

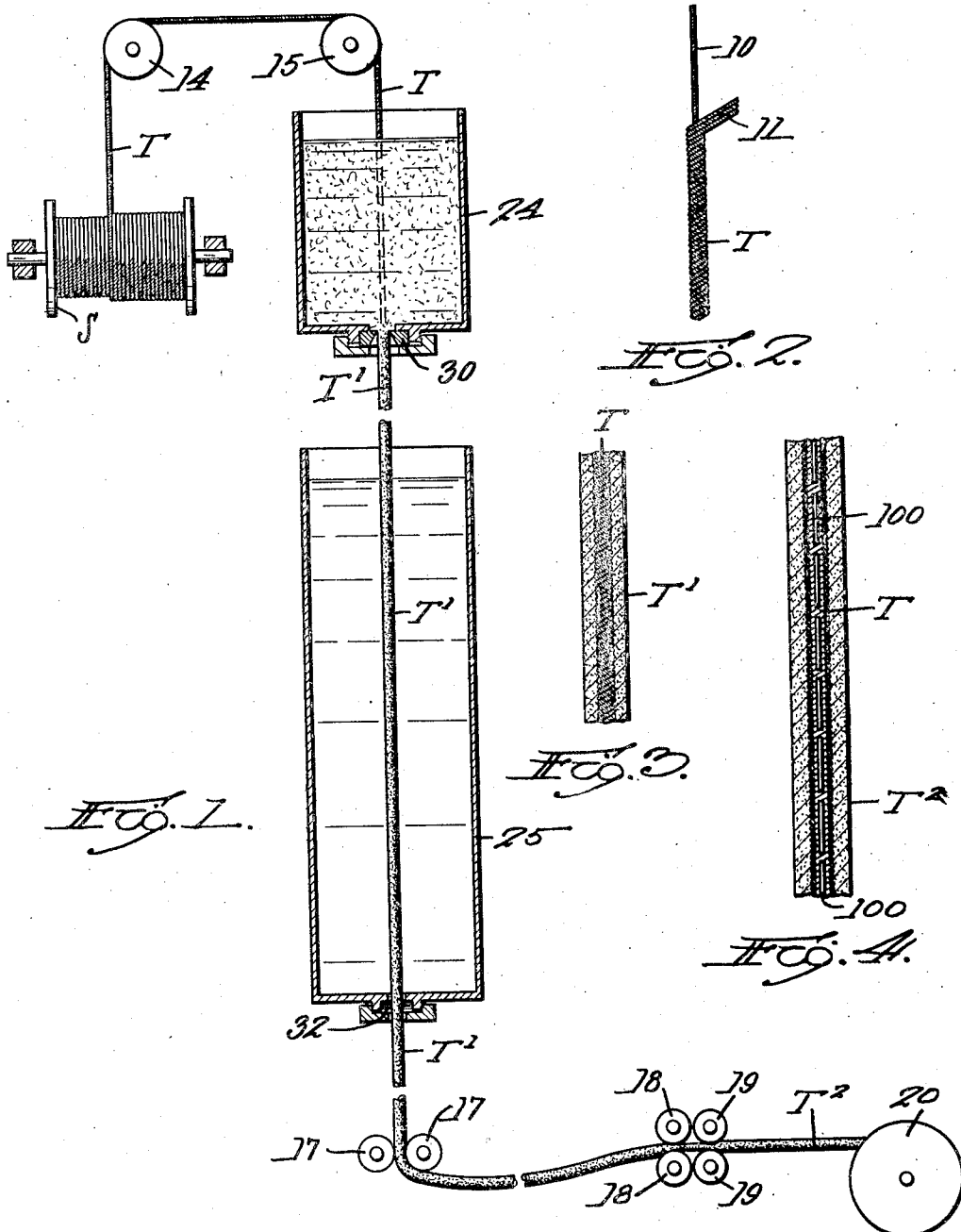
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RUBBER THREAD AND METHOD OF MAKING THE SAME

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RUBBER THREAD AND METHOD OF MAKING THE SAME

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This invention relates to a rubber thread suitable for use in the manufacture of elastic webs or fabric and for other similar purposes.

