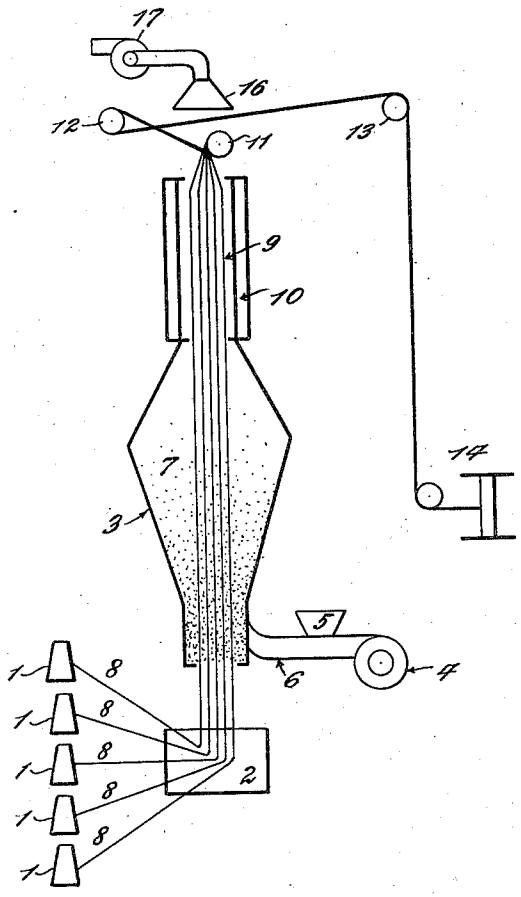
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COATED STRAND MATERIAL

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COATED STRAND MATERIAL

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1 Claim. (Cl. 117—33)

This invention relates to the art of producing an asbestos cord and more particularly to the art of producing a cord comprising a multiplicity of textile cores, said cores being coated with a suitable binder and a coating of asbestos fibers.

It has heretofore been necessary to produce asbestos yarn by spinning asbestos fibers alone or by spinning asbestos fibers mixed with discontinuous textile fibers such as cotton, said textile fibers serving as reinforcement. These products, however, have the disadvantages of low tensile strength, poor uniformity and, furthermore, they require the use of expensive, long fiber asbestos. In order to avoid these disadvantages, it has been proposed in the past to produce an asbestos yarn by coating a textile core with asbestos fibers. The processes suggested have attempted to coat the textile core thread by rubbing on asbestos fibers by means of some sort of doffer belt upon which the asbestos fibers were matted. In some cases it has been proposed to use a binder or adhesive for holding fibers to the textile thread. These proposed processes, however, have suffered from the disadvantage of not being able to produce a uniform coating. In passing the thread over a belt upon which the asbestos is matted, only one side of the thread is presented to the asbestos matting. Where attempts have been made to twist the thread so as to avoid this problem, a good deal of complicated equipment has been required. In addition the processes have been encumbered by the requirement for complex equipment such as carding machines, twisting mechanisms, rubbing belts, etc.

It is an object of this invention to produce a yarn or cord of high asbestos content which is of superior tensile strength and which has a high degree of uniformity. Another object is to produce this asbestos yarn by a simple method requiring a minimum of equipment. Still another object of this invention is to utilize asbestos particles which are very short in comparison with those ordinarily required for asbestos yarns. A further object of this invention is to produce an asbestos yarn or cord suitable in composition and strength and uniformity for use in the coating of electric arc welding electrodes. It is a further object of the invention to provide strand material in general with a uniform coating deposited on said strand material from said coating material in the form of a suspension of that material in a gas.

Further advantages of this invention will become obvious from the following description.

In accordance with this invention, an asbestos yarn of a very high degree of uniformity is made by coating textile threads with a binding agent and with asbestos fibers by a new process. The textile thread may be dipped in a solution of a binder or adhesive and then passed through a chamber in which asbestos fibers are maintained in suspension as a cloud by means of a blast of air. The thread in passing through this chamber is uniformly surrounded on all sides by a concentrated suspension of asbestos fibers. The fibers coming in contact with the thread attach themselves thereto and are held on the thread by the binder. Immediately after being coated with asbestos fibers the thread passes into a heated drier wherein any volatile material in the binder is removed and the binding properties of the binder developed to more securely bind the particles to the thread. In order to obtain a heavy asbestos cord, a multiplicity of threads may be coated simultaneously and then twisted or braided together. This twisting or braiding operation, in addition to providing asbestos cords of various diameters, serves to lock in the asbestos fibers and at the same time add to the tensile strength of the final cord.

The advantages and objects of this invention will be further exemplified by a consideration of the accompanying drawing, in which the figure diagrammatically illustrates a method of producing the asbestos coated yarn.

