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ADOBE COMPOSITION AND METHOD

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1 Claim. (Cl. 106—122)

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This invention relates to adobe building material and more particularly to an improved combination and method of making an adobe clay building material in combination with a shrinkable filler.

Adobe construction ordinarily consists of wetting of a quantity of suitable adobe clay and admixing straw, hay, grass roots or other fibrous material and mixing the same, and compacting the mixture, as by trampling, to a proper consistency. Shaping into bricks is performed by molds or the like. Sometimes the adobe is applied directly to a wall or other surface in successive layers like plaster.

Such construction requires relatively long intervals of drying or baking of the adobe in the sun and, due ordinarily to sluggish internal ventilation and lack of porosity, differential drying frequently results in cracking of the material. Moreover, adobe bricks, as thus made, are excessively heavy and are therefore frequently unable to sustain their own weight beyond a limited height. The organic materials usually included are calculated more to bind the brick together than to prevent cracking, and the resultant brick is usually as heavy as though such materials were altogether omitted.

The practice of the invention herein disclosed and the adobe material contained thereby is not intended to be restricted to bricks as such but may be used in the construction of roof tile, drain pipes, incinerators, lawn ornaments such as statues, bird baths and the like, and objects and structures capable of being molded to a desired shape.

It is intended by this invention to provide a more or less cellular adobe construction in which an expansible material in flaked or granular form, as sawdust, is initially caused to swell to its utmost as by soaking in water, and is then mixed in approximately equal bulk with adobe mud. When the adobe and sawdust dry, the latter tends to shrink and to become considerably lighter in weight, resulting in a cellular or porous adobe brick in which the sawdust particles are individually loosely held, thereby substantially reducing the weight of the brick but diminishing its tendency to break in handling, speeding its drying qualities, and increasing its strength per unit of volume.

The invention therefore has among its objects the production of a relatively strong adobe brick construction of light weight compared with bricks heretofore produced of a similar material.

It is another object of this invention to provide such an adobe brick susceptible of more rapid mass production than heretofore accomplished associated with ease of manufacture.

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Another object of the invention is to provide such a construction brick or material formed from readily available ingredients and at a relatively low cost.

Yet another object of the invention is to provide an adobe brick construction having the desirable characteristics set forth without the necessity of firing the brick or heating it by artificial means.

Still another object of the invention is to provide in a brick of the character described a filler material which in its original state is expanded and in its cured state is relatively contracted and light in weight and whereby the brick is rendered cellular in structure.

Another further object of the invention is to provide an optionally water-proofed, rot-resistant construction by addition of a preserving and water-proofing material.

It is moreover an object of this invention to provide improvements over prior art compositions and methods heretofore contemplated for generally similar purposes.

Other objects will appear in the following specification and the appended claim.

A preferred method of practicing the invention is to soak run-of-the-mill sawdust as available from commercial sawmills and the like in a water bath until the same has absorbed as much imbibed and free water as reasonably possible. This, from a practicable standpoint, is usually accomplished in approximately twenty-four to forty-eight hours of soaking. An adobe clay mud is then prepared in a usual manner and the water-soaked and hence expanded sawdust is combined with the mud in approximately equal volumes. More than sixty percent by volume of sawdust tends to make the resultant product more porous and cellular than is ordinarily desired and tends also to reduce its load sustainability below a preferred optimum of three hundred pounds per square inch or over. Less than forty percent by volume of the sawdust tends to increase the weight of the brick above a desired maximum of approximately eighty-five to ninety pounds per cubic foot.

The preferred mixture above described may then be placed in suitable conventional forms. Any size or shape may be obtained, but commonly the same is rectangular, being preferably, in commercial use, approximately six inches high by twelve inches wide by eighteen inches long.

The mixed material is preferably dried in the mold in sunlight or otherwise, in accordance with conventional practice, the drying time of a brick of the above size being, however, reduced to an amount corresponding to bricks of usual construction only two-thirds that size, and then removed from the mold ready for use.

Water contained in the sawdust is absorbed and is evaporated during the drying process through the surrounding clay. The individual sawdust particles upon being depleted of their free water, and to some extent also their imbibed water, have been found to shrink approximately seven to twenty-one percent of their original volume and incidentally to lose water comprising thirty to two hundred and fifty percent of their saturated weight by evaporation. Because the clay, depending upon its character, must ordinarily be held to a shrinkage of less than three and one-half percent as a maximum, and is preferably about two and one-half to three percent by volume, a relative shriveling in the particles of the sawdust takes place and because the clay is formerly packed during the process of brick formation, numerous hollow cells containing grains of sawdust form throughout the mass. The walls of these cells, being formerly packed and generally more or less arcuate in cross-section, are capable of sustaining considerable stress. In addition, the cellular structure accelerates drying of the brick and, without detracting from the excellent sound-deadening and insulating properties of the brick, results in a lightweight honeycombed product of highly porous character loosely containing shrunken, lightweight sawdust particles.

