Jan. 7, 1936. W. GRUBER 2,026,736

PROCESS FOR THE MANUFACTURE OF WOOLLY THREADS

Filed Nov. 29, 1933

Fig. 1a

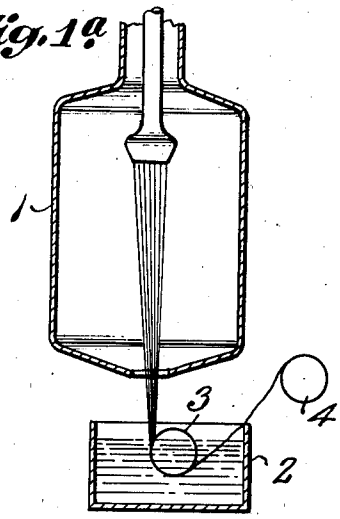


Fig. 2.

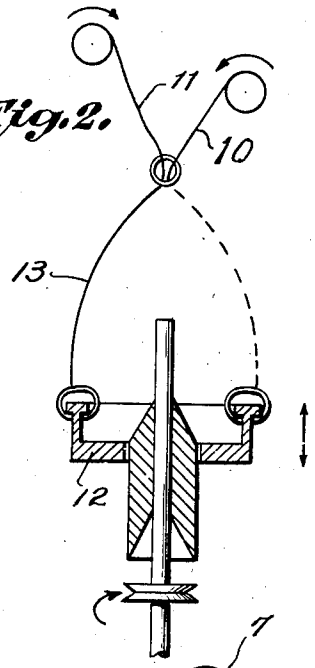
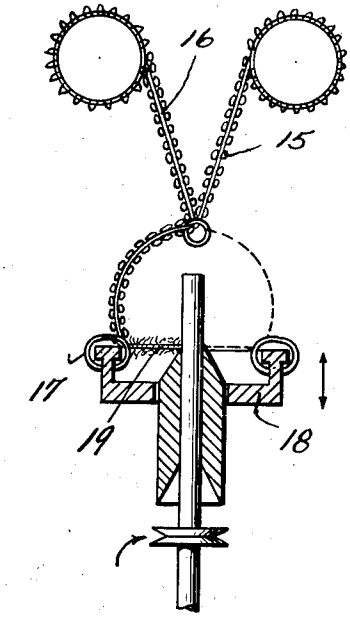


Fig. 3.



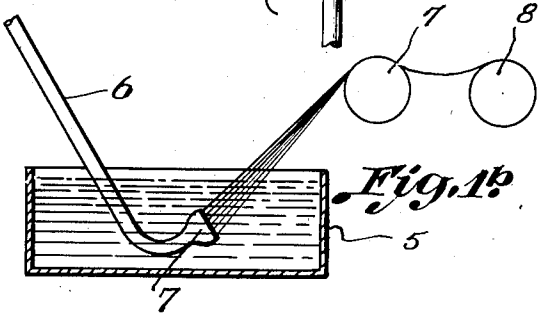


Fig. 1b



Fig. 4.

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Patented Jan. 7, 1936 2,026,736

UNITED STATES PATENT OFFICE

2,026,736

PROCESS FOR THE MANUFACTURE OF WOOLLY THREADS

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Application November 29, 1933, Serial No. 700,219
In Germany December 1, 1932

8 Claims. (Cl. 117—2)

Numerous attempts have been made to produce woolly artificial silk threads; for instance the more or less plastic threads have been drawn through grooved rolls so as to provide them with waves and curls, or woolen threads have been enclosed in an artificial silk covering. Attempts have also been made to curl artificial silk threads by boiling them in water, salt solutions, solvents and swelling agents and the like, or by quick heating and sudden cooling, etc.

All these processes result in producing loose and open threads which lack a woolly character as they do not have the desired jutting tiny hairs. Attempts have been made to obtain this woolly effect by drawing lightly twisted dry threads over rough cylinders and surfaces, so as to break up the outer layers. It is plain that with this process a very uneven thread is obtained, without appreciable loosening, as the roughening is purely external.

I have found that by the successive application of various treatments hereinafter described, an exceptionally soft, voluminous thread of woolly character is obtained. My invention comprises twisting two or more bundles of artificial threads under unequal tension, for example on a ring doubling frame, with the thread bundles under lighter tension having a lower titre than the others. The solution used for the spinning preferably contains substances which are wholly or partly soluble in water, e. g. glycol, glycerin, their esters, etc. Furthermore, pigments, colors, softeners, etc. may likewise be present, so that special effects may be obtained. Instead of artificial threads of a homogeneous material also artificial threads of different origin, e. g. viscose and acetyl-cellulose or mixed threads of natural fibre and artificial threads may be employed. The thread bundles may also be provided with a dressing before twisting.

By twisting in the above mentioned manner each thread bundle under light tension forms loops and nooses which can be fixed on a fancy yarn machine. This is not necessary, however, for with further operation (doubling) the loose threads become properly fixed.

The twisted bundles of threads are now twisted into a main yarn or thread, and in this operation a ring doubling frame with a heavy traveler is used, which beats and breaks up the previously formed loops and nooses of said bundles. This thread does not yet have the quality of a woolly thread, as the individual threads are smooth and stiff. The jutting and beaten fibres of the thread, however, take on a very woolly character if they are boiled for a considerable time in a soapy solution or in a diluted solution of salt or acid, if necessary under increased or diminished pressure. In the latter case the boiling period must generally be increased.

The threads obtained in accordance with my invention are far superior in tensile strength to a wool of light twist, as the majority of the individual threads are uninjured and very long.

