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HEAT INSULATING MATERIAL

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5 Claims. (Cl. 106—121)

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The present invention relates to improvements in heat insulating material, and has particular reference to a binder for such materials as magnesia, diatomaceous earth, calcium silicate and others of similar character.

The principal object of the invention is to provide a binder comprising fiberglass fiber and slag wool pellets combined in such a manner that the fiberglass will embed itself into and through the slag wool pellets and will cling thereto so that the two can be mixed with an aqueous suspension containing any one of the above-mentioned materials and will be dispersed throughout the mixture, the pellets serving to hold the fiberglass fibers in suspension and to cause their uniform distribution in a promiscuous arrangement throughout the mass and to be held in this arrangement until the whole mixture can be dried by heat or by air. This allows the fiberglass fiber which has great strength to act as a binder that will hold the mass in solid form, while the slag wool primarily serves as an agent to separate and hold in suspension the fiberglass fiber.

The principal binder used at the present time in connection with magnesia is asbestos fiber which in the well-known product known as 85% magnesia is mixed into the magnesia in the proportions of approximately 15% of asbestos fiber to 85% of magnesia. This binder is also largely used in connection with diatomaceous earth and other insulating materials.

It appears, however, that the supply of asbestos fiber is rather limited and is not sufficient to keep up with the demand due to the tremendous expansion of the industry. Although there are other fibers of an organic nature which are capable of providing the strength necessary to bind the insulation, they usually are not capable to resist the temperature which a good insulation must protect.

There is, however, one fiber which has both the necessary strength and the desired resistance to high temperatures, and that is fiberglass fiber. Up to the present time, however, no one has been able to find a way to keep this fiber tin suspension when mixed with an aqueous solution. The fiberglass fiber has a high affinity for itself and is difficult to separate, and will mat and flow together when wet.

With this in mind, and having noted the even higher affinity that fiberglass has for slag wool, I conceived the idea of mixing the two in such a manner that the slag wool will act as an agent to hold and separate the fiberglass fiber so as to allow the fibers to be completely dispersed through

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the solution with which it is mixed. Accordingly, using the granulated type of wool, hand rolled over a wire screen to further separate the very small shot pellets, and mixing it with the proper lengths of fiberglass fibers, I found that the glass fiber would separate even further into many thousands of strands and would imbed itself into, around and through the pellets of slag wool in such a manner that the mixture could be wet and mixed with magnesia or diatomaceous earth and then poured or forced into molds.

This mixture, heat dried, when removed from the molds is very white and has an appearance that is remarkably similar to the present forms of 85% magnesia. Although the use of diatomaceous earth would provide an insulation of greater range, it is slightly heavier and does not have the extremely white color that is very desirable.

In carrying out my invention, I mix, by hand or by the use of suitable machinery, fiberglass fibers of approximately ½ inch length with slag wool pellets in such a manner that the fiberglass will imbed itself into, through and around the slag wool pellets and will cling thereto in the form of extremely fine strands uniformly distributed through the slag wool pellets in promiscuous order. While I do not desire to limit myself to any specific proportions, I preferably use about one pound of fiberglass fiber to fifty pounds of slag wool. The resulting mixture, which I refer to as a binder, is then mixed into an aqueous suspension containing magnesia, diatomaceous earth, calcium silicate or any other suitable insulating materials and will disperse throughout this mixture, the slag wool serving to hold the glass fibers in suspension until the whole mixture can be dried by heat or by air. In forming the latter mixture I preferably use the binder and the insulating material in approximately equal proportions. The mixing can be accomplished by any suitable machinery conventionally used for this purpose.

The pre-mixing of the fiberglass fibers with the slag wool pellets tends to keep the fibers separate and in suspension during the final mixing process with the insulating material, and the thorough distribution of the fiberglass fibers through the final product eliminates shrinkage and cracking in the drying process as well as in the later use of the material. My final product provides an efficient and strong insulation capable of resisting a high temperature range.

My binder can also readily be used with cement in the manufacture of shingles and boards or in

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the application to surfaces with trowels or by air gun.

My binder can also be mixed with gypsum to make an acoustical plaster or wall board.

The use of slag wool in the manufacture of any or all of the above-mentioned products should create a better market for the over supply of wool. By comparison with 85% magnesia, I believe that a product using wool and magnesia would have a lower "K" factor, a better temperature range, lower costs of production, and less shrinkage in the manufacture and when used at high temperatures.

I claim:

1. A binder for magnesia and the like, comprising an intimate mixture of fiberglass fibers having great strength and heat resistance and sufficient affinity for each other to prevent their free dispersion in an aqueous solution of the magnesia, and slag wool pellets having fibers of less strength and heat resistance, said fiberglass fibers being embedded in, through and around the slag wool pellets in a substantially complete state of dispersion whereby the fiberglass fibers are prevented from matting when the binder is mixed in an aqueous solution of the said magnesia.

2. A binder as defined in claim 1 in which the ingredients are mixed substantially in the proportion of one pound of fiberglass fibers to fifty pounds of slag wool pellets.

3. A heat insulating body comprising as major ingredients magnesia and a binder, comprising an intimate mixture of fiberglass fibers having great strength and heat resistance and sufficient affinity for each other to prevent their free dispersion in an aqueous solution of the magnesia, and slag wool pellets having fibers of less strength and heat resistance, said fiberglass fibers being embedded in, through and around the slag wool pellets in a substantially complete state of dispersion whereby the fiberglass fibers are prevented from matting when the binder is mixed in an aqueous solution of the said magnesia.

4. A heat insulating body as defined in claim 3 in which the magnesia and the binder are mixed in about equal proportions by weight.

5. A heat insulating body as defined in claim 3, in which the fiberglass fibers and the slag wool pellets in the binder are mixed substantially in the proportions of one to fifty by weight.

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