Cl 106

Published July 13, 1943

Serial No. 401,522

ALIEN PROPERTY CUSTODIAN

PROCESS FOR THE PRODUCTION OF POROUS MATERIAL

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No Drawing. Application filed July 8, 1941

My invention relates to a process for the production of porous products from fibrous material, particularly for isolating purposes.

Hitherto it was already known to produce materials with a porous structure for building purposes by gas generating of a paste consisting of hydraulically binding substances such as concrete, gypsum and the like and water, and if desired, with addition of a filling material, e. g. sand.

Now I have found that high grade, extraordinarily light products with an excellent isolating effect with respect to heat and sound may be obtained if an aqueous pulp of fibrous material such as straw, wood pulp, peat, asbestos is raised with gas generating substances, for instance, peroxygen compounds. The gas generation of the mass may begin according to the moment of addition of the gas generating medium, for instance, hydrogen peroxide, and the decomposition catalysts such as manganese sulfate, either already during the mixing operation and/or after the casting of the pulp into the forms. The raised and formed products are then dried. Instead of peroxygen compounds also other gas evolving substances such as ammonium carbonate or metals in combination with an acid or an alkali may be used.

It was not to be foreseen that the present invention would warrant an uniform raising process without an escape of the greater part of the gases evolved in the pulp. Furthermore, it could not be predicted that the products made according to my invention would have a sufficient solidity and strength. Contrary to all expectations, however, the process of my invention yields to products with uniform regulable and reproducible porosities. I have observed that during the raising process according to the kind of fibres used, a more or less distinct felting of the fibres takes place whereby, also in absence of any binding material, the escape of the gases evolved in the mass is prevented or rendered difficult whilst the agglomeration and consequently the mechanical strength is considerably increased.

To favor the raising effect all known means may be employed. Thus, for instance, substances may be added to regulate the size and stabilization of the pores, i. e. substances which reduce the surface tension. Such substances are, for instance, saponine, wetting agents such as Igepon or other colloids. Good results were also obtained with an addition of milk. The amount of such additions may be insignificant, for instance, below 1% up to a few percents based on the mass of the pulp to be treated. In using peroxygen compounds as raising media, the decomposition catalysts, for instance, manganese sulfate and ammonia may be introduced by stirring, preferably after homogenisation of the paste, whereupon the evolution of gas begins. Furthermore, hypochlorites may be added besides the peroxygen compounds; both these substances react with each other evolving oxygen.

Sometimes I have found it expedient to employ a mixture of various fibrous materials, for instance, of high grade and low grade material, long and short fibrous material or the like. Also non fibrous filling material may be added. Moreover, it is possible to influence the properties of the porous mass in a definite direction by other additions, as, for instance, by substances which reduce the combustibility. If specially elastic masses are required, additions of caoutchouc have proved advantageous for purposes which need an extremely high mechanical stress, for instance, pressure or bending, stiffening substances such as pitch, bitumen, artificial resins and the like may be added in moderate quantities, preferably during the preparation of the pulp. The final products may also be impregnated with the aforementioned or other substances in order to confer special qualities to the porous material.

As an illustration of my invention the following examples are given:

1. 65 grs opened straw cardboard are mixed with 575 cc water whereupon 50 mgrs manganese sulfate and 7 cc of hydrogen peroxide 40 Vol.% are added. After careful homogenisation 12 cc concentrated ammonia are introduced whilst stirring, involving the raising of the pulp. The pulp is filled into the forms where the gas generation is finished. The subsequent drying is carried out at slowly increasing temperatures of about 60 to 140° C. The final mass has a specific gravity of 0,09 and shows besides good solidity excellent isolating qualities, for instance, with respect to sound and heat.

2. 65 grs straw stuff are introduced in 325 cc water to form a pulp whereupon 75 cc hydrogen peroxide 40 Vol.% containing 0,9 g dissolved saponine are added. The whole pulp is thoroughly mixed and 1 g pyrolusite added as decomposition catalyst. The further working up is carried out according to Example 1. The product obtained has a specific gravity of 0,08, a uniform vesicular structure and shows a good felting.

3. From 50 g asbestos fibres (length 3 to 5 cm), 475 cc water with 50 mgrs dissolved manganese sulfate and 7,0 cc hydrogen peroxide 40 Vol.%

and 1 g dissolved saponine a homogeneous mixture is prepared. 12 cc of concentrated ammonia are admixed and the pulp worked up according to Example 1. The thus obtained product is extremely well suited for heat isolating purposes at higher temperatures.

The products which are obtained according to my invention allow a manifold utilization, especially in cases where a low weight and/or good isolation is desired, as for instance, in the builder's trade and for isolation against sound and heat. Since it is possible to keep the specific gravity of these new products below the specific gravity of cork and since it is also possible to assimilate the properties of the new product with those of cork, the new products may replace the use of cork in numerous cases.

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