Dec. 3, 1957 A. H. RUSSELL 2,814,836

METHOD OF PRODUCING COATED MASONRY BUILDING UNITS

Filed Feb. 1, 1956

Fig. 1

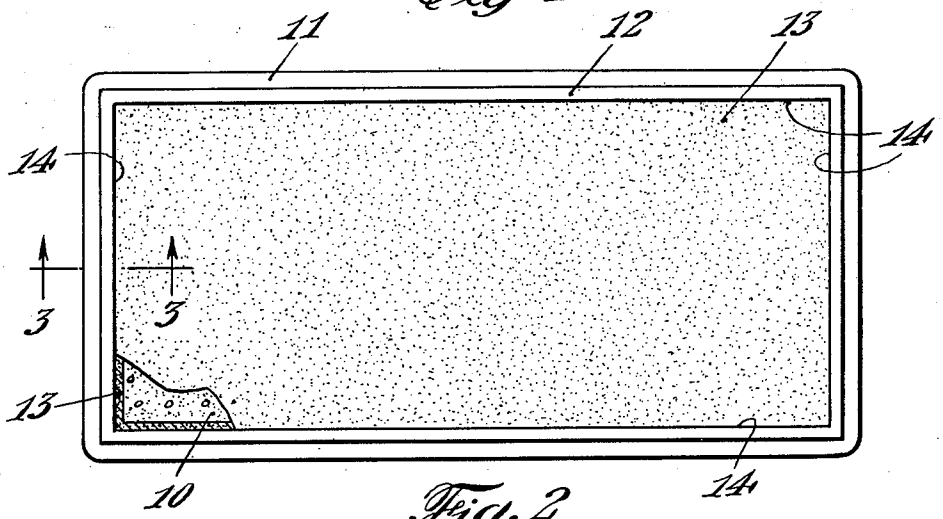


Fig. 2

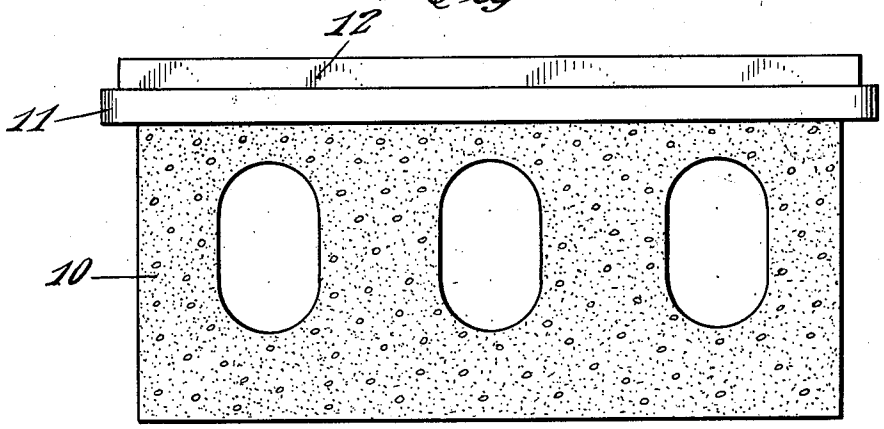
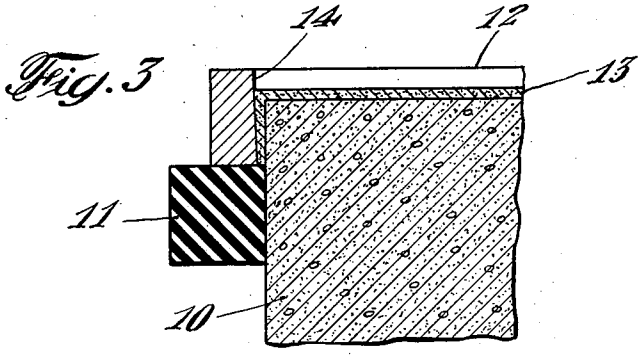


Fig. 3



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METHOD OF PRODUCING COATED MASONRY BUILDING UNITS

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Application February 1, 1956, Serial No. 562,907

18 Claims. (Cl. 18—60)

The present invention relates to coated masonry building units and more specifically to a novel method of producing coated masonry building units. More particularly, the invention relates to a novel method for coating masonry building blocks, such as those made from cinders, slag, cement, haydite, clay, or the like, to produce an adherent and preferably dense, hard coating on at least one face thereof.

Building units of the type mentioned above are more or less porous, and in general those that can be produced most economically are the most porous and present the greatest difficulty in applying a decorative or impervious finish to a wall constructed from them. For example, a wall made of cinder blocks has a very rough porous surface which is extremely difficult to paint or coat in any suitable fashion to produce a smooth, attractive surface. Liquid coating agents are difficult to apply to such a surface, are absorbed or soaked into the surface, thus becoming somewhat dissipated, and do not readily bridge over the pores to conceal surface imperfections in the blocks.

