Patented May 28, 1929. 1,714,702

UNITED STATES PATENT OFFICE.

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WATERPROOFING COMPOSITION OF MATTER.

No Drawing. Application filed September 3, 1926. Serial No. 133,517.

This invention is concerned with a composition for waterproofing various articles of manufacture, and more particularly fibrous articles such as tubing or conduit made of paper stock.

Such tubing may be made by winding a web of cellulose pulp or wet paper from a web-forming mechanism on to a mandrel until a wall of the desired thickness has been built, whereupon the tube may be removed from the mandrel and dried. The successive convolutions are sufficiently matted together to constitute in effect a substantially homogeneous or non-laminated wall which is of considerable strength and rigidity. Tubing thus formed is permeable to water, so that when used as a conduit or pipe or for other purposes where waterproofness is desired, it has been the practice to saturate it with a waterproofing material, or coat it with a layer thereof, or in some instances both to saturate and coat it.

The prime object of the present invention is to provide a composition of matter suitable for satisfactorily waterproofing such article as tubes or conduits, and which will remain substantially stable or unaffected by even the most severe changes in atmospheric temperature conditions. I have found that this object may be realized by the use of a composition comprising a mixture of suitable proportions of blown petroleum asphalt, a mineral wax, such as paraffin, and a finely divided, inert material or filler. Generally stated, such a composition comprises a preponderant proportion of asphalt, a lesser proportion of paraffin, and a still lesser proportion of filler.

The asphalt employed in the composition is a tough, rubbery solid, which has a long melting temperature range, in contradistinction to the sharp melting point of pure chemicals, or such bitumens as coal tar pitch or gilsonite. Such blown asphalt as I preferably employ is more or less sticky at or above room temperature, but when melted and maintained at a temperature which will not carbonize or char the tubing, does not yield a fluid thin enough to produce an even coating on tubing upon dipping thereinto. The paraffin, which is miscible with the molten asphalt, when added thereto in sufficient amount, functions to lower the viscosity of the melt to a point whereat a satisfactory coating of the tubing may be produced at a temperature which will not injure the tubing. The paraffin also serves to impart a waxy consistency to the asphalt, so that when the composition is allowed to congeal or harden at ordinary temperature, it is non-sticky and waxlike. Finely divided inert material, such as bentonite, fuller's earth, slate dust, or the like, is added to the melt for the purpose of increasing the stability or hardness of the composition at temperatures of, say, 100° to 140° F. Thus, if no inert material is used, and a composition or mixture of only asphalt and paraffin is made which is soft enough to remain tough and rubbery at 40° to 50° F., it is likely to be too soft at 100° to 140° F., which is the temperature sometimes attained by black bodies exposed to direct rays of the sun. The use of the finely divided filler does not appreciably increase the hardness or frangibility of the composition at low temperatures, but it has a very pronounced effect in raising its softening temperature. For example, if half-inch cubes made of an asphalt-paraffin mixture, and like cubes made of the same mixture but having incorporated thereinto 20% by weight of bentonite, are set at the top of 90 degree grooves in a sheet of metal and placed in an oven and inclined 45 degrees to the horizontal, and subjected to a temperature of 200° F. for one hour, it will be found that at the end of the period, the cube containing the bentonite has warped down hill by only a small amount—possibly 1/8 inch—while the cube containing no bentonite has run together and flowed down the groove for about 3/4 inch, thus showing the effect of the addition of the powdered inert material.

The proportions of asphalt, paraffin and filler employed in the composition depends upon the grade or quality of each employed as a raw material. Preferably, a blown petroleum asphalt, having a melting point of about 265° F. is used, but blown asphalts having melting points from 265° F. down to 200° F. may successfully be used, if the asphalt proportion in the composition is increased. Also, asphalts having melting points from 265° F. up to 280° F. may be used, if the asphalt proportion in the composition is decreased. Similarly, various grades of paraffins may be employed, or other mineral waxes, such as ozokerite. The grade of paraffin called "yellow crude scale"

has been found to give good results, and is preferably employed. If desired, however, a purified paraffin of higher melting point may be employed, but in such case the proportion of paraffin in the composition must be increased somewhat. Ozokerites, being high-melting waxes, must be used in considerably higher proportion than the soft paraffin wax. The proportion of finely divided inert material or filler which should be incorporated into the composition is dependent upon the fineness of its particles, and more especially upon its content of "impalpable dust," i. e., particles finer than 200 mesh. Thus, a smaller proportion of a filler of high "dust" content need be incorporated into the composition than a filler having a lower "dust" content.