It is the general object of my invention to provide a rubber thread of novel and improved construction and of lowered manufacturing cost.

It is a further and important object of my invention to provide a rubber thread by the use of which injuries to elastic fabric caused by puncture or breakage of threads will be effectively localized.

My invention also consists in the provision of a new and improved method of producing a rubber thread by a drawing rather than an extruding operation.

My invention further relates to certain combinations of parts and steps of procedure which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of my invention, together with illustrative apparatus for producing the same, is shown in the drawing, in which

Fig. 1 is a diagrammatic view of apparatus by which my improved rubber thread may be produced;

Fig. 2 is a side view of a portion of the compound textile thread on which the rubber thread is formed;

Fig. 3 is a sectional side elevation of a portion of the rubber thread as it leaves the coating and vulcanizing tanks, and

Fig. 4 is an enlarged sectional side elevation of a portion of the finished rubber thread.

In the manufacture of my improved rubber thread, I first form a compound thread or core by taking a textile thread 10 and winding it closely with a second textile thread 11. These threads 10 and 11 are commonly and preferably of cotton, and the thread 10 is lighter and weaker than the thread 11. During the winding operation, the thread 10 is held under sufficient tension so that the thread 10 remains substantially straight, while the thread 11 is wound in coils around the straight thread 10.

This compound cotton thread T may be

stored in any convenient manner, as on a spool S, from which it is supplied to the coating mechanism shown in Fig. 1. This mechanism may comprise guide-rolls 14 and 15, draft rolls 17, drawing rolls 18 and 19, a winding roll 20, and successive tanks or receptacles 24 and 25.

The tank 24 contains a liquid rubber or latex solution and has an opening in the bottom covered by a die plate 30. This plate 30 is provided with a hole or opening of the correct size to permit a thread of the desired diameter to be drawn therethrough.

The tank 25 is filled with an acid or sulphur solution which will have a hardening or vulcanizing effect on the thread. The lower end of the tank 25 is provided with an outlet having a packing member or gland 32 permitting the partially hardened or vulcanized thread to be drawn therethrough but substantially preventing escape of liquid from the tank 25.

In the carrying out of my invention, the rolls 17, 18 and 19 are positively driven in definite speed relations. The draft rolls 17 draw the combined thread or core T from the spool S over the guide-rolls 14 and 15 and down through the tank 24, the die plate 30, the tank 25 and the packing member or gland 32.

As the cotton thread T is drawn through the rubber or latex solution in the tank 24, it becomes thoroughly coated and impregnated with rubber. The surplus rubber is removed from the thread by the die plate 30, so that the thread leaves the tank 24 as a rubber-coated but soft and exceedingly sticky thread T' of the desired exterior diameter.

This thread enters directly into the solution in the tank 25 without touching any external object. As the thread is drawn down through the tank 25, the acid or sulphur solution has a sufficient hardening or vulcanizing effect so that the exterior of the thread is no longer sticky as it is drawn out through the outlet packing member 32 by the draft rolls 17.

The thread at this time is in the condition indicated at T' in Fig. 3, with the original compound cotton thread T embedded in and surrounded by a coating of rubber or latex.

As the thread T' leaves the tension roll 17, it passes loosely to two or more pairs of drawing rolls 18 and 19.

The rolls 18 preferably revolve with the same surface speed as the draft rolls 17, but the rolls 19 revolve at substantially higher speed so that the thread T' is stretched between the rolls 18 and 19, during which operation the straight and relatively weak cotton thread 10 is broken up into a series of short separate pieces as indicated at 100 in the finished thread T² shown in Fig. 4.

This thread T² is then allowed to contract and is wound on the roll 20 or is otherwise stored for use as desired.

The broken lines in Fig. 1 indicate that the various parts of the diagrammatic apparatus may be spaced apart at any required distances.

