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2,251,226

APPARATUS FOR THE PROