May 18, 1926.

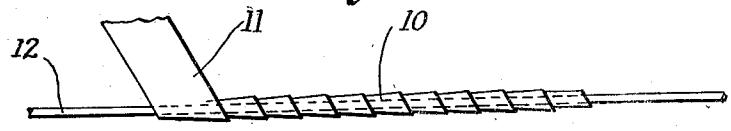
1,585,621

J. A. HEANY

REENFORCED YARN

Filed July 30, 1923

Fig. 1.



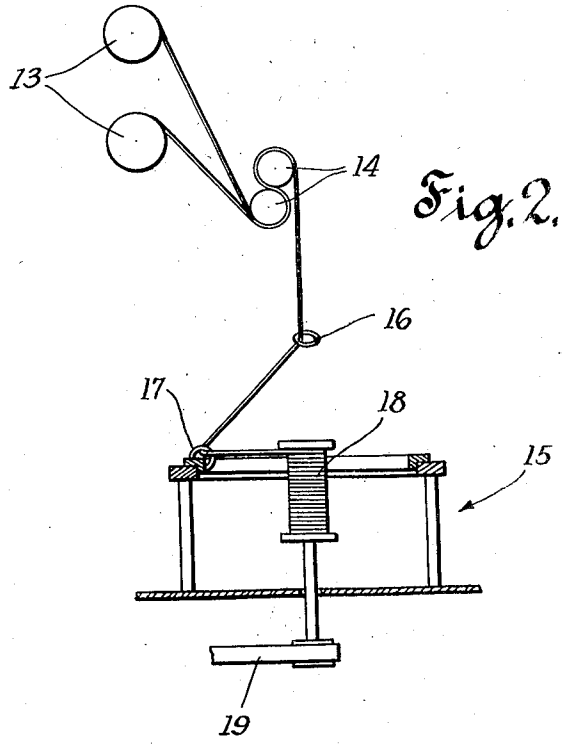


Fig. 2.

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UNITED STATES PATENT OFFICE.

JOHN ALLEN HEANY, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO WORLD BESTOS CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF DELAWARE.

REENFORCED YARN.

Application filed July 30, 1923. Serial No. 654,511.

This invention relates generally to yarns and specifically to such yarns as are reenforced for uses where relatively high tensile strength and resistance are desirable.

In the manufacture of yarn, in order to give the requisite tensile strength and coherence to the material, it is customary to utilize a central core thread or filament about which is twisted long-fibred material, such as jute, hemp, flax, cotton or the like, which forms a self-sustaining fabric sheath or casing over the core. Such a method of manufacture is, however, not applicable to material such as cellulose, asbestos and paper pulp, where the fibres are short; nor to composition forming a pulpy, mouldable mass almost devoid of fibrous structure.

According to one method, short-fibred material is utilized by cementing the material together to a core by means of a binder, such as starch or albumen, but these yarns are readily subject to breakage and deterioration from moisture effects, strains, heat and friction, particularly where, as in the case of asbestos yarns, the material is utilized for brake lining or steam packing.

An important object of the invention is to provide improved yarns formed of suitable filaments and paper-like strips or bands, particularly strips or bands formed from asbestos material. Another object is to provide yarns in which the relative positions of the filaments and the strips or bands are maintained without any close binding of such bands or strips on individual filaments, as by tightly twisting or winding the strips or bands on the individual filaments or cores. A further important object is to provide a yarn of asbestos and like material which possesses high resistance to tension, friction, heat, and mechanical deformation.

An important object also is the provision of a yarn characterized by the absence of free fibres, the material being matted in a paper strip prior to twisting so that a smooth, and uniformly wound yarn is obtainable, free of outstanding excrescences and loose fibres.

Further objects and objects relating to details of construction will appear from consideration of an embodiment of my invention which may be preferred, described hereinbelow and illustrated in the accompanying drawing, in which—

Figure 1 illustrates a core element or filament loosely covered by asbestos paper strip; and

Fig. 2 illustrates the formation of a final yarn from two strands such as illustrated in Fig. 1.

In a co-pending application, Serial No. 516,129 filed Nov. 18, 1921, is described one of several processes which may be employed to form an asbestos yarn. In accordance with this process, the asbestos or similar material is bound and formed from pulp into paper strip which is wound about a core, either by a winding machine or a conical twist tube. As shown in Figure 1 of the drawing, the elementary strand 10 is formed of thin and narrow strip paper 11 made of asbestos material bound together by a simple binder or cement, such as starch. This strip 11 is loosely wound on a filament or core 12, preferably of material possessing high tensile strength and maintaining a set when bent or twisted such as brass or copper metal although freely flexible material may also be employed, such as hemp cord or thread. In the event that a metal filament or wire is used for the core, the core will have in the final yarn a series of undulations or coils which tend to hold the strips or bands against longitudinal movement with respect to the yarn. Obviously the metal core might be given this general form before the wrapping of a strip or band thereabout. The element or strand 10 is then wound on spools or bobbins 13, from which they are fed through pressure and guide rollers 14 to the twister 15, any conventional form of twister being employed. For illustration there is shown a "ring twister" having a stationary ring 16, a rotatable and movable guide ring 17, and a spool 18 power driven by belt 19.