One object of my invention is to provide a novel method whereby such building units or blocks can be coated in a simple economical manner so that the block will have a suitable coating which is preferably impervious to moisture and which may have a smooth surface and which can be applied in attractive colors.

Another object of my invention is to provide a novel method for coating individual masonry building units or blocks with a coating composition to produce a decorative, serviceable surface thereon.

A further object of my invention is to provide a novel process for coating masonry building units or blocks which requires no expensive surface molds and which thereby eliminates costly and time-consuming cleaning operations which are frequently required where surface molds are employed.

These and other objects of the invention will be better understood by reference to a description of the invention in connection with the accompanying drawings, in which:

Fig. 1 is a top view of a building block shown during the curing operation of the coating process of the present invention. One small corner section of the coating has been cut away.

Fig. 2 is a side elevation of the coated building block of Fig. 1 shown during the curing of the coating.

Fig. 3 is a sectional view of the block during the coating process taken on the line 3—3 of Fig. 1.

Referring to the broader aspects of the process of my invention, the building unit to be coated is prepared for the coating treatment by placing an elastic band support member around the perimeter of the block in close proximity to the upper surface to be coated. A rigid frame member, which is slightly larger in internal dimensions than the top of the block to be coated, and which conforms generally to the configuration of the topside edges of the block, is placed over the edges of the top surface of the block so that it rests on the elastic band support

member and yet provides a wall which will retain the coating composition when poured on the top of the building block. The rigid frame member may be constructed of various rigid or semi-rigid materials, such as stainless steel, glass, or stiff paper or other composition having rigid characteristics, or other suitable material. The frame member may be coated with a glass enamel, frit or porcelain, as desired.

The rigid frame member is preferably only slightly larger in internal dimensions than the external edge dimensions of the surface of the block to be coated.

A quantity of a pre-mixed coating composition, such as the pre-mixed resinous coating compositions preferred for use in this invention, is then applied evenly over the surface of the top of the block in such quantity as will produce a coating layer of desired thickness and yet not pour over the top edges of the rigid frame member. The coating composition is then cured by such conditions of heat as are required to cure the composition. After the coating surface has been cured, the elastic band support member is removed from the block and the rigid steel frame lifted free from the coating and the block itself. The preferred coating compositions for use in the process of the invention shrink to some degree during curing, thus making it easier to remove the rigid frame member.

The coated surface that may thus be obtained by the process of the invention may be produced within uniform, fine tolerances to provide a dimensionally true coated surface. This reduces to a minimum any imperfections in any wall surface which will result from differences in height or width between the individual blocks. The process of the invention permits coating of the building block without employing surface molds which often require frequent time-consuming and expensive cleaning treatment before the molds may be reused. Such molds are often expensive and since they may be dispensed with the process permits additional economies.

Referring more particularly to the drawings, number 10 indicates a block to be coated, which is in this case an ordinary cinder block. Numeral 11 indicates the elastic band support member which is placed around the perimeter of the block in a position approximately one-half an inch in from the top surface to be coated. While the cross-sectional dimensions of the elastic band may vary within wide limits in accordance with individual preferences, one convenient cross-sectional area is approximately ¾ of an inch by ¾ of an inch. The internal circumference of the band should be such that it provides sufficient tension when placed around the block to support both itself and the rigid frame member in position without permitting drainage of appreciable quantities of coating composition down the sides of the building block. The elastic band support member should be of sufficient thickness to provide a surface upon which the rigid frame may rest. Numeral 12 indicates the rigid frame member which rests on top of the elastic band support member and which is employed to hold the coating material on the top surface of the block. The internal dimensions of the rigid frame member are preferably only slightly larger than the external dimensions of the top surface of the block to be coated and they should conform generally in shape to the top surface area. It is possible to standardize the dimensions of the rigid frame member so as to accommodate the reasonable variations in block dimensions which are usually obtained in commercial production of building blocks. By employing rigid frames of standard size, which may be produced conveniently and economically, it is possible to produce coated blocks wherein each block will have uniform top surface dimensions, in spite of the fact that the building blocks will vary greatly from one unit to the next.

The height of the frame member may vary substantially as desired providing that sufficient height is available to permit retention of a coating layer of sufficient thickness when the frame rests upon the elastic support member. A height of about 1 to 1.5 inches has been found to be satisfactory.

After the elastic band member and rigid frame member are in position, the fluid coating composition is applied uniformly over the top of the block 10. This coating composition forms a layer 13 and portions of the composition drain down the sides of the block between the internal surface 14 of the rigid frame member 13 and the external surface of the block. The elastic band support member prevents seepage of the coating composition by virtue of its intimate contact with the circumference of the building block. Desirably the internal surface of the rigid frame member is tapered slightly so as to facilitate the removal of the frame member from the coated block. This slightly tapering is shown at numeral 14 in cross-sectional Fig. 3.

