

ALIEN PROPERTY CUSTODIAN

LATENTLY HYDRAULIC BINDER

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No Drawing. Application filed April 29, 1941

This invention relates to a latently hydraulic binder. In the well known processes for producing alumina in which the starting material is "opened" or solubilized by heat and the product of this operation is lixiviated with diluted soda solution, after lixiviation a residue is left containing all the constituents of the calcined product which are insoluble in the lixiviating liquid.

Now we have found that this residue possesses latently hydraulic properties and therefore is excellently adapted to be employed as a substituent for trass or Si-material. As a matter of fact, this residue when dried and mixed with Portland cement constitutes a compound cement the strength properties of which resemble those of a normal Portland cement which proves that the addition of this residue not acts in the sense of the addition of an inert material so as to decrease the strengthening properties, but that this material participates itself in the setting and hardening operation.

It is true that it is old to employ, as a hydraulic addition, the so-called Si-material resulting from the solubilization of clay by means of acids and substantially consisting of reactive silic acid. This Si-material in its composition corresponds, owing to its contents of solubilized silicic acid, to a considerable extent to the natural sorts of trass. However it could by no means be expected that the residue obtained by alkaline opening and subsequent lixiviation with water or with an alkaline solution would show the same latently hydraulic properties. We have ascertained that this residue can be used as an additional material for cements participating in the setting process. The hydraulic properties may, however, also be developed by the addition of other suitable substances such as plaster of Paris.

The invention may be more fully explained by the following practical example.

100 kilograms of an aluminous raw material

containing about 25 p. Ct of Al_2O_3 are intimately mixed with 150 kilograms of calcium carbonate containing about 96 p. Ct. $CaCO_3$ and calcined at a temperature of from 1400 to 1450° C. The calcined product containing calcium aluminate is lixiviated with a soda solution containing 5 grams Na_2CO_3 per liter. By filtering off the aqueous solution a residue of about 150 kilograms calculated upon dry material is obtained which residue when mixed with a normal Portland cement in the ratio of 70 parts by weight of Portland cement to 30 parts by weight of the dried residue, or of 50:50 respectively for carrying out the normal test shows the following strength properties:

Normal test with the above material mixed with normal sand in the ratio of 1:3

	70:30		50:50	
	Compression	Tension	Compression	Tension
3 days W ¹	288	28	208	22
7 days W	318	29	227	27
28 days W	438	41	325	28
28 days K ²	515	43	394	38

¹ W = water storing.
² K = mixed storing.

Strength test, admixture of Rhine sand 1:3 earth moisture

	70:30		50:50	
	Compression	Tension	Compression	Tension
3 days W	310	29	216	19
7 days W	439	33	332	28
28 days W	536	36	372	32
28 days K	673	53	468	39

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