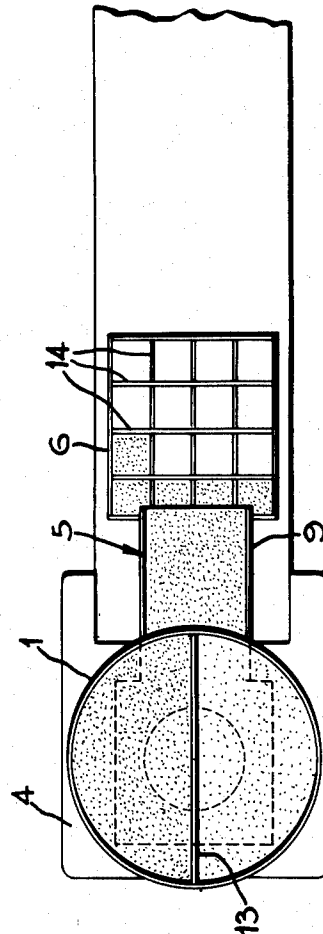


Fig. 2

Fig. 3

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2 Sheets-Sheet 2

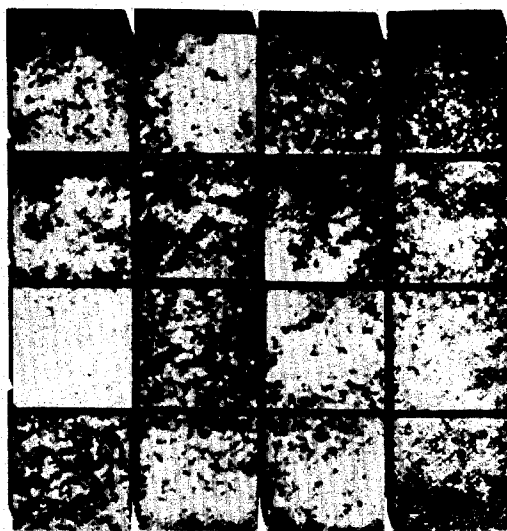


Fig. 4

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UNITED STATES PATENT OFFICE

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METHOD OF MAKING BLENDED TILE

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1 Claim. (Cl. 18—48.8)

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This invention relates to the art of making ceramic tiles. It is directed particularly to a simple method of producing tiles which have a blending of shades of color within individual pieces of tile, which differ from piece to piece in hue, chroma and value, and which, therefore, are of much more attractive appearance than tiles of uniform color and appearance.

It has been recognized that the installation of large expanses of tile of absolute uniform color and appearance is undesirable, since the effect, artistically, tends to be dead and monotonous. In attempting to avoid such effects, mottled tiles have been produced in the past, but the pieces, although individually mottled, have in general been of the same hue, chroma and color value, and the overall effect has been that of a monotone. In other instances, tiles have been produced by the application of superficial color non-uniformly upon tile bodies of a solid color, or, the color is applied uniformly but checks occur during firing to such an extent that the final product is of textured appearance. For wall purposes, such tile is generally satisfactory. However, if such tiles are used for floors, the glaze eventually wears away, the underlying color of the body is exposed, and the tile presents a very undesirable appearance.

It is the principal objective of the invention to provide a simple and convenient method for producing tile pieces which vary in color throughout the body of each piece and which also vary in hue, chroma and value within individual pieces and from piece to piece. Such tiles, when assembled either on a floor or wall, display a varying overall color effect which renders the assemblage more attractive in appearance. Such tiles are particularly adapted for flooring purposes, since uniformity of color variation throughout the bodies of the individual tiles enables them to retain their overall original appearance even though wear may expose different colors in the individual tiles.

Tile is produced on a commercial scale by depositing the body composition, which is in the form of a powder, in a so-called shaker box, from a hopper, after which the shaker box is slid over die cavities in a tile press, such that the powder falls from the box into the die cavities. Subsequently, the powder in the respective cavities of the die is compressed, and the compressed pieces are then removed from the die for firing or glazing followed by firing. The hopper is arranged adjacent the tile press, and the operator spreads the powder with his hands to make sure

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that each cavity will be filled with powder from the shaker box.

