PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Process for Manufacturing a Product with Porous Structure for Insulating Purposes, adapted to be used especially as a Filling Substance

We, AXEL FROKJÆR-JENSEN, of 23, Fortunvej, Charlottenlund, Denmark, and ALFRED HERMAN MUNCH ANDREASEN, of 9, Henning Bojesensvej, Gentofte, Denmark, both Danish Subjects, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

It is a known fact that lumps or formed pieces of various clays, when subjected to relatively rapid heating, i.e. a heating more rapid than that normally used in the burning of ceramics, may increase very much in volume and by undergoing a considerable deformation will form a product of porous, preferably honeycomb structure.

It is further known that such products may be used in the building trade as heat, cold and sound insulators, for instance, in the form of filling material in bricks or concrete, the resulting lumps or balls being crushed to suitable sizes.

It is also known practice to produce such honeycombed products commercially in suitable kilns, for example, rotary kilns or tunnel kilns, and in order to obtain the best possible product it must be ensured that the formation of a honeycomb structure, or "blistering" takes place in such a way that the product will be reasonably homogeneous, and neither too porous nor too dense, and that the blisters are of a suitably small size.

It is further a known fact that the production (burning) of the material in such kilns may involve difficulties inasmuch as the material at the temperatures at which the blistering takes place will stick together in masses of undesirably large size or will stick to the walls of the kiln, which will impede operations and give a heterogeneous product with an undesirable grain size. It will often be expedient in the production of the material to use an ordinary rotary kiln into which the clay is introduced at the upper end, for instance in wet condition as a kind of paste, and the aim will frequently be to operate the kiln in the same way as in the production of Portland cement, so that the burned product will be removed in the form of a clinker, for example of the size of a nut, at the lower end of the kiln, which is fired for example with coal dust. The clays used are preferably such as are too impure for the manufacture of better class ceramics, for example clay with a high content of flux, and clays which in the main or entirely exist as so-called mixed gels and which thus only to a small extent, if at all, exist in the form of felspar residue clays. The so-called plastic clay to be found in Denmark at Refsnaes and Lillebaelt is for instance suitable. A sample of this clay has by analysis been found to contain:—

SiO_2	56
Fe_2O_3	8
Al_2O_3	22
CaO	1
Na_2O	1
K_2O	3

Remainder mainly water.

It is a further well known fact that a product suitable for the purposes mentioned is obtained when prior to burning the clay is mixed with some organic substance.

However, it has now been found that particular advantages are attained in the finished product, in the first place an especially homogeneous honeycomb structure and an especially low unit weight, by the process according to the invention, which is characterized by using as organic substance the lignin decomposition products obtained as by-products or waste products in the manufacture of cellulose, preferably in their commercial form as sulphite lye.

It is an especially advantageous procedure to introduce the waste lye in the

[Price 1/-]

plastic clay in small quantities, and the fact that it contains various impurities, such as inorganic salts or insoluble particles, for instance, insoluble organic ingredients, is of secondary importance. The quantities of the said substances required are, as mentioned, relatively small, as for instance an admixture in the clay of 1 per cent. (calculated on the quantities of dry matter) will have an appreciable effect. Thus, it has been found that by admixing 1 per cent. of sulphite lye of a dry matter content of about 70 per cent. under normal working conditions unit weights of 240 kg./cu.m. have been obtained in the loose clinker product, and that sawed cubes of a weight of 0.4 to 0.2 kg./litre may possess a cube compression strength of 30—15 kg./sq.cm.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is.:—

1. A process for the production of a material of honeycomb structure for insulation purposes, mainly for use as filling material, by the burning of suitable clays and by the admixture to the clay of an organic substance to regulate the honeycomb structure and reduce the unit weight of the product, characterized in that for admixture a solution of lignin decomposition products obtained as a by-product or waste product in the manufacture of cellulose is used, preferably in its commercial form under the name of sulphite lye.

2. A process as claimed in Claim 1, characterized in that small quantities of the substance of admixture, preferably of the order of 1 per cent., are added to a plastic clay.

3. A process as claimed in Claim 1, characterized in that the addition of the substances concerned is effected by kneading the same into a plastic clay.

4. The process for the production of a material of honeycomb structure for insulation purposes, substantially as hereinbefore described.

5. A material of honeycomb structure when produced by the process particularly described and ascertained.

Dated this 9th day of December, 1941.
MARKS & CLERK.

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