It thus appears that my improved rubber thread is formed by taking a compound cotton thread or core T, impregnating and coating it with a liquid rubber or latex solution, sizing the coated thread by the die plate 30, passing the thread directly to a second acid or sulphur solution by which the surface of the thread is hardened or vulcanized, and thereafter subjecting the thread to a stretching operation by which the straight weak cotton thread 10 is broken up into short pieces, leaving the thread T² as shown in Fig. 4, with the coiled thread 11 embedded in the rubber but with the straight thread 10 so broken up that it does not interfere with the elasticity of the thread T².

My improved rubber thread T², produced as above described, may then be used for any of the purposes to which bare rubber threads are commonly applied, or it may be coated with silk or other fibre in the well-known commercial manner. This novel rubber thread may be very easily and cheaply produced, and it possesses one very important advantage over the ordinary rubber thread when used in elastic fabrics.

Much waste is caused in the manufacture of articles from elastic fabric by the fact that the elastic threads are frequently punctured or broken by the needle of the machine which is used in sewing the garment. When a thread is thus punctured or broken, it contracts for a considerable distance, frequently one or two inches, and leaves a visible defect in the cloth which may cause the garment to be classed as a "second" and sold at a reduced price.

When my improved rubber threads are used, either bare or covered, the coiled cotton thread 11 localizes any break in a thread which may occur from needle puncture or otherwise. The only effect of such breakage is to straighten one or two adjacent coils of the thread 11. The rubber thread thus remains substantially in its original position and without complete separation, the thread

11 being so embedded in the rubber substance that no substantial separation is possible. Runs in the fabric are thus avoided.

In a modified form of my invention, the thread 11 may be omitted and the weak straight thread only may be drawn through the tanks and coated as described. This form of thread possesses certain but not all of the advantages of the previously described thread.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein described, otherwise than as set forth in the claims, but what I claim is:—

1. As an article of manufacture, a rubber thread comprising a compound textile core impregnated and covered with rubber, said core being formed of a straight and relatively weak thread in short discontinuous fragments in the finished product, and a winding thread disposed in helical coils around said straight core thread.

2. The method of making a rubber thread which comprises taking a relatively weak core thread, drawing said core thread through a rubber solution whereby said core thread is impregnated and coated with rubber, drawing said coated thread through a second solution by which the surface of the rubber thread is rendered substantially non-adhesive, and thereafter breaking said core thread into short discontinuous fragments, whereby stretching of said rubber thread is facilitated.

3. The method of making a rubber thread which comprises forming a compound core thread by holding a relatively weak thread straight and winding a second thread in helical coils about said straight thread, drawing said compound core thread through a rubber solution whereby said core thread is impregnated and coated with rubber, drawing said coated thread through a die plate and through a second solution by which the surface of the rubber thread is rendered substantially non-adhesive, and thereafter breaking said core thread into short discontinuous fragments whereby stretching of said rubber thread is facilitated.

4. The method of making a rubber thread which comprises forming a compound core thread by holding a relatively weak thread straight and winding a second thread in helical coils about said straight thread, drawing said compound core thread through a rubber solution whereby said core thread is impregnated and coated with rubber, drawing said coated thread through a die plate and through a second solution by which the surface of the rubber thread is rendered substantially non-adhesive, and thereafter submitting said coated thread to a stretching operation by which the straight core thread is broken into short discontinuous fragments.

5. The method of making a rubber thread

which comprises forming a compound core thread by holding a relatively weak thread straight and winding a second thread in helical coils about said straight thread, drawing said compound core thread through a rubber solution whereby said core thread is impregnated and coated with rubber, drawing said coated thread through a die plate and through a second solution by which the surface of the rubber thread is rendered substantially non-adhesive, and thereafter passing said coated thread through successive pairs of drawing rolls by which the straight core thread is broken into short discontinuous fragments.

In testimony whereof I have hereunto affixed my signature.

LESTER B. CHISHOLM.

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