The composition of the body determines its final appearance. Sometimes in the past, so-called stippled or mottled tile has been manufactured by mixing two different color compositions, somewhat roughly, before introduction of the body into the hopper and such tiles, when fired, will individually present a somewhat mottled appearance. However, in such cases, the individual pieces will be the same in color hue, chroma and value.

The present invention is based upon the concept of dividing the hopper into two or more compartments, placing body compositions of different color into the compartments and discharging the different compositions simultaneously to the shaker box and subsequently to the die cavities in the tile press. It has been determined that superficial admixing of the two body colors will occur during their passage to the shaker box and during distribution to the die cavities in the tile press, to such an extent that the pieces of tile produced in this manner will have blended shades of color individually, will vary in color in cross section, but will also vary qualitatively and quantitatively in hue, chroma or color value from piece to piece. An assembly of such pieces, therefore, will produce the desired permanence of appearance, as well as the desired tonal variations necessary to avoid the monotony which has been characteristic of expenses of tile produced by past production methods.

In the practice of the invention, the hopper for the body powder contains one or more partitions and preferably is constructed to discharge body compositions from the hopper on to a vibrating table or spout at which some mixing can occur. The press operator spreads the powder in the shaker box with his hands in the usual manner and this produces additional blending of the two body compositions. Next, the shaker box is slid over the die cavities, and the usual compression procedure follows. Although the change in procedure is not great, the final products are much more attractive than those previously produced on a commercial scale.

Inasmuch as the present invention is particularly useful in the manufacture of floor tiles, where permanence of the appearance is of greatest importance, the invention is disclosed particularly in relation to such utilization, but it will be understood that the word tile, as used in the specification and claim, embraces wall tile as well as floor tile, and tile bodies of vitreous

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as well as semi-vitreous nature, depending upon the body composition and the temperature and time conditions under which the tile is matured.

Further objectives and advantages of the invention appear in the following description of the drawings, in which:

Figure 1 is a side elevation of apparatus adapted to be used in the practice of the invention.

Figure 2 is a plan view of the apparatus shown in Figure 1.

Figure 3 is a cross sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a photolithographic reproduction of an assembly of tiles produced in accordance with the present invention.

In the apparatus shown in the drawings, a hopper 1, having a conical lower portion 2 provided with a discharge annulus 3, is mounted over a bed 4. Between the bed and the hopper is located a sloping vibrating spout or table 5, which receives the powdered ceramic body from the hopper and distributes it into mold or shaker box 6. The upper end of the vibrating table is attached to the bed by means of a leaf spring 7, and the lower end of the table is vibrated by means of a vibrator 8. The table 5 comprises a discharge portion 9 which distributes the composition into the mold, and a receiving portion 10 disposed directly below the annulus of the hopper. A cloth sleeve 11 extends downwardly from the annulus of the hopper and engages the receiving portion of the vibrating table. In order to prevent spilling of the ceramic material, the receiving portion of the table and the spout are provided with an upwardly standing marginal wall 12.

The hopper 1 is provided by an internal partition 13, which preferably is disposed parallel to the path of discharge of the ceramic body from the vibrating table. Ceramic body of one color is placed on one side of the hopper and of a different color on the other side of the hopper, so that the hopper discharges two streams of ceramic material of different colors. The position of the partition in the hopper may be varied toward one side or the other to control the relative diameters of the two streams, and, thereby, to control the relative proportions of the two body streams. During movement of the streams down the spout 9, additional mixing is furthered by the manual operation of distributing and smoothing the material discharged by the table into the shaker box. Thus, a charge of material is led into the box, and the operator sweeps over the box by hand to insure that it is filled evenly. The die in which the tiles are pressed has its upper surface in the plane of the table over which the shaker box is movable and is usually a multiple cavity die in which 12 or 16 pieces of tile may be compressed at once. The shaker box, when filled, is passed over the surface of the die and the clay falls from the box into the cavities after which the box is returned for the next load and the body composition in the die cavities is then pressed. Subsequently, the tile bodies are removed from the die cavities and are fired according to usual procedure.