After the coating has been cured under proper conditions, which will depend upon the coating composition employed, the elastic band support member 11 is stretched to remove it from the block and the rigid frame member 12 is slipped from the coating surface in the direction opposite to that of its taper.

Upon removal of the elastic band support member and rigid frame member, the building block, having a cured coating surface, may be employed to erect walls. The process of the present invention will produce a smooth uniform coating on the block. Where suitable overlap or lip thickness is provided, it is possible to erect walls without mortar showing at the joints. By employing rigid frame members of uniform internal dimensions it is possible to produce concrete blocks with a coating surface of uniform area despite substantial variations in the surface area of the blocks themselves. This permits the erection of walls having uniform surface area common to each of its component blocks. The thickness of the overlap or lip is dependent upon the difference between the internal dimensions of the frame and the perimeter of the block.

The elastic band member may be made of any convenient elastic material such as the various natural and synthetic rubber band materials which are readily available in commerce. Specific examples of such elastic materials are natural rubber, rubbery butadiene-styrene copolymer, rubbery butadiene-acrylonitrile copolymer, Butyl rubber (isobutylene-butadiene copolymer), polychloroprene, polyvinyl chloride elastomers, etc. To prevent adherence of the cured coating composition to the elastic band member and the rigid frame member, they can be coated with a lubricant, such as a polymeric dimethyl siloxane oil.

It has also been found that improved adhesion of a polyester coating to the less porous membres of the above defined class of building units, such as clay bricks, can be improved if the surface of the brick to which the coating is applied has numerous small ridges or other roughened exterior.

The degree of penetration of the coating composition into the pores of the building block is dependent upon the porosity of the block and viscosity of the coating composition. This degree of penetration can be controlled to some extent by adjustment of the time of introducing the coating composition on to the top surface of the block. If the coating composition is introduced after the composition has begun to gel or harden, penetration will be reduced. I preferably compensate for undue penetration of the coating composition by increasing its viscosity by imparting thixotropic properties to the coating composition. This reduces penetration into the porous surface of the building block and reduces the drainage of coating material from the top of the block. As previously set forth, if the degree of penetration is relatively slight, as with clay bricks, the adherence of the coating composition to the brick can be increased by scoring the surface of the brick to provide numerous ridges thereon.

The employment of a rigid frame member having uniform and slightly larger internal dimensions than the external perimeter of the block to be coated and which rests on an elastic band support member in intimate contact with the external perimeter of the building block constitutes an important feature of my present invention. Without using this combination it would be impossible to produce coated concrete blocks in which the coated surface will be uniform for each unit produced and yet eliminate draining of the initially fluid coating composition over the edges of the surface of the block when coated in a face-up position. Accordingly, the employment of this combination in my process constitutes an essential feature of this invention.

A wide variety of coating compositions may be employed in the process of my invention. However I prefer to use resinous compositions such as are disclosed in the copending application for Letters Patent of John A. Sergovic, Serial No. 521,529, filed July 12, 1955, now Patent No. 2,751,775 and assigned to a common assignee. Also the apparatus used to dispense the coating composition to the surface of the block, the conveyers and curing apparatus are desirably essentialy those described in Figs. 5, 6 and 7 of the drawings and in the accompanying description of said application Serial No. 521,529 now Patent No. 2,751,775. It is my intention to incorporate by reference the entire disclosure of said copending application.

The coating compositions which are most desirable for employment in the process of the present invention include the polyester type of resin, whatever catalyst may be necessary to produce curing of the resin, a monomeric polymerizable solvent that does not volatilize when the resin is cured, one or more suitable finely-divided fillers or aggregates, and, if desired, pigment or coloring material.

The polyester resins are a class of resins with which the resin chemist is familiar. These are ethylenically unsaturated alkyd resins. The preferred resins of this class for employment in the coating compositions of the invention are the polymeric ester reaction products of one or more dicarboxylic acids and one or more polyhydric alcohols. Desirably one or more of these reactants shall contain a reactive double bond or ethylenic linkage. Among the dicarboxylic acids which may be used are phthalic, malic, maleic, fumaric, adipic, pimelic, suberic, sebacic, itaconic, citraconic, and succinic acids and their anhydrides. It is essential that some of the dicarboxylic acid component of the polyester resin contain an unsaturated ethylenic linkage. For this reason, maleic and fumaric acids are most desirable. Among the polyhydric alcohols which may be used are ethylene glycol, diethylene glycol and propylene glycol. A mixture of propylene glycol and dipropylene glycol is the most satisfactory polyhydric alcohol. One may use an unsaturated monohydric alcohol in place of part of the polyhydric alcohol. A typical example of such an alcohol is allyl alcohol which produces an allyl ester of the dicarboxylic acid. The polyester resins may be suitably modified or plasticized by the incorporation of alcohols, fatty acids, etc., to modify the chemical and physical characteristics as desired. The polyesters should comprise upward from about 15% or 30% and preferably 50% to 85% by weight of the resin and resin-forming component, e. g., styrene, of the coating composition.