The above-described process may be varied to the extent of omitting the boiling. In this case, however, specially treated artificial threads must be used in twisting the bundles. A beginning is made with artificial threads which have not yet been subjected to twisting; they are wetted with water if they are not already wet from the spinning, and are wound up under a light pull. On drying the thread assumes a very curly form. Hereupon several thread bundles are twisted together in the above-indicated manner under uneven tension and the latter into a main yarn by means of a ring doubling frame with a heavy traveler. The formation of the nooses and loops is identical; they are here also beaten apart by the heavy traveler. The boiling can be omitted in this case.

Example 1

I begin with a spinning solution containing about 20% glycol, and possibly also pigments, colors, softeners, and the like, to produce special effects. This is spun in the conventional manner, the threads being wound up in the usual way and, if necessary, also provided with a dressing. Thereupon two or more thread bundles are twisted together under such an uneven tension on a ring doubling frame as to form loops and nooses. The composite thread or yarn is next twisted on a ring doubling frame with a heavy traveler, whereby the loops and nooses are beaten apart. The thread is hereupon boiled for thirty minutes to two hours in a soap solution or in a diluted watery salt or acid solution. It then has a perfectly wooly quality.

Example 2

I begin with a spinning solution containing about 10% triacetin, which is spun in the conventional manner. The threads are then wetted with water and wound up under light pull. The threads are then dried and assume hereby a very curly form. Thereupon a composite thread or yarn is formed of at least two thread bundles which, as indicated in Example 1, are twisted under uneven tension on a ring doubling frame.

The rest of the operation is as indicated in Example 1. The boiling may be omitted.

The process covered by the invention is illustrated by the following views:

Figs. 1*a* and 1*b* are diagrammatic views showing different forms of spinning apparatus;

Fig. 2 is a diagrammatic view of the apparatus of a ring doubling frame for twisting strands of thread;

Fig. 3 is a diagrammatic view of the ring doubling frame showing the step of twisting and beating the strand of threads to form the finished product; and

Fig. 4 is a side elevation illustrating the wooly thread produced by this process.

In Figure 1*a*, 1 is a spinning apparatus, 2 a vessel with water, in which the threads run over a roll 3 for wetting the threads. The threads are wound with a low tension over a roll 4.

In Figure 1*b*, 5 is a wet-spinning apparatus with a nozzle 6 for the spinning solution. The threads are wound over a roll 7 and with a low tension over a roll 8.

In Figure 2, 10 and 11 are bundles of threads which are twisted together with unequal tension on a ring doubling frame 12 into a yarn 13. Thread 11 which has the lower tension forms loops and nooses when twisting.

In Figure 3, 15 and 16 are threads with loops and nooses which are beaten apart by a heavy traveller 17 of a ring doubling frame 18 into a woolly thread 19.

Figure 4 shows the final product. The woolly character of the thread 19 can be seen from this figure.

Various changes may be made in the processes described above without departing from the scope and spirit of the invention as defined in the appended claims.

The invention claimed is:—

1. Process of manufacturing woolly threads which comprises forming spun threads of artificial silk into a plurality of bundles, twisting said bundles of threads together under unequal tension to form loops and nooses, and twisting the whole into a yarn while beating said loops and nooses apart.

2. Process according claim 1, characterized in this, that the threads of one bundle have a lower titre than the threads of the other bundle and that, in twisting said bundles together, the lower tension is applied to the bundle which contains the threads of lower titre.

3. Process of manufacturing woolly threads which comprises forming spun threads of artificial silk into a plurality of bundles, twisting said bundles of threads together under unequal tension to form loops and nooses, twisting the whole into a yarn while beating said loops and nooses apart, and boiling said yarn in an aqueous solution containing a material selected from the group consisting of soap, salt or acid.

4. Process of manufacturing woolly threads which comprises forming mixed natural and artificial threads into a plurality of bundles, twisting said bundles of threads together under unequal tension to form loops and nooses, twisting the whole into a yarn while beating said loops and nooses apart, and boiling said yarn in an aqueous solution containing a material selected from the group consisting of soap, salt or acid.

5. Process of manufacturing woolly threads which comprises spinning and wetting threads of artificial silk, winding the wet threads under a light pull, drying said threads, forming said threads into a plurality of bundles, twisting said bundles of threads together under unequal tension to form loops and nooses, and twisting the whole into a yarn while beating said loops and nooses apart.

6. Process of manufacturing woolly threads which comprises forming mixed natural and artificial threads, wetting the threads, winding the threads under a light pull, drying said threads, forming said threads into a plurality of bundles, twisting said bundles of threads together under unequal tension to form loops and nooses, and twisting the whole into a yarn while beating said loops and nooses apart.

7. Process of manufacturing woolly threads which comprises spinning threads from a spinning solution containing up to 20% of an organic material which is miscible with water and with the spinning solution, forming said threads into a plurality of bundles, twisting said bundles of threads together under unequal tension to form loops and nooses, twisting the whole into a yarn while beating said loops and nooses apart, and boiling said yarn in an aqueous solution containing a material selected from the group consisting of soap, salt or acid.

8. Process of manufacturing woolly threads which comprises spinning threads from a spinning solution containing up to 20% of a material selected from the group consisting of glycol, glycerin and their esters or derivatives, forming threads into a plurality of bundles, twisting said bundles of threads together under unequal tension to form loops and nooses, twisting the whole into a yarn while beating said loop and nooses apart, and boiling said yarn in an aqueous solution containing a material selected from the group consisting of soap, salt or acid.

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