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HEAT INSULATING MATERIAL AND METHOD OF WATERPROOFING SAME

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This invention relates to heat-insulating packing; its object is to render fibrous packing material moisture-resistant and therefore less liable to become inefficient to serve its heat-insulating purpose. The heat insulating fibrous packing used in conduits for steam pipes is peculiarly liable to wetting; in spite of constructional precautions, water may seep in from outside the conduit, or form in the conduit by condensation of steam leaking from the inside piping.

An example of the kind of heat-insulating packing to which this invention relates, and is peculiarly applicable, is therefore the loosely packed asbestos fibre in underground steam conduits, which fills the space between the steam pipes and the protective pipe or conduit around them. While it remains dry, such asbestos fibre packing retains its place, filling the conduit space, but should it become wet its non-conductive character is deteriorated, it settles and packs into a more or less dense mass according to the kind of asbestos employed, losing its heat insulating mass efficiency, by leaving air spaces in which convective currents may circulate, transferring heat from the steam pipes to the enclosing conduit.

To prevent wetting of the insulating fibrous packing, according to this invention the fibres are coated as uniformly as possible with a thin deposit of material inherently water-resistant or unsusceptible to wetting by water. Water, whether leaking into the conduit from outside, or formed by condensation of steam leaking from the enclosed steam pipes, sheds from the fibres thus protected, and collects in the bottom of the conduit, whence it may be drained through suitably placed apertures.

An insoluble soap, such as, for instance, aluminum stearate, deposited on the fibres of the packing material, will render the latter practically immune to wetting. The deposit of insoluble soap on the fibres should be as light as possible consistent with practical continuity; practical, that is to say, as measured by the water-shedding effect. If such deposit be not continuous, as a film, but be in small individual particles, it will be practically continuous if these particles be so close together that water drops can not find lodgment between them on the fibres themselves. A deposit of this character may be produced by immersing a mass of fibrous packing material, for instance asbestos fibre, in a solution of a soluble soap and then forming an insoluble soap by introducing a water-soluble metallic salt which reacts to form the insoluble soap of the metal, then draining and drying the fibre. This method is not, however, recommended, but is mentioned only by way of illustrating the principle of this invention.

Another method, believed to be practically better than the first above mentioned, is: to mix with asbestos fibre packing a quantity of powdered insoluble soap, dry; as by forking the fibres and the soap powder together, and then completing the distribution of the latter by passing the mixture through a fan-blower, and finally heating the powdered fibre to the temperature at which the insoluble soap softens or melts, which, in the case of aluminum stearate, is between 230° and 280° F. Decomposition temperature should, of course, be avoided.

This treatment produces a practically continuous deposit of water-repellant insoluble soap on the asbestos fibres, but requires the employment of a larger proportionate weight of the insoluble soap than is desirable. Therefore the recommended procedure is as follows:

Prepare a mixture of powdered aluminum stearate, 20% and powdered talc 80%. Then mix this powder with asbestos fibre, in proportions about 12½% of the soap-talc powder to 87½% fibre, by first forking over the materials and then passing them through a fan-blower. By this means the asbestos fibres become quite uniformly dusted with the powdered material.

The function of the talc (which is itself difficult to wet with water) is to extend the aluminum stearate. After the asbestos fibre has been thus dusted, it is heated to about 230° F; the aluminum stearate softens and melts, spreading over and among the talc particles and producing a water-repellant armor on the asbestos fibres.

When the asbestos fibre thus protected is used in the usual manner as a heat insulating filling or packing, as in a steam pipe conduit, it is immune to wetting, and retains its spacial extension in the conduit permanently; water entering or formed by condensation in the packing space will not cling to the fibres, collects in the bottom of the conduit, whence it may be drained away through apertures provided for the purpose.

The inert powder represented by the talc—facilitates the initial dusting of the fibres, and makes is possible to obtain the protective deposit with a smaller quantity of insoluble soap than would be the case were the inert powder not present.

Other materials, physically so constituted as to be water-repellant, capable of assuming comminuted or powdered form at relatively low tem-

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peratures, and liquefiable at higher temperatures, may be substituted for the insoluble soap above mentioned. Normally hard waxes such as montan wax have demonstrated their qualitative equivalency to the aluminum stearate in the stated combination and method, but, so far as observed, are not so effective as the aluminum stearate. Zinc stearate is practically a full equivalent for aluminum stearate, and can be applied in the same way.

We claim:

1. Method of preparing fibrous heat-insulating material, characterized by depositing in powdered form, upon the fibres while in loosely aggregated arrangement, a heat-liquefiable inherently water-repellant material, and thereafter extending said deposit by heating the deposited powdered material conserving said loose aggregation during and after the formation of said deposit.

2. Method of preparing fibrous heat-insulating material, characterized by depositing in powdered form, upon the fibres while in loosely aggregated arrangement, a heat-liquefiable inherently water-repellant insoluble soap, and thereafter extending said deposit by heating the deposited powdered material conserving said loose aggregation during and after the formation of said deposit.

3. Method of preparing fibrous heat-insulating material, characterized by dusting the fibres while in loosely aggregated arrangement with a comminuted mixture of heat-liquefiable inherently water-repellant material and inert solid material, and thereafter extending the said heat-liquefiable water-repellant material by heat conserving said loose aggregation during and after the formation of said deposit.

4. Method of preparing fibrous heat insulating material, characterized by dusting the fibres while in loosely aggregated arrangement with a comminuted mixture of heat-liquefiable water-repellant insoluble soap and talc, and thereafter extending the insoluble soap by heat conserving said loose aggregation during and after the formation of said deposit.

5. Heat-insulating material comprising a discrete loosely aggregated assemblage of asbestos fibres, and an insoluble metallic soap, associated with comminuted talc distributed over the said fibres.

6. Heat insulating material of the type which may be employed permanently and loosely to fill irregular spaces and thus provide numerous voids, said material comprising a loosely aggregated open assemblage of individual fibres and a moisture-resistant coating adherent to the surfaces of the individual fibres, said coating comprising a water insoluble stearate soap and talc, the fibres maintaining their indviduality in the loosely aggregated mass.

7. Heat insulating material comprising a discrete open assemblage of mineral fibres individually coated with a water-repellant material, said material comprising an insoluble metallic soap and comminuted talc.

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