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MORTAR-LIKE CONSTRUCTION MATERIAL

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The present invention relates to a new mortar for constructing walls, stone-work, brick-work and the like.

It has been proposed in my co-pending application Ser. No. 184,800, of which the present application is a continuation in part, to use a bitumen mortar consisting of sand and bitumen emulsion as binding element for constructing walls. The particular advantage of this method of wall construction resides in the fact that the emulsion water is liberated when the emulsion is broken up and is absorbed by the bricks and quickly evaporated so that a building constructed of walls according to this new method can be used much earlier than a building in the construction of which lime or cement mortar is used, which last mentioned mortars, because of their slow setting process, require many months for drying.

An object of the present invention is to provide a new mortar for constructing brick work which mortar consists of a mixture of sand and bitumen emulsion whereby, if the mortar particularly with respect to the addition of the bitumen emulsion to the sand is produced according to the present invention, the strength of the mortar of the type set forth and thereby the constructions in which said mortar is used is extraordinarily greater than that of conventional mortars.

It has been found that such increased strength is obtained when the mortar according to the invention, after breaking up of the emulsion and vaporization of the emulsion water, contains certain predetermined amounts of bitumen; these amounts of bitumen were found by extensive tests to be 3.5% to 5.2% at a weight of the dry sand used for making the mortar of 75—81 pounds per cubic foot. A mortar of the composition set forth is sufficiently strong to answer all conventional purposes. The percentage set forth naturally depends on the character of the sand used; tests have revealed the finer the sand used the greater the strength. It has been found that at a size of the grains of the sand of 0.2 inches, at least one third of such coarse sand must be replaced by finer sand in order to obtain a strength which is greater than that of brick work which is constructed with crude calcium acetate of a mixture proportion of 1 to 4.

Conventional bitumen emulsions or tar emulsions, particularly the so-called cold asphalt, containing an average of 50% to 60% bitumen may be used for producing the mortar according to the invention. In order to assure a predetermined desired strength of the brick-work a certain bitumen content of the emulsion used is essential. For producing the mortar according to the invention it must also be determined whether water be added to the mixture of sand and bitumen emulsion in order to adapt the mortar to be applied with a ladel and also whether the sand used is dry or moist. In the following examples, compositions of mortars according to the invention using emulsions having a bitumen content of 50% to 60% are used. For intermediary bitumen contents the figures must be changed proportionately.

Example 1

For obtaining a strength of the construction using the mortar according to the present invention which strength is equal to that of a conventional brick-work construction made with crude calcium acetate containing 1 part by volume lime to 4 parts by volume sand, the mortar according to the invention is of the following composition:

Bitumen-emulsion

2.82 cubic feet or 7.4 per cent, by volume, emulsion containing 60 per cent bitumen, or 3.35 cubic feet or 8.6 per cent, by volume, emulsion containing 50 per cent bitumen.

Sand

35.51 cubic feet or 9.2 per cent or 91.4 per cent respectively, by volume, pit sand free of loam.

Example 2

For producing a construction the strength of which corresponds to that of brick-work made with crude calcium acetate containing 1 part by volume lime to 3 parts by volume sand, the mortar according to the invention is of the following composition:

Bitumen-emulsion

3 cubic feet or 7.8 per cent, by volume, emulsion containing 60 per cent bitumen, or 3.53 cubic feet or 9.1 per cent, by volume, emulsion containing 50 per cent bitumen.

Sand

23.6 cubic feet or 61.6 or 60.8 per cent respectively, by volume, pit sand free of loam, and 11.7 cubic feet or 30.6 or 30.1 per cent respectively, by volume, crushed lime sand of not more than 0.2 inch grain size.

EXAMPLE 3

For producing a construction the strength of which corresponds to that of brick-work made with lime cement mortar containing 330 pounds cement and 8.85 cubic feet lime to 35.51 cubic feet sand, the mortar according to the present invention is of the following composition:

Bitumen-emulsion

3.89 cubic feet or 10 per cent, by volume, emulsion containing 60 per cent bitumen, or 4.6 cubic feet or 11.5 per cent, by volume, emulsion containing 50 per cent bitumen.

Sand

35.31 cubic feet or 90 or 88.5 per cent respectively, by volume, crushed lime sand of not more than 0.2 inch grain size, or 17.7 cubic feet or 45 or 44.25 per cent respectively, by volume, river sand, and 17.7 cubic feet or 45 or 44.25 per cent respectively, by volume, crushed lime sand of not more than 0.2 inch grain size.

The porportions set forth above with respect to the sand hold good as long as completely dry sand is used. The examples show that when lime sand is used more emulsion is necessary than when quartz sand is used. A simple calculation reveals that the bitumen content of the dry mortar, in the examples set forth above, is 2.6% to 5.2% by volume, on the basis of a weight of the sand used of 112 to 75 pounds per cubic foot. Since the specific weight of the sand varies according to the nature of its material and according to the size of the grain, as a rule 2% to 6% bitumen content of the dry mortar can be assumed.

It may be added that for producing a construction with the mortar according to the invention and having a strength corresponding to that of brick-work made by means of lime mortar any type of sand may be used.

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