In accordance with the process, as above indicated, the paper strip which on the individual strand, without means for closely binding the same to the filament, is comparatively loosely positioned, becomes in the twisted portion 17 a closely bound yarn in which the asbestos strip is permanently fixed. It is noteworthy that yarns made in accordance with the process above referred to, possess marked uniformity of texture and smoothness of exterior, due to the employment of a finished strip with no free ravellings as a casing for the individual

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strands. The paper strip may be made up in auxiliary machinery from paper vats as indicated in the copending application referred to, or it may be obtained separately from another manufacturer, the yarn manufacturer requiring only the inexpensive equipment necessary to wind the strip on the core and twist the strands together. Moreover, by binding and forming the asbestos material into paper-like strips or bands, it is possible by suitable carding or delivery apparatus in the paper manufacture to lay the fibres longitudinally or at such angle as will be most resistant when the same is made up in the final yarn, although the carding operation may be entirely omitted with very satisfactory results.

It is, of course, evident that the primary function of the binder in the paper strip is to maintain cohesion of the asbestos or other fibres until the same are permanently bound in the yarn, and subsequent to this final operation, it may be immaterial whether or not the binder, by solution or mechanical jar, is removed. It is pointed out, however, that the invention is not intended to be limited to paper strip only as a primary substance in the manufacture of yarn in accordance with the above method, since any other means of maintaining cohesion between the short fibres of the material prior to the twisting operation, may also be used.

If the material is secured to the filamentary cores, however, the final twisting serves to enclose and bind the material closely, evenly and smoothly between the separate strands, thus forming a yarn of high tensile strength and of such rigidity and permanence of form as to give service superior to that obtainable from long-fibred rovings in all ordinary usages, and by thus making possible the effectual utilization of asbestos and the like material, the employment of asbestos for such important uses as brake linings, steam pipe casings, and various friction devices subject to large friction and heat action, is readily possible.

It will be apparent that, in making the yarn of the present invention, use may be made of asbestos paper strips of less cohesiveness and tenacity than required for direct twisting with filaments. In the wrapping operation the stresses to which the strips or bands are subjected may be made less than in the twisting operations and there is less tendency to kink. Furthermore, in intertwisting the strands of filaments wrapped with such strips or bands there is no great tendency to break the strips or bands and at the same time they are firmly bound into a yarn in which the tensile strength is given to a great extent by the filaments or wires.

It should be understood that the term "asbestos material", wherever it appears in the specification and claims, is intended to refer to material having a substantial percentage of asbestos fibres, such as to give more or less the characteristics of asbestos as far as working and handling are concerned, and the term "asbestos material" where used in the specification and claims shall be considered as thus defined.

While the invention has been described as applied to a specific illustrative embodiment, various other arrangements of the invention will be readily apparent to those skilled in the art to which this invention appertains and accordingly the invention should be limited only in accordance with the claims hereto appended.

What I claim as new and desire to secure by Letters Patent is:

1. An asbestos yarn comprising intertwisted strands, at least one of which consists of a filament and wrapped therearound in flat form a strip or band of asbestos material bound into paper of sufficient cohesiveness and tenacity to undergo strand and yarn forming operations.

2. An asbestos yarn comprising intertwisted strands, each of which consists of a filament and wrapped therearound in flat form a strip or band of asbestos material bound into paper of sufficient cohesiveness and tenacity to undergo strand and yarn forming operations.

3. An asbestos yarn comprising a plurality of filaments in intertwisted relation and a plurality of strips or bands of asbestos material bound into paper of sufficient cohesiveness and tenacity to undergo strand and yarn forming operations, each strip or band being wound around a filament and being secured in position by the intertwisted arrangement of said filaments.

4. An asbestos yarn comprising intertwisted strands, each of which consists of a filament having a series of undulations and wrapped therearound in flat form a strip or band of asbestos material bound into paper of sufficient cohesiveness and tenacity to undergo strand and yarn forming operations.

5. An asbestos yarn comprising intertwisted strands, each of which consists of a metal filament having set undulations formed in the twisting and wrapped therearound a strip or band of asbestos material bound into paper of sufficient cohesiveness and tenacity to undergo strand and yarn forming operations.

In testimony whereof, I affix my signature.

JOHN ALLEN HEANY.

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