The resin component of the preferred coating compositions should also contain a non-volatile, monomeric, crosslinking solvent for the polyester resin. The function of this solvent is to make the polyester resin more fluid and also to crosslink the polyester resin at the time of curing to produce a crosslinked, or three dimensional

resin with the polyester resin which is thermosetting in character. This monomeric solvent is an important member of the resin component, for it provides the necessary fluidity to resin component, imparts thermosetting characteristics to the cured resin and is consumed during the curing of the resin without forming volatile materials. This freedom from volatility is highly important for otherwise the release of volatile matter would produce bubbles, voids or pinholes on the surface and throughout the finished coating of the building block. The lack of volatile matter permits curing when under pressure without requiring provision for vents, etc., in the molds. Also, escaping combustible, volatile matter may produce explosions, or fire hazards.

Among the monomeric polymerizable solvents which may be used are the hydrocarbons: styrene, vinyl toluene, e. g., o-vinyl toluene, p-vinyl toluene, and m-vinyl toluene, cyclopentadiene; vinyl acetate; diallyl esters, e. g., diallyl phthalate and triallyl cyanurate, as well as alpha methyl styrene. Styrene has produced the most satisfactory results thus far.

When obtained commercially, these resin compositions also contain a small amount of a polymerization inhibitor so as to prevent gelation during storage prior to usage. Such inhibitors include the well-known antioxidants: hydroquinone, t-butyl catechol, quinone, etc.

Polyester resins of the character contemplated for use in the process of the present invention are sold in the trade and identified as "Paraplex" or "Vibrin" resins. In general, these resins are unsaturated high molecular weight polymers made by reacting one or more acids or a blend of acids, such as maleic or fumaric acid, with a dihydroxy alcohol, such as ethylene glycol. The specific properties of these resins vary depending largely upon the type and amount of each constituent in the combination. For best results it is preferable to employ a mixture of two different types of such resins. Certain of these resins form masses upon curing that are very rigid or inflexible, while others form more flexible rubbery masses. It is preferred to use a mixture of the rigid and flexible resins, and about two to five parts of rigid resin and one part of flexible resin produce excellent results. These proportions may, of course, be varied within wide limits depending upon the particular properties desired for the cured coating layer and the properties of the resins that are mixed.

The resin and monomeric polymerizable solvent, such as styrene or other vinyl monomer, such as vinyl acetate and vinyl toluene, are mixed with finely-divided filler, preferably a mineral filler and more particularly sand, or aggregate to form a coating composition having the consistency of a thick slurry. Styrene is recommended because of lower cost and other advantages. For this purpose the liquids may be proportioned in the ratio of about 30% or preferably 50% to 85%, or more, resin solids and the balance styrene or other solvent. About 40% resin solids and 60% styrene gives a good workable consistency.

The filler may vary greatly as to kind and amount and may include such materials as the calcium carbonates, clays, burned clays, glass beads, asbestine, diatomaceous earth, silica flour, sand and other natural or manufactured granular particles which may be blended together. The filler is an important part of the coating composition since it provides, in a sense, a diluting medium enabling savings of the more expensive polyester resins and also contributes very desirable properties of its own in providing a satisfactory coating. Sand is an excellent material for this purpose and it greatly increases the hardness and strength of the coated surface. Sand slows down the wick action which tends to draw the liquid down into the pores of the block being coated, eliminates holes and cracking and improves the ability to strip the coated block from the molds after curing.

It is desirable that the filler used consist of rounded particles. Rounded particles will nest more closely together than will rough, irregular shaped particles. Rounded particles will slide past one another more readily than rough, irregular particles and are thus extremely beneficial in enhancing the flowability of the slurry mix. Because of this latter property they permit substantial savings in the amount of polyester resins required as it becomes possible to increase the filler concentration. It is for this reason that sand is a preferred source of filler, for most sand particles are more smooth and rounded than are many of the other filler materials.

By employing filler materials having a gradation of particle sizes a number of advantages may be obtained. It is advantageous to be able to use a coating composition having the greatest possible ratio of filler to resin. Not only are the resins substantially more expensive, but the fillers contribute essential properties to a satisfactory facing. By using a gradation of particle sizes one can increase the amount of filler from as much as 40% to 400% or 500% per weight of liquid resin component without sacrificing any process economies or flowability of the composition and yet obtain a superior coating. By using a gradation of particle sizes, it is possible to obtain filler material which approaches maximum density by reducing the open void spaces between the filler particles to a minimum. This makes it possible to use a small amount of resin in filling the voids and yet provides a rugged coating.