Most types of sawdust, as available from commercial sawmills, are capable of being directly utilized, but softer woods, such as pine and fir, being relatively more porous and capable therefore of absorbing water more rapidly and swelling to a greater extent, are to be preferred over hard woods, such as some mahogany, iron wood and the like, or to oily wood, such as lignum vitae. Obviously, in view of the relative rarity of the latter, the bulk of commercial sawdust is suitable for the intended purpose.

It is to be understood that the commonly used straw, grass roots and similar fibrous litter used as a binder are not analogous to sawdust used in the manner intended, first because the straw, grass roots and similar materials do not swell to the same extent when wet nor do they dry with as great facility. In addition, being long, they tend to string out through the clay material and if shrunk differentially, would excessively weaken the mass and contravene the binding purpose for which they are intended. Moreover, their shrinkage would not leave a cellular grain. Experience has shown that a volume of straw, grass roots and the like, if incorporated in the same volumetric proportions as the clay, will result in a weakened, heavy mass, readily subject to crumbling and marked by numerous cracks, mainly in the direction of the fibres and transverse thereto.

If desired, a minimal amount, as five to ten percent by volume, of grass roots may be used in addition to not more than fifty percent of sawdust. Its inclusion, however, appears to have no material effect upon the strength, weight, and other significant physical qualities of the instant block.

An oil emulsion may be utilized in the practice of this invention, the water being normally absorbed by the clay to form a mud, precipitation of the oil upon the colloidal clay then not ordinarily occurring until the water has evaporated. Thereafter, the emulsified oil is brought into contact with the soil and colloidal clay, spreading therethrough by capillary action and coating the particles thereof with a film. The heavier oils, such as asphalt, are preferred, as supplying a further bond for the clay and being less subject to evaporation, over the lighter oils.

The emulsion will also cause swelling of the sawdust if soaked therein, the oil phase remaining in suspension or in a distinct oily form pending the evaporation of the water, whereupon the oil coats the wood rendering the same water-resistant and further protecting it against the onslaught of pests, such as termites. Oil in emulsified form, and in suitable proportion to the water phase, will readily provide a clay mud without undue depositing of the oil upon the colloidal clay while the same is wet. It will likewise permit the bulk of the fluid to be absorbed in the sawdust and intermixed with the clay without excessive precipitation of the oil thereon until the wood is dried to a desired extent.

The amount of water used may vary within obvious limits known to those skilled in the art of adobe brick construction. A suitable proportion of oil has been found to be approximately one part by volume to twenty parts of the mixture of clay and sawdust. This will, of course, vary with the nature of the adobe clay or other analogous structural soil material.

Optionally, oil or other desired coating may be sprayed or otherwise used as a coating or binder on the finished brick. The clay material may also obviously be utilized as a plaster, and applied layers, like the bricks, may be coated with lime or the like in a conventional manner.

Test bricks comprising fifty percent by volume of sawdust and fifty percent by volume of adobe clay, but without added oil or other ingredients, were tested after three years of experimental weathering with the following results:

Results of compression test

Dimensions:	
Length	11.875
Width	7.93
Depth	5.37
Area square inch	94.2
Compressive strength:	
Total load, lbs	37,690
Lbs. per sq. in	400
Weight per cu. ft., lbs	84.2

There was no indication of termite activity although the brick was constantly in contact with the ground in a termite area.

This invention features the provision of a cellular brick of adobe soil or similar construction having dispersed throughout its body preferably individual particles of sawdust loosely confined within corresponding individual cell structures. It also features the provision of a moldable adobe soil composition capable of being shaped into any desired structural forms or configurations including tile, pipe, statuettes, bird baths and similar objects.

Although the invention has been herein shown and described in what is conceived to be the most practical and preferred method and embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed

herein but is to be accorded the full scope of the claim so as to embrace any and all equivalent structures and methods.

The invention having been herein described, what I claim as new and desire to secure by Letters Patent is:

The method of forming an adobe block comprising preparing an emulsion of asphalt in water, mixing said emulsion with an adobe clay to form a mud, soaking wood sawdust in water for approximately twenty-four to forty-eight hours until said sawdust is thoroughly saturated with said water and swollen thereby, mixing said swollen sawdust with said mud in approximately equal proportions, pouring said mix in a mold in the shape of a building block and drying said mix including said sawdust distributed therethrough at a temperature not above natural atmospheric temperatures.

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