In the figure, a multiciplicity of strands of the textile core 8 are unwound from spindles 1 and pulled through a bath containing the binder 2 and thence through the cloud in the dusting chamber 3. A blower 4 blows air into the chamber 3 through the duct 6 while picking up asbestos fibers from the hopper 5. The current of air maintains a uniform gaseous suspension of asbestos fibers in the space 7 so that the textile threads 8 are uniformly coated with said asbestos fibers. In the space 7 the density of the suspension varies from substantially a cloud or dust at the top thereof in which the weight of the particles per unit volume is low, to a denser suspension at the bottom which is essentially a mobile mass of particles maintained in a "boiling" condition. The asbestos coated threads then pass through the heater space 9, which is heated by means of the furnace 10, to remove a sufficient amount of water or other solvent to "set" the binder. The dried and coated threads then pass over a tension pulley 11 which is driven at constant speed. Over this pulley is an exhaust hood 16 through which excess asbestos fibers are removed by means of the suction fan. From the tension pulley 11 the coated threads pass over

guide pulleys 12 and 13 and thence to a spool or spindle 14. The spindle 14 may be on a twisting machine of the usual type so that the coated threads are twisted together and wound upon the spindle. As an alternative method, the coated threads may be wound on bobbins. These bobbins are then put on the creel of any of the usual twisting machines so as to twist together several of the coated threads.

The diameter and strength of the yarn may be varied by the method of twisting. Thus any number of coated threads may be twisted together and then a multiplicity of these groups of twisted threads may be twisted together in the reverse direction so as to build up a final diameter of any given size.

The strength of the final yarn will be a function of the number of threads, the method of twisting and the strength of the individual threads.

The composition of the yarn may be controlled by a number of factors such as the thickness of the core thread, the time of pass through the binder, the nature of the binder, the size of asbestos and the asbestos concentration, etc. In addition, the physical character of the core thread, such as the degree of roughness and its previous treatment will greatly affect the amount of asbestos pick-up.

Either cotton thread or cotton yarn serves as a suitable textile core thread, although threads of any other fibers such as rayon, wool, glass, etc. may be used. It has been found, however, that the physical nature of the particular thread used has a very marked effect upon the amount of asbestos picked up. In particular, we have found that it is necessary for the thread to be thoroughly wet with the binder in order to obtain a high percentage of asbestos pick-up. Thus, for example, if unbleached cotton yarns are used with a sodium silicate solution as the binder, the cotton is not wet very well with the sodium silicate solution, and the asbestos pick-up is therefore low. We have found, however, that if a small quantity of a wetting agent is added to the sodium silicate solution the asbestos pick-up becomes very high.

Thus, in a particular example, an unbleached No. 30, 2-ply cotton yarn was pulled through a sodium silicate solution of 3.25 silica to caustic ratio and of specific gravity 1.13. This yarn when coated had a 30 percent cotton content. When the same yarn was pulled through the same sodium silicate solution to which had been added a fraction of a percent of a suitable wetting agent such as an aromatic sulphonic acid salt or any of the other usual wetting agents, the asbestos coated yarn had a cotton content of only 6.5 percent. Thus it is seen that it is possible to obtain a very high asbestos content with cotton yarns if a suitable binder is used.

It is possible to use very short asbestos fibers for the coating process. Thus asbestos fibers of the grade 7HO5 as evaluated according to the Quebec standard testing machine, have been found suitable. This grade is commonly known as "refuse" or "shorts" fiber and is one of the cheapest grades available.

Binders in general may be used including starch, glues, resins, gums, etc. Preferably a sodium silicate solution is used of 1.05 to 1.15 specific gravity and 3.0 to 3.5 silica to caustic ratio and a suitable wetting agent, as stated above. The use of this binder permits the production of a yarn suitable in composition for use in winding on electric arc welding electrodes. Such yarns are satisfactory substitutes for the spun asbestos yarns commonly used, insofar as welding characteristics go. In addition the strength and uniformity of our yarn is far superior to that of the spun yarns.

Yarns of the following composition range are easily prepared by the above described method and are suitable for use on electric arc welding electrodes:

	Percent
Asbestos	50 to 90
Cotton	5 to 40
Sodium silicate	2 to 10

Although the above description has emphasized that species of the invention relating to the creation of a uniform deposit of asbestos fibers on a strand of yarn, thread, cord and the like, the invention extends generically to the deposition on strand material generally of a uniform coating from a gaseous suspension of that material through which the strand is passed or with which the strand is brought in contact, said strand having been provided with a suitable binder. The strand may be filamentary, as in the case of metals or plastics extruded through an orifice, or may comprise a plurality of such filaments twisted or braided, and may also be of a fibrous nature made by spinning and twisting various staple fibers. In its generic aspect the invention is not limited to the use of any particular binder but rather binders generically, the specific nature of the binder being varied, of course, to suit the use requirements of the ultimate product. Moreover, the invention may also employ generically as coating material, any material which can be advantageously deposited on a binder-treated strand from a gaseous suspension of that material.

By gaseous suspension is meant a freely flowing mass of particles caused to flow by passage through them of a stream of air or other gas, and it may vary from a cloud containing a small weight of particles in a given volume to a relatively dense suspension where the particles are rubbing upon each other and maintained in mobile condition by the movement of gaseous currents.

We claim:

Method of producing a cord of high asbestos content which comprises continuously passing feed cord through a bath containing an adhesive, then passing said feed cord through a vertically elongated treating zone, transporting finely-divided asbestos fibres in suspension in a gaseous medium to a lower portion of said treating zone, flowing said suspension into and upwardly in said treating zone, maintaining in said treating zone a lower dense "fluidized" phase and characterized by a density such that the asbestos fibres rub upon each other and an upper less dense "fluidized" phase of suspension solely by continuously injecting gas into said lower phase and thereafter passing said cord through a heating zone.

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