Cl. 92

Published May 4, 1943

Serial No. 292,749

ALIEN PROPERTY CUSTODIAN

PROCESSES FOR THE PRODUCTION OF ASBESTOS CEMENT SLATE POSSESSING INCREASED BENDING AND IMPACT STRENGTH

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No Drawing. Application filed August 30, 1939

Artificial slate produced on paper-machines from cement mortar mixed with asbestos fibres, presents a relatively low bending and impact strength. While this is less important in the case of smaller slabs as employed for roof covering, it is a serious drawback in the case of large slabs as employed for lining purposes or as constructional elements.

The low mechanical strength of artificial slate is due to the high density of its substance, while artificial slate of lower density could not be obtained as other artificial stones by high dilution of the mortar used for its production because the density of the mortar taken up by the sieve drum of the paper-machine is practically independent of the dilution of the mortar into which the sieve drum is dipped so that the density of the product will remain invariably between 2 and 2.2.

According to the invention this drawback can be eliminated by adding to the mortar prepared with cement and asbestos fibre and used for the manufacture of the slate, diatomaceous earth amounting to between 10 and 20 per cent of the weight of the cement and saponifiable organic acids such as fatty, resinic, or naphthenic acids, amounting to between 15 and 30 per cent of the weight of the cement, emulsified with a quantity of alkali approximately sufficient for the saponification of the acid, and diluting the mortar with water, such as 10–20 times the weight of the cement, to a consistence suitable for working in a paper pulp engine.

Advantageously 20 to 30 per cent of the total quantity of cement may be substituted by trass, and preferably 10 to 20 per cent filling substance may be added consisting of stone garble, ground to pass a sieve with 64 meshes per square centimetre.

The layer taken up from the above said mortar by the sieve drum of the paper machine contains and keeps up to its solidification so much water that the weight per cubic decimetre of the dry slabs will be less than 0.6 down to 0.1 kilogram.

Though the quantity of soap incorporated with the mortar is a multiple of the quantity which has been considered as dangerous for the mechanical strength, it has been found that the mechanical strength will not be inadmissibly lowered. Although the specific bending strength of the material of these slabs will be lower than that of compact artificial slate, the thickness of a plate produced according to the invention exceeds the thickness of a compact slab having the same weight per surface unit to such a degree that owing to the increased modulus of inertia of the higher cross-section, the new slab will carry a substantially higher bending load than a compact slab of the same weight per surface unit. The impact strength of the slab according to the invention is substantially higher than that of compact slabs.

Example

To a mixture composed of 80 parts by weight of Portland cement, 10 parts by weight of diatomaceous earth, 15 parts by weight of stone garble passing through a sieve of 64 meshes per sq. cms., 20 parts by weight of trass and 18 parts by weight of asbestos, an emulsion is added composed of 20 parts by weight of resin emulsified in 30 parts by weight of water with 2 parts by weight of sodium hydroxide. This mortar is diluted in a paper pulp engine with 1000 parts by weight of water. The diluted mixture is worked on a usual machine for production of artificial slate substantially similar to a paper-board machine. The flattened layers of mortar removed from the drum of the machine are, however, not squeezed between plates, as usual in the manufacture of compact slabs, but are allowed to harden in the loose condition in which the mortar mix settles on the paper-machine drum. After drying, the weight per square metre of the slabs of 10 mm thickness is not higher than 9 kgs.

The rinsing water leaving the sieve drum contains the finer particles of the mortar not retained by the sieve. The mortar being diluted by the rinsing water up to five times its original volume, part of the cement settles and is utilised for the next mortar batch, while the remaining portion of the mortar particles is carried upwards by the floating soap. According to the invention this latter, upper portion of the rinsing water in which the soap and cement waste concentrates, is added too to the next mortar batch.

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