The gradation of particle size of filler material increases the flowability of the slurry mix enabling the slurry to move readily through restricted openings of the slurry charging equipment when under pressure. The smaller particles are believed to serve as a lubricant for the movement of larger particles. It is quite important that the slurry mix have satisfactory flow characteristics if a satisfactory glazed block is to be obtained. By imparting greater flowability, it is possible to obtain both easier charging of the molds and better leveling of the slurry in the mold. It is also easier to obtain a homogeneous layer of slurry. This prevents the formation of resin-rich and resin-starved areas and a resulting undesirable difference in shrinking rate during the curing operation. Since the slurry has excellent flow properties it will flow into the voids, holes and interstices of the building unit to a desirable depth and provide an effective bond upon curing. Because of the satisfactory flow properties, it is possible to obtain a lip which is "full"; that is, as wide as the edge of the mold is high. The resulting full lip is also more resistant to breakage during shipment and handling on the job.

Gradation of particle size also makes it possible to have a coating of optimum hardness. Most inorganic fillers have a hardness greater than that of resins. Therefore, the more filler that can be concentrated at the surface of the facing, the harder the facing will be. By gradation of filler particle sizes, it is possible to approach maximum density and obtain a facing having an optimum concentration of filler present in the mix.

Also, because of its excellent flow characteristics, the filler material is dispersed more uniformly throughout the slurry, providing a facing which is of optimum uniformity in color, gloss and texture.

In general, the gradation of particle size of the filler should be such that there is a gradual diminution in the quantity of material (by weight) corresponding to each sieve size as one goes from larger to smaller standard sieve sizes. Stated in another way, the percentages by weight of the portions of larger sized particles retained by each standard sieve size should be greater than those of the portions of smaller sized particles. I have found that for best results when using sand as the filler, the maximum particle size should be that of a 40-mesh sieve (0.0165 inch), i. e., retained by a 40-mesh sieve but not retained by a 30-mesh sieve (0.0232 inch).

In practice, satisfactory results may be obtained by

using particles having at least two general particle size classifications, one of which may be said to be of large size (in the order of 30–70 mesh) and another of small size (in the order of 100–325 mesh). It is desirable to employ a major proportion, and preferably 60% or more, by weight of the large size particles. One particularly successful gradation is one in which about 65% by weight of the filler is of sand of approximately 40–70 mesh and 35% is of 70–140 mesh size. A gradation of 80% of the former mesh size and 20% of the latter is equally satisfactory.

It has been found that it is particularly desirable in the coating mixture to employ at least about 50% by weight of sand or other inert filler materials, and at least about 10% by weight of the resin solids and polymerizable solvent, if one is to obtain the best physical properties in the coating layer.

A suitable catalyst should be added to the resin mixture just prior to the addition of the filler or after the addition of the filler. Coating slurry containing a polymerization catalyst should be placed on the top face of the blocks prepared with the elastic supporting band and rigid frame and the coating operation completed within a short period of time, otherwise the coating slurry may become too viscous for convenient extrusion from the charging equipment and subsequent handling as a result of premature polymerization. Occasionally satisfactory results may be obtained by adding the catalyst to the coating slurry after it has been poured onto the block. This practice is not recommended as the catalyst does not, as a rule, become intimately mixed into the slurry and uneven polymerization results.

A larger number of oxidizing catalysts, such as dicumyl-peroxide, cumene hydroperoxide, benzoyl peroxide and the like, with which those skilled in the resin art are familiar, may be used satisfactorily. For better results and for more uniform dependability, methyl ethyl ketone peroxide, either alone or admixed with one of the other peroxides, notably benzoyl peroxide, should be used. This catalyst gives much more satisfactory results than does benzoyl peroxide, which has heretofore been the catalyst of choice of polyester resin chemists. Methyl ethyl ketone peroxide should desirably be used in greater concentration for optimum results than benzoyl peroxide and other catalysts. The optimum concentration of methyl ethyl ketone peroxide is about 4% of the resin weight whereas the general practice in the art for other catalysts is the use of an amount of from 0.5% to 2%.

The use of metallic driers in combination with the peroxide catalysts, and particularly with either benzoyl peroxide or methyl ethyl ketone peroxide, is desirable. When, for example, methyl ethyl ketone peroxide and manganese naphthenate are used together in the proportions of about 2% of the former and about 1½% of the latter by weight of the resins, the face of the resulting block coating possesses a pleasing, high degree of glossiness. When for example, about 2% benzoyl peroxide and about 1½% manganese naphthenate and about 0.5% cobalt naphthenate are used equally, satisfactory results are obtained when using hot-air curing. The use of this combination of a metal drier with the peroxide also increases the efficiency of the process as it results in substantial reduction in the sticking of the coating to the rigid frame member. As previously mentioned, silicone oils, such as polydimethyl siloxane, also can be used to prevent sticking of the coating to the rigid frame member or the elastic band support members.

