Sept. 1, 1936. B. M. TAYLOR 2,052,731

APPARATUS FOR PRODUCTION OF ARTIFICIAL THREAD

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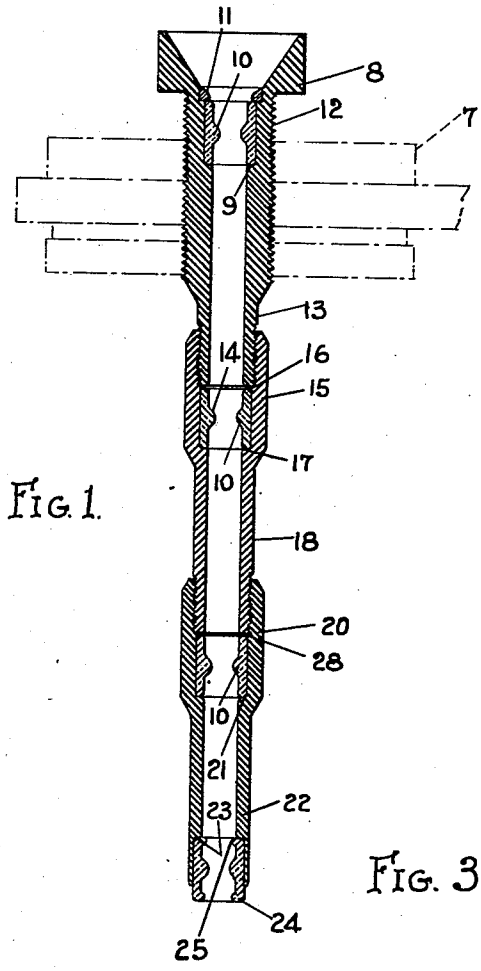


Fig. 1.

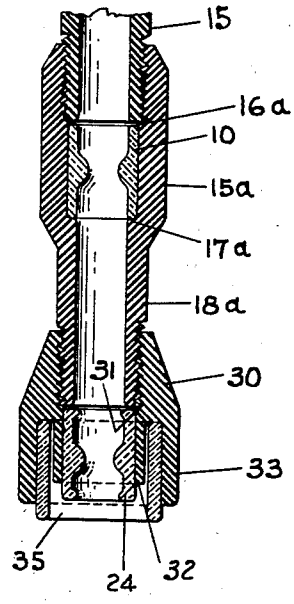


Fig. 2

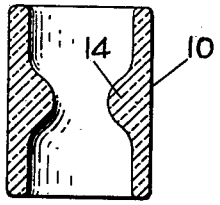


Fig. 3

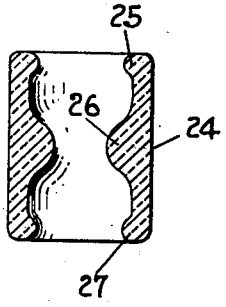


Fig. 4.

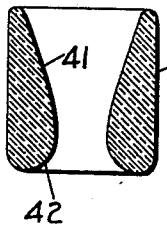


Fig. 5

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APPARATUS FOR PRODUCTION OF ARTIFICIAL THREAD

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8 Claims. (Cl. 117—27.5)

This invention relates to artificial thread-producing apparatus and more particularly it relates to a thread-guiding mechanism for guiding a freshly formed artificial thread into a centrifugal bucket or the like. This invention will be described with particular reference to the manufacture of regenerated cellulose rayon but it is to be understood that the invention is applicable to all cases in which a guide is used for the transference of thread to a revolving container.

In one of the methods of manufacturing rayon, the regenerated cellulose thread is collected in a centrifugal bucket which revolves at a high rate of speed. The thread is built up within the bucket in the form of a hollow cake. In order that the thread be laid in the cake evenly and in order that it may be readily unwound when withdrawn from the bucket, a reciprocating mechanism is used whereby the thread is laid against the walls of the bucket in superimposed helices. The reciprocating mechanism commonly used comprises a glass funnel guide projecting into the bucket, said guide being mounted on a reciprocating traverse bar. The commonly used funnel guide consists of a relatively long piece of glass tubing which has been formed with a number of constrictions at intervals in order to keep the thread centered and to prevent the wet thread from dragging against the sides of the funnel guide and which has a bell or conically shaped enlargement at the top thereof. The funnels are mounted in individual funnel arms which are in turn hingedly connected to the reciprocating bar. The funnels are mounted in the funnel arms in an adjustable manner, such as, for example, by means of a threaded connection so as to permit the adjustment of the relative height of the funnel tip from the bottom of the centrifugal bucket when it is screwed up or down in the funnel arm. The funnel arm is ordinarily pivotably connected to the traverse bar so that when the spin is completed and it is desired to remove the bucket from the spindle in order to doff the cake, the funnel arm and funnel guide can be swung backwardly to provide the requisite amount of clearance.