The degree of mixing achieved by the vibrating table and the shaker box distributing and filling manipulation may be varied to produce desired effects, but, in any case, the mixing is sufficient to prevent stratification of the streams, so that individual tile do not display sharp lines of contrast, and stops short of homogeneity, which would provide a tile not of two colors, but of one

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resultant color. If desired, three or more colors may be employed, but artistic effects may be achieved by means of two colors only.

Since the degree of admixture of the differently colored ceramic materials is less than that requisite to provide a uniform resultant color, the tiles will not be individually alike as to hue, chroma or value. Each will differ from other tiles in respect to the amount of exposed surface of each color and the surface design constituted by the co-mingled colors. Yet the individual tiles may be used together effectively and artistically.

Tile manufactured according to the invention displays a number of ornamental advantages:

(1) Since the tile is slightly translucent, the color immediately below the surface effects the appearance of the surface, thereby providing shading more delicate than if a surface pigmentation alone were visible. (2) The fluxing components in the tile body, i. e., the glass, which forms about pigment particles or agglomerates, tends to bleed or dissolve them, which softens their outlines, whereby a pleasing effect may be obtained. (3) The pieces will vary from one another; one may be relatively darker than the one adjacent in overall effect, or one may have an area of substantial size which is of lighter hue than the surrounding or adjacent area. An assemblage of such pieces produces a more pleasant tonal variation than uniform color or uniform stippling. Such tile, even when worn by long hard abrasion, maintains its general appearance since the colors vary in the body and not merely on the surface of the body.

Representative examples of mixes of ceramic bodies suitable for use in the practice of this invention are as follows:

EXAMPLE 1

White

	Per cent
Kaolin	15
China clay	18
Feldspar	54
Flint	8
Ball clay	5
Talc	1

Gray

	Per cent
Kaolin	15.0
China clay	18.5
Feldspar	58.7
Flint	7.8
Talc	.5
Iron chromate	.335
Yellow body stain	.168

EXAMPLE 2

Light turquoise

	Per cent
Kaolin	15.0
China clay	18.5
Feldspar	58.7
Flint	7.8
Talc	.5
Blue green body stain	.34

Dark turquoise

	Per cent
Kaolin	15.0
China clay	18.5
Feldspar	58.7
Flint	7.8
Talc	.5
Blue green body stain	1.36

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EXAMPLE 3

Salmon pink

	Per cent
Kaolin -----	15.0
China clay -----	18.5
Feldspar -----	53.0
Flint -----	13.5
Talc -----	.5
Pink body stain -----	2.25
Rutile -----	3.15

Buff

	Per cent
Kaolin -----	15.0
China clay -----	18.5
Feldspar -----	53.0
Flint -----	13.5
Talc -----	.5
Rutile -----	4.5

Percentages are by weight.

Any two of these may be used in combination in the hopper to produce the tile of this invention. A particularly pleasing effect is obtained by combining a white body and a dark body to produce tile in which the under particles of dark body modify in varying degrees the color of the white body and vice versa. Thus, a photolithograph of such tile pieces in assembly is disclosed in Figure 4.

Having described my invention, I desire to be limited only by the following claim:

The method of making tile which comprises discharging a plurality of streams of differently colored dry powdered ceramic materials into a shaker box, mixing said stream sufficiently to

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blend the different colors and prevent stratification thereof, but not sufficiently to accomplish homogeneous admixture of the colors, and discharging the powder in the shaker box into a plurality of individual tile molds, compressing the powder into tile pieces and firing them, whereby an assemblage of individual tile pieces is provided, said individual tile pieces being like one another in that the color of each comprises an admixture of shades resulting from blending of the constituting colors, but being different from one another in that the shades vary qualitatively and quantitatively from tile to tile.

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