The metallic driers discussed above are materials with which those skilled in the art, and particularly in the paint art, are familiar. These materials are metal salts of an organic acid, such as naphthenic acid. The primarily important driers are cobalt, manganese and iron naphthenates. I prefer to use manganese naphthenate, which is introduced in the form of a 6% solution, as the drier.

It has been found to be desirable to incorporate into the coating slurry a small percentage of a cation modified clay. Such clay products are disclosed in U. S. Patent No. 2,531,427 which issued on November 28, 1950 to Ernest A. Hauser. These cation modified clays are essentially clays, such as bentonite, which normally possess cation exchanging properties and which have in place of the normal exchangeable cation an onium base. Such onium base derivatives of the clays are the quaternary ammonium, phosphonium, oxonium, sulfonium, arsonium, stibonium and telluronium derivatives. The ammonium base clays are preferred. Excellent results have been obtained by incorporating about 1½% to 3%, and preferably 3%, by weight of dimethyldioctadecylammonium bentonite per weight of mixed resins. This particular onium base derivative is supplied by the National Lead Company under the trade name "Bentone 34." This material has a specific gravity of 1.8 and is desirably of a small particle size, such as 0.05 to 1.0 micron in length.

The employment of these cation modified clays imparts thixotropic properties to the coating slurry and thus enhances its viscosity. This more viscous slurry is less apt to flow into the voids of the block and over the edges of the block. The cation modified clays also improve appreciably the stain resistance of the coating surface.

It may be desirable to add additional ingredients to the coating composition to insure the production of a surface that is non-combustible. This property will not always be required, however, so that such additions are entirely optional. The addition of antimony trioxide and chlorinated paraffins even in small amounts is sufficient for this purpose, although other materials such as tricresyl phosphate may be used in place thereof.

Other coating compositions than those described hereinabove and in co-pending application for U. S. Letters Patent, Serial No. 521,529, now Patent No. 2,751,775 of John A. Sergovic may be employed. For example, other resin and filler compositions which will provide a pleasing coated surface and which may be suitably cured may be used if desired.

The curing conditions will vary depending upon the nature of the coating composition employed. With the polyester resin compositions described hereinabove a curing temperature such as about 150°–350° F., or higher, but preferably about 190°–220° F. when live steam is used as the source of heat, is desirable. Usually only a relatively short curing or baking cycle is required. A period of 0.5 up to 6 hours has been found to be satisfactory where curing is effected with live steam as the source of heat. When dry heat is used at the higher temperatures, a shorter time of 10 to 60 minutes will suffice. Optionally, the block may be pre-heated before applying the coating composition to the top surface of a building block which has been prepared for the coating treatment by attaching the elastic band support member and the rigid frame member in accordance with the process of my invention.

In order more clearly to disclose the nature of the present invention, specific examples illustrating the process of the present invention will hereinafter be described. It should be understood, however, that this is done solely by way of example and is intended neither to delineate the scope of the invention nor limit the ambit of the appended claims. In each example the building block is first prepared by attaching the elastic band support member and the rigid frame member, then the flowing coating composition described is uniformly applied over the top surface of the block, the coating layer is cured, and the band and frame members removed in accordance with the hereinabove described process.

Example 1

A coating composition slurry was prepared by first stirring in a mixing vessel just prior to the coating operation an initial mixture having the following composition:

A mixture of about 27% by weight of polyester resins made up of 3 parts of rigid type polyester resin (Paraplex P43, believed to be a condensation product of propylene glycol and dipropylene glycol in the ratio of 1 to 3 with phthalic anhydride and maleic anhydride in ratio of 3 to 2) and 1 part of flexible type polyester resin (Paraplex P13, believed to be a condensation product of ethylene glycol and diethylene glycol with phthalic anhydride, maleic anhydride and adipic acid), 23% by weight of styrene monomer, 5% by weight of titanium dioxide as a pigment, and about 45% by weight of #325-mesh asbestine ---------- gms--	150

To this initial mixture were added the following:

Styrene monomer (solvent) ---------- gms--	25
Bentone 34 (dimethyldioctadecylammonium bentonite) ---------- gms--	6
Methyl ethyl ketone peroxide (catalyst) ---------- cc--	4
Manganese naphthenate (catalyst) (6% solution) ---------- cc--	2
Cobalt naphthenate (catalyst) (6% solution) -- cc--	1

The resulting mix was agitated and to it were added promptly the following fillers:

448 grams of special coarse No. 2 sand.
112 grams of banding sand.