This intermittent raising and lowering of the funnel out of or into the bucket often results in the breaking of the glass funnel guide due to its inherent brittleness and furthermore due to the constrictions formed therein. Due to this breakage and the irreparable damage caused to the spinning bucket and yarn contained therein, various attempts have been made heretofore to avoid the use of glass funnel guides. Hard rubber guides, or guides of similar material, having spaced inserts of glass or porcelain have been substituted for glass guides and used with more or less success. Such funnel guides are much more expensive and when breakage does occur, replacements are naturally more costly. Furthermore, it frequently happens that the spaced inserts of glass, or porcelain, or the like, continuously contact the thread at the same point or within a relatively small area which becomes cut or roughened and causes degradation of the yarn. The inserts in such previously known funnels are not easily accessible and cannot be examined periodically, so that a great deal of low quality yarn may be produced before the defect is located.

It is therefore an object of this invention to improve the manufacture of artificial thread.

It is another object of this invention to provide an improved funnel guide for the production of artificial thread.

Other objects of the invention will appear hereinafter.

The objects of this invention can be accomplished generally by constructing a funnel guide with a hollow tube comprising a plurality of separable sections of hard rubber or similar material, and provided at each joint with an insert of a hard, inert material, such as, for example, glass, porcelain, synthetic resins, or the like. These inserts are preferably mounted so as to be free to rotate about the axis of the funnel but are prevented from sliding up and down within said funnel.

The purposes and advantages of the invention will become more clearly apparent by reference to the following detailed description taken in connection with the accompanying illustrations of certain specific embodiments thereof, and in which:

Fig. 1 is a vertical cross sectional view showing a funnel constructed in accordance with the invention, and having a series of freely rotatable inserts therein;

Fig. 2 is a fragmentary, vertical cross sectional view showing a modified form of funnel tip;

Fig. 3 is an enlarged vertical cross sectional view of one form of funnel insert;

Fig. 4 is an enlarged vertical cross sectional view of one form of funnel tip insert;

Fig. 5 is an enlarged vertical cross sectional view of a modified form of funnel insert.

Referring to Fig. 1 of the drawing, reference character 7 designates generally a funnel-recip-

rocating mechanism to which the top section 8 of the funnel is screw-threaded by means of thread 12. The top portion of the funnel is provided with a conical enlargement to aid in more easily inserting the artificial thread therein. The section 8 is provided with a main axial bore of substantially uniform diameter through the greater portion thereof. The top portion of the section 8 adjacent to the conical enlargement is provided with a counter bore slightly larger than the main bore and providing a shoulder 9. An insert of glass, porcelain, agate, or the like, is loosely positioned in this counter bore with the bottom edge thereof resting on the shoulder 9. This insert may be loosely positioned in the section 8 and if desired may be provided with a yieldable ring 11 to prevent the insert 10 from dropping out of the funnel when the same is inverted. The section 8 is provided with a reduced portion 13 at the lower end thereof which is externally threaded to cooperate with the internal threads of a second section 15 so that the two may be securely joined together.

The section 15 is provided throughout the major portion thereof with an axial bore of substantially the same diameter as the main bore in section 8. Section 15 is also provided with a counter bore in which may be positioned a second insert 10, which insert is adapted to rest on the shoulder 17 of the counter bore. The internal threads of section 15 terminate abruptly at a point 16 spaced slightly from the top of insert 10 to prevent damage to the insert when the sections 8 and 15 are screwed together. The inserts 10 in both sections 15 and 8 are arranged in the sections in a loose fit so as to permit the same to freely rotate. Section 15 is provided with a reduced portion 18 having an external thread thereon adapted to cooperate with the internal thread of a third section 20. This section 20 is constructed similar to section 15, being provided with a central bore and counter bore in which may be positioned another insert 10 to rest on the shoulder 21, and the threads are abruptly terminated at point 28 to prevent damage to the insert. The lower part of section 20 is provided with a reduced portion 22 and a second counter bore at the bottom end thereof for the insertion of a tip insert 24. This tip insert will be positioned in the section 20 so as to rest against the shoulder 23 of the counter bore and is fastened in place by gluing, cementing, pressing thereinto while in a heated condition, vulcanizing, or in any other desired manner.