A composition which has been found to give excellent results is composed of 55% blown petroleum asphalt having a melting point of 265° F., 25% "yellow crude scale," and 20% commercial slate dust. The asphalt and paraffin are heated together until molten, and the filler is then uniformly disseminated throughout the melt by stirring. The composition is heated to a temperature of about 350° F., at which point it possesses the proper viscosity to produce a satisfactory coating for fiber tubing. Upon dipping the tubes thereinto, a thin, smooth, tough and highly waterproof coating is left on the surfaces thereof, without carbonizing or injuring the fibers. Such a coating will satisfactorily retain its hardness or stability under the severest changes in atmospheric temperature conditions.

Compositions made from other grades of asphalt, paraffin and filler may be composed of, say, 40% to 70% asphalt, 15% to 40% paraffin, and 10% to 30% filler. The dipping temperature will vary with the composition used in each case, the temperature range being from about 300° to 375° F. If a very finely divided filler is used, there is little tendency for the particles to settle to the bottom of the melt, but with a fairly coarse one, such as fuller's earth, it may be necessary to provide for continuous or frequent stirring.

A waterproofing treatment with compositions, such as herein described, may be carried out under pressure, if desired, to ensure appreciable penetration of waterproofing composition within the pores and interstices of the tubes. Or, if desired, the tubes may first be immersed, preferably under pressure, in a bath of waterproofing material, e. g., molten pitch, of sufficiently high penetrability to impregnate thoroughly the fibrous structure thereof. Such treatment also increases the strength and rigidity of the tubes. The impregnated tubes may then be dipped into the composition of the present invention to form an interior and exterior coating, to increase the waterproofness thereof, and to provide a wax-like finish which will remain substantially unaffected by severe atmospheric temperature changes.

A characteristic of the coating is that even at those temperatures resulting from direct solar rays, it is tenacious and sufficiently hard so that it is not transferred by adhesion to the hand of one grasping the coated conduit.

Having thus described this invention, it is evident that various changes might be resorted to without departing from the spirit or scope of invention as defined by the appended claims.

What I claim is:

1. A waterproofing coating composition which becomes hard, non-sticky and wax-like at ordinary temperatures and which melts to a comparatively thin fluid at a temperature of about 350° F., consisting of a mixture of petroleum asphalt, a mineral wax, and a finely divided inert material.

2. A waterproofing coating composition which becomes hard, non-sticky and wax-like at ordinary temperatures, comprising a mixture of preponderant proportion of petroleum asphalt, a lesser proportion of paraffin, and a still lesser proportion of a finely divided inert material.

3. A waterproofing coating composition which remains firm at about 100° to 140° F. and tough at about 40° to 50° F., and is composed of a mixture of blown petroleum asphalt, paraffin, and a finely divided filler.

4. A waterproofing composition which is hard, non-sticky and waxlike at ordinary temperatures, remains tenacious at about 100° to 140° F., and tough at about 40° to 50° F., and is composed of a mixture of about 40% to 70% petroleum asphalt, 15% to 40% paraffin, and 10% to 30% of a finely divided filler.

5. A waterproofing coating composition which maintains a tough consistency substantially without change under the severest atmospheric temperature changes but which melts to a comparatively thin fluid at a temperature of about 350° F. and consists of a mixture of petroleum asphalt, paraffin, and a finely divided inert filler.

6. A waterproofing coating composition comprising a mixture of a preponderant proportion of blown petroleum asphalt having a melting point of about 200° F. to 280° F., a lesser proportion of mineral wax, and a still lesser proportion of a finely divided filler.

In testimony whereof I have affixed my signature.

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