The mixed slurry was applied uniformly over the top surface of a slag building block which had been prepared with the elastic band support member and the rigid frame member in accordance with the detailed preferred procedure described earlier in the specification. The elastic band support member was made of natural rubber and the rigid frame member was made of stainless steel. After curing the coating composition on the building unit at 212° F. with live steam for 0.5 hour, the block was permitted to cool and the elastic band and the rigid frame removed.

Example 2

A coating composition was prepared by stirring in a mixing vessel just prior to the coating operation an initial mixture having the following composition:

A mixture of about 27% by weight of polyester resins made up of polyester resin (Paraplex P43), 1 part of flexible type polyester resin (Paraplex P13), 23% by weight of styrene monomer, 5% by weight of pigment, and about 45% by weight of #325-mesh asbestine ---------- lbs--	25.5

To this initial mixture were added the following:

Styrene monomer (solvent) ---------- lbs--	6.5
Bentone 34 (dimethyldioctadecylammonium bentonite) ---------- lbs--	0.5
Methyl ethyl ketone peroxide (catalyst) ---- cc--	250
Manganese naphthenate (catalyst) ---------- lbs--	0.4

The resulting mix was agitated and to it were added promptly the following fillers:

86 lbs. crystal silica sand having the following approximate sieve analysis:

Sieve sizes:	Approx. percentages
No. 40	38.0
No. 50	41.0
No. 70	14.0
No. 100	4.0

22 lbs. banding sand having the following approximate sieve analysis:

Sieve sizes:	Approx. percentages
No. 50	0.9
No. 70	20.0
No. 100	48.2
No. 140	20.9
No. 200	7.0
No. 270	2.5

After mixing under a vacuum of 28 in. of mercury for about 15 minutes, the coating composition was subjected to an air pressure of 30 lbs. per sq. in. and forced uniformly over the building blocks which were equipped with the elastic band and rigid frame in accordance with the detailed preferred procedure described earlier in this specification. After curing the composition on the building unit at 212° F. with live steam for 0.5 hours, a coated block was obtained which had an excellent adhesion of the coating to the block and which was resistant to marring, scratching, thermal shock, staining, crazing, etc. The coated face of the building block was found to be waterproof and very decorative in appearance.

Example 3

Another bolck was coated according to the procedure described in Example 2 but using the following composition:

	Parts by weight
Rigid type polyester resin (Paraplex P43) ----------	38
Flexible type polyester resin (Paraplex P13) ------	19.5
Benzoyl peroxide (catalyst) ----------	2
Manganese naphthenate (catalyst) ----------	1.5
Cobalt naphthenate ----------	0.5
Titanium dioxide (pigment) ----------	4.5
Resin coated calcium carbonate (Surfex) (filler) --	20
Bentone 34 ----------	1.5
Antimony trioxide ----------	4.5
Chlorinated paraffin ----------	4.5
Monomeric styrene (solvent) ----------	3.5
Total ----------	100

To this mixture were added about 1 part of silica sand to 1 part of the mixture and, in a second example, 2 parts of silica sand to 1 part of the mixture. This silica sand was composed of about 65% by weight of particles of about 40 to 50 sieve size and 35% of about 100 sieve size. The block coated with the foregoing composition was similar in appearance and properties to the article obtained according to Example 2, and in this case the coating in addition was rendered incombustible for all practical purposes by the presence of the antimony dioxide and chlorinated paraffin. The time and temperature of treatment is the same as in Example 2.

Example 4

A particularly suitable coating composition for cinder or slag block or the like is as follows:

	Parts by weight
Mixture of sands containing about 60% size 16–40 mesh and balance size 40–300 mesh ----------	5
Liquid composed of 40% resin solids (80% rigid type "Paraplex 43" resin and 20% flexible type "Paraplex 13" resin and 60% styrene ----------	2

The coated cinder block was formed and cured as in Example 1.

Example 5

A solid polyester resin was prepared from 1266 lbs. phthalic anhydride, 636 lbs. maleic anhydride, 501 lbs. dipropylene glycol and 855 lbs. of propylene glycol. This resin, which possessed an acid number of 35, was mixed with 1.32 lbs. of hydroquinone as an inhibitor. This mixture of resin and inhibitor was diluted with 1284 lbs. of styrene.

To 52 lbs. of this resin, inhibitor and styrene mixture there were added 1.5 lbs. of benzoyl peroxide and 1.5

lbs. of methyl ethyl ketone peroxide as well as 1.5 lbs. of manganese naphthenate, 0.5 lb. of cobalt naphthenate, 4.5 lbs. of titanium dioxide (pigment), 1.5 lbs. of Bentone 34, 5 lbs. of antimony trioxide, 10 lbs. of solid chlorinated paraffin and 18 lbs. of styrene.