In the modification of the invention illustrated in Fig. 2, section 15*a*, which is similar to section 15 in all respects except that it is slightly shorter, is attached to the guide between section 15 and an end section 30. Reference characters 16*a*, 17*a* and 18*a* designate the various parts of section 15*a* which correspond to parts 16, 17 and 18 of section 15. Sections 15*a* and 30 are substituted for end section 20 of Fig. 1. The section 30 is provided with annular extensions 32 and 33 between which may be inserted a glass or porcelain ring 35. A glass or porcelain tip insert 24 is inserted on the internal surface of extension 32 and is prevented from contacting section 15*a* by means of the shoulder 31 beyond which the cooperating threads will not turn. Both the ring 35 and the tip insert 24 are securely fastened in place in section 30, preferably against the internal surfaces of the extensions 33 and 32 respectively.

Fig. 3 illustrates one of the freely rotatable inserts 10 on an enlarged scale. This insert 10 is provided with an axial bore which is of substantially the same diameter as the respective bores of the sections throughout the funnel. This bore through insert 10 is provided with a constriction 14 against which the artificial thread will contact to prevent its contact with the walls of the funnel.

Fig. 4 discloses the funnel tip insert 24 which is provided with a constriction 26 similar to the constriction 14 in tip 10 and is provided with additional smaller constrictions or beads 25 and 27 at the ends thereof.

Fig. 5 illustrates a modified form of insert which is designed to be used either as a freely rotatable internal insert or as a tip insert for the funnel. The insert 40 is provided with gradually sloping internal sides 41 and a bottom curved portion 42 to provide the necessary constriction against which the thread will contact. All portions of the inserts 10, 24, or 40, against which the thread may contact during its passage therethrough, are preferably highly polished to prevent any degradation of the yarn.

The various funnel sections 8, 15, 15*a*, 20 and 30 may be constructed of any suitable plastic material, among which may be mentioned hard rubber, gutta percha, vinyl resins, phenol-formaldehyde resins, polyhydric alcohol-polybasic acid resins, and cellulose derivatives. The various inserts may be constructed of any desired hard, inert material, such as glass, porcelain, agate, a hard metallic carbide, e. g. tungsten carbide, synthetic resins, or the like.

Inasmuch as the inserts are loosely mounted in the funnel for free rotation therein, they are not subjected to any excessive wear at any particular point thereof against which the thread may continually contact, and they may be used over long periods of time without deleteriously affecting the thread. Furthermore, the inserts, as well as the various sections of the funnel, are interchangeable, and if the funnel becomes broken, most of the parts can be salvaged and used over again. Another advantage of the funnel constructed in accordance with this invention is that it may be disassembled and the inserts inspected periodically for defects, and thus insuring the maintenance of the production of high quality yarn.

It will be obvious that many changes and modifications may be made in the above detailed description without departing from the nature and spirit of the invention. It is therefore to be understood that the invention is not to be limited except as set forth in the appended claims.

I claim:

1. In a thread-guiding tube, a plurality of separable sections, and hard, substantially inert inserts rotatably positioned between said sections.

2. In a thread-guiding tube, a plurality of sections separable from each other, and hard, substantially inert, thread-contacting inserts freely rotatably positioned between said sections.

3. In a thread-guiding tube, a plurality of sections separable from each other, hard, substantially inert, thread-contacting inserts freely rotatably positioned between said sections, and an insert firmly positioned in the bottom end thereof.

4. In a thread-guiding tube, a plurality of sections separable from each other, hard, substantially inert, thread-contacting inserts freely rotatably positioned between said sections, and concentrically positioned inserts in the bottom end thereof.

5. In a thread-guiding tube, a plurality of sections separable from each other, and hard, sub-

stantially inert, thread-contacting inserts freely rotatably positioned between said sections, said inserts having constricted portions on the internal surface thereof.

6. In a thread-guiding tube, a plurality of sections separable from each other, hard, substantially inert, thread-contacting inserts freely rotatably positioned between said sections, and means for preventing the clamping of said inserts between said sections.

7. In a thread-guiding tube, a hard, substantially inert, thread-contacting insert rotatably mounted therein, said insert being positioned entirely within said tube.

8. In a thread-guiding tube, a plurality of hard, substantially inert, thread-contacting inserts rotatably mounted therein, said inserts having constricted portions on the internal surface thereof.

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