

July 16, 1935.

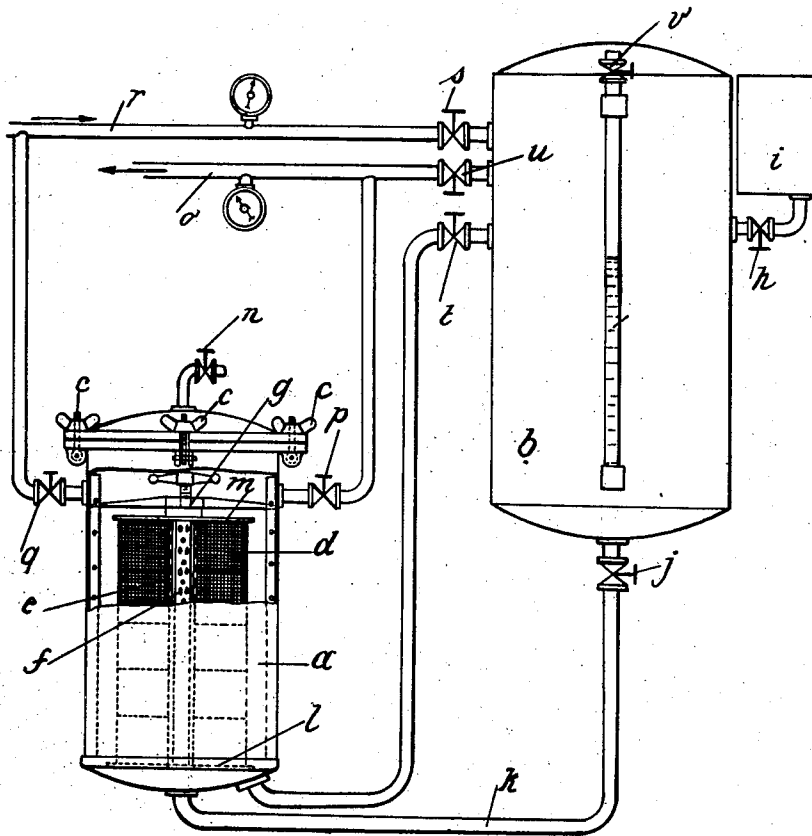
J. E. C. BONGRAND ET AL

2,008,127

THREAD COMPOSED OF TEXTILE FIBERS

Original Filed April 11, 1930 2 Sheets-Sheet 1

FIG 1.



Inventors:-
Jean Etienne Charles Bongrand
and
Leon Sylvain Max Leseune
By
Mauro & Lewis,
Attorneys

July 16, 1935.

J. E. C. BONGRAND ET AL

2,008,127

THREAD COMPOSED OF TEXTILE FIBERS

Original Filed April 11, 1930 2 Sheets-Sheet 2

FIG. 2

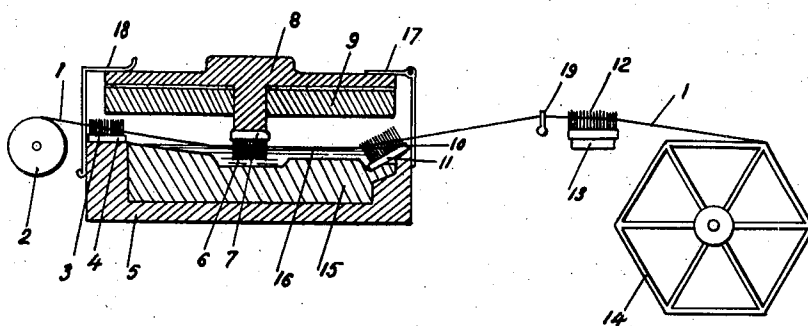


FIG. 3.

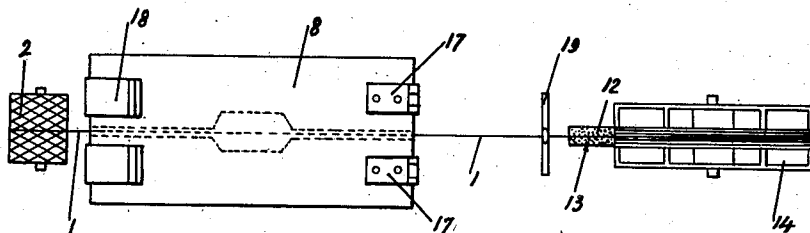
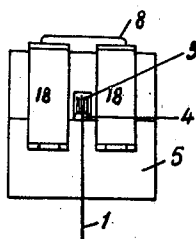


FIG. 4.



Inventors.
Jean Etienne Charles Bongrand
and
Leon Sylwain Max Lejeune
By *Mauro & Lewis*
Attorneys

UNITED STATES PATENT OFFICE

2,008,127

THREAD COMPOSED OF TEXTILE FIBERS

Jean Etienne Charles Bongrand, Paris, and Léon
Sylvain Max Lejeune, Wasquehal, FranceOriginal application April 11, 1930, Serial No.
443,470. Divided and this application January
6, 1933, Serial No. 650,576. In France Novem-
ber 8, 1929

5 Claims. (Cl. 28-1)

The present invention is for improved fibrous products impregnated with an elastic substance, such as natural or artificial aqueous dispersion of rubber (latex) this application being a division of application Ser. No. 443,470, filed April 11, 1930. According to our invention products are obtained in which every textile fiber is completely penetrated by the liquid of impregnation and is also surrounded by the same, so that the several elementary fibers are firmly bound together.

Textile threads impregnated with latex are already known but they do not possess a sufficient degree of impregnation and are not penetrated right through the core of the thread, and to envelop or penetrate the individual fibers.

The complete penetration is obtained, according to the present invention, by subjecting the fibrous mass or roving, before twisting or cording, to contact in a closed container with the impregnating dispersion (latex) under the action of a fluid under pressure, the mass being then removed from the container and submitted to the action of coagulating agent and subsequently dried. Before drying the thread may be twisted and corded.

In the threads according to our invention the elementary fibers are connected to their neighbours by the latex, which forms an elastic bond between them having remarkable mechanical properties, so that for one and the same quality of fibers, a smaller twist gives the same strength and with the same twist and even with a smaller twist, shorter fibers may be used.

Even in the case of twisted or corded threads, the elementary fibers are deeply impregnated according to our invention. In such threads the complete coating with rubber of each of the elements isolates or separates each of the elements from the others which gives very useful qualities of imputrescibility and is very advantageous for certain applications (for instance threads for pneumatic tires).

The threads forming the subject matter of the present invention differ from the known threads coated outside with a rubber solution or with latex and used for forming the thread framework in outer covers of pneumatic or "cord" tires, mainly in that the latex impregnates the threads deeply in order closely to connect the fibers to one another and then the thread is coated, whilst in the case of the outside rubber application of the usual processes, not only are the elements constituting the "cord" and formed by twisted threads stranded or corded together

not impregnated to their core, but they are not even isolated by the rubber from one another. The threads according to this invention also differ from threads finished with starch in solution or with other adhesives, by the fact of their impregnation and by the nature of the impregnating and covering substance.

The threads impregnated to the core may receive a superficial coating by passing the threads through a bath of an elastic substance, at atmospheric pressure, and with the aid of brushes. The substance may be concentrated latex.

The threads according to the present invention have a different appearance and feel from those of other textiles. They are impermeable and do not putrefy, and they possess high dielectric properties. For these reasons they are used for the weaving of fabrics for umbrellas, for hosiery, trimmings and lace making, and for use in the electric industry for braiding and covering of electric wires.

The accompanying drawings show diagrammatically by way of example an apparatus suitable for manufacturing the threads according to this invention.

Fig. 1 shows an apparatus for the treatment of the textile fibers by means of the liquid under pressure, a vacuum being used for accelerating the circulation of the bath;

Fig. 2 is a similar view, partly in section, of an apparatus for the superficial treatment of the threads;

Fig. 3 is a plane of the same and

Fig. 4 an end elevation.

The apparatus shown in Fig. 1 comprises a container *a* with an autoclave closing device for receiving the textile to be treated and another container *b* for the impregnating substance (latex). *i* is a filling vat and *h* a cock. The textile material is preferably placed on bobbins *d* with flexible and perforated spindles *e* affording passage to the substance. Said bobbins are threaded on a perforated tube *f* and held close together by a clamping device such as *g*. If the textile is in hanks, the latter are placed in packets and arranged round the central tube *f*. The containers *a* and *b* are connected by the pipe *k* and cock *j* on the one hand and by the pipe *x* and cock *t* on the other hand. In the container *b* opens a compress gas pipe *r* which may be closed by the cock *s* and the same pipe opens into the container *a* through pipe *r'* and cock *q*. A vacuum pipe *o* opens into the container *b* (cock *u*) and into the container *a* (cock *p*)

the vacuum being used for accelerating the circulation of the liquid substance.

The operation of the apparatus is as follows:

The containers being first completely empty and the cocks closed, the bobbins *d* are placed in the container *a* which is then closed by tightening screws *c*. The cocks *h* and *v* (air escape) are then opened and the impregnating dispersion runs from the vat *i* to the container *b*. The cocks *h* and *v* are then closed. In opening the cock *p* a certain vacuum is created in the container *a*. The cocks *n* and *j* are then opened to produce the passage of the dispersion from *b* to *a* through the pipe *k*; at the same time the compressed gas cock *s* is opened. When the liquid has reached a determined level the cock *n* is closed. The textile material is now in contact with the impregnating dispersion under pressure. After a suitable time of contact the cocks *s* and *j* are closed and the cock *v* opened for the air escape. When the pressure has fallen to zero in the container *b*, the cock *n* is opened to create a certain vacuum in the said container and then the cock *t* is opened to allow the liquid of the container *a* to return into the container *b*. On the other hand the cock *q* may be opened in order to accelerate by the pressure the backflow of the liquid from *a* to *b*.

The operations as described may be repeated several times if desired. The bobbins are then unwound and the textile material is subjected to the action of a chemical coagulating agent, for instance dilute acetic acid. The drying is then effected preferably in vacuo.

Using latex as the impregnating substance we obtain special advantages in that, particularly, the rubber adheres more closely, it is much more tenacious, than the rubber obtained from evaporated solution. Furthermore the rubber coming from latex is in an undepolymerized condition and to this are due the special properties mentioned.

The textile impregnated with latex as above described is then assembled into a twisted thread by the ordinary spinning processes. The assembling is preferably effected before coagulation and drying. The twisted threads are then stranded or corded if necessary.

The threads obtained may be utilized in the rubber industry as insertion textiles in the form of web cord for pneumatic tyres or of cords for hose-pipes or in the form of fabrics. The threads according to the invention may be woven, the fabric being thereupon vulcanized either hot or cold by the usual means.

For certain applications above referred to it may be advisable to proceed with a superficial coating of rubber after the deep impregnation described. By this operation the outside fluff, for instance, may be caused to disappear completely.

For this superficial coating, concentrated latex may be used and the treatment may be effected with the apparatus as per Figs. 2-4. The textile to be impregnated, coming from a bobbin 2, passes first between the bristles 3 of a brush 4 secured to a support 5, then between the bristles 6 of a brush 7 secured to a movable cover provided with support 8 and a joint 9. The threads pass finally through the bristles 10 of a brush 11 also secured to the support 5 and between

the bristles 12 of a brush 13 before being wound on the reel 14. The support 5 has a vat 15 provided with a recess 16 in which is placed the complementary treating liquid. The cover 8 is mounted on the support 5 by means of a hinge 17 and may be held against said support by means of a closing device 18. Between the brushes 10 and 12, the threads pass through an eyelet 19 having a reciprocating motion.

The cover 8 having been raised and the vat 15 filled with concentrated latex for instance, shown at 16, the thread is unwound from the bobbin 2 and caused to pass through the bristles 3, 10, 12 of the brushes 4, 11, 13 and the end of the thread is attached to the reel 14. The cover 8 is then turned down and locked by the device 18, with the result that the thread is caused to engage the bristles 6 of the brush 7 and to be immersed in the vat 15. The reel 14 is then started and the thread is unwound from the bobbin 2 in order to pass successively through the brushes 4, 6, 11 and 13, owing to which it is superficially treated or coated by the liquid the excess of which is removed and regulated by the brush 13 and through the bristles 12 in which the thread rubs not only longitudinally owing to its movement, but also transversely owing to the reciprocating movement of the eyelet 19.

What we claim is:

1. A thread composed of textile fibers deeply impregnated and also individually enveloped with rubber which isolates the several fibers and at the same time binds them closely together by an elastic bond, the rubber being in a state of contraction and the fibers and rubber being in a condition of high radial pressure, so that the thread is characterized by great tensile strength relative to the degree of twist; the thread being also characterized by imputrescibility, high dielectric properties, smooth surface, regular size and high percentage of rubber fixed within and upon the fibers.

2. A thread composed of textile fibers and rubber in which the fibers are deeply impregnated and also individually enveloped with rubber which isolates the several fibers and at the same time binds them closely together, and in which the binding of the fibers and rubber is enhanced by a high radial pressure exerted by the rubber onto the fibers.

3. A thread composed of textile fibers and rubber in which the fibers are deeply impregnated and also individually enveloped with rubber which isolates the several fibers and at the same time binds them closely together, and in which the inside rubber is compressed by the outer rubber.

4. A thread composed of textile fibers deeply impregnated with rubber of latex, said fibers being individually enveloped and also integrated by said rubber of latex, the rubber being in a state of contraction and the fibers and rubber being in a condition of high radial pressure, the thread itself being characterized by relatively great strength, by imputrescibility and by high dielectric properties.

5. Woven fabric composed of threads as specified in claim 1.

JEAN ETIENNE CHARLES BONGRAND.
LÉON SYLVAIN MAX LEJEUNE.