To 1 lb. of the above composition there is added 3.2 lbs. of graded silica sand (of the same composition as in Example 2) and a slag-masonry load bearing block was coated with this slurry in the manner described in Example 1, and the coating composition was also cured as in Example 1. The block had a smooth decorative face of the resin composition which had permeated the surface of the block. The face of the block was highly resistant to marring, scratching, staining, crazing and thermal shock, and was also waterproof.

Example 6

This example is identical with Example 5 except that in place of 3.2 lbs. of sand there were employed 0.6 lbs. of a ceramic frit coated colored rock granule (40 mesh) and 2.6 lbs. of ungraded sand of 30 to 160 mesh (having a variable concentration of different particle sizes). The final block had a pleasing mottled appearance which did not show scratch marks and other slight damages which might occur in use when solid colors are employed. In its other properties it was substantially identical with the block prepared in Example 5.

Example 7

This example is identical with Example 6, except that instead of employing a slag-masonry block, there was used a fired clay brick 8" x 2" x 3½", the top surface of which had numerous score lines running substantially parallel to the width of the brick and resulting in numerous irregularly shaped ridges thereon. The ridges are about ⅛" above the valleys. The ridges were approximately 1/16 in. in width, as were the valleys between the ridges. The coating composition was securely held to the bricks and in this respect the coated bricks were superior to similar bricks which had a smooth top surface.

The fired clay brick produced in accordance with the foregoing example, and further described elsewhere in the specification, is claimed in my copending divisional application.

It is particularly desirable in the coating mixture to employ at least about 50% by weight of sand or other inert filler materials, and at least about 10% by weight of the resin solids and polymerizable solvent, if one is to obtain the best physical properties in the coating layer. That is, the sand is present in an amount of at least 50% and not over 90% of the total of the resin, monomer and filler by weight.

The terms and expressions which I have employed are used as terms of description and not of limitation, and I have no intention, in the use of such terms and expressions, of excluding any equivalents of the features shown and described or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

What is claimed is:

1. A method of coating a face of a molded masonry building unit which comprises placing a temporary elastic band support member around the perimeter of the building unit near the face to be coated, placing on said support member a rigid frame member capable of preventing a semi-liquid coating composition from flowing down the sides of the building unit when in cooperation with the elastic band support member, pouring a flowable coating composition uniformly upon the face of the building unit and curing said coating composition until it is rigid and firmly fixed to the building unit surface.

2. A method as defined in claim 1, in which the elastic band support member and rigid frame member are removed after curing of the coating composition.

3. A method as defined in claim 1, in which the building unit is pre-heated before the coating composition is applied.

4. A method as defined in claim 1, in which the coating composition contains a mixture of flexible and rigid polyester type resins.

5. A method as defined in claim 1, in which the coating composition is introduced upon the face of the building unit after the coating composition has commenced to gel.

6. A method of coating one face of a porous building unit which comprises placing a temporary elastic band support member around the perimeter of the building unit near the face to be coated, placing on said support member a rigid frame member capable of preventing a semi-liquid coating composition from flowing down the sides of the building unit when in cooperation with the elastic band support member, pouring a flowable heat-convertible resinous coating composition uniformly upon the face of the building unit and in quantities sufficiently to provide a layer of suitable thickness over the surface of the building unit, said coating composition comprising a polyester type resin and a filler, commencing polymerization of the resin and heating the coating composition to complete the curing of the resin.

7. A method as defined in claim 6, in which the elastic band support member and rigid frame member are removed after curing of the coating composition.

8. A method as defined in claim 6, in which the coating composition comprises a mixture of flexible and rigid polyester type resins, a non-volatilizing polymerizable crosslinking solvent for said resins and chemically inert, finely-divided filler.

9. A method as defined in claim 6, in which the coating composition comprises a mixture of flexible and rigid polyester type resins, a curing catalyst and styrene.

10. A method as defined in claim 6, in which the filler material is of chemically inert, finely-divided material and which has substantially rounded particles.

11. A method as defined in claim 6, in which the filler material comprises sand.

12. A method as defined in claim 6, in which the filler is of chemically inert, finely-divided material having a gradation of particle size.

13. A method as defined in claim 6, in which said coating composition contains a cation modified clay in the form of an onium derivative of said clay.

14. A method as defined by claim 13, in which said cation modified clay is an ammonium derivative of said clay.

15. A method as defined by claim 6, wherein the internal dimensions of the rigid frame member are slightly larger than the external perimeter of the building unit.

16. A method as defined by claim 6, wherein the internal dimensions of the rigid frame member are smaller than the elastic band support member when said band member is placed around the perimeter of the building unit.

17. A method according to claim 6, wherein the porous building unit is a clay brick having numerous valleys and ridges on its said one face composition which aid in securing the coating composition to the brick.

18. A method according to claim 17, wherein the porous building unit is a slag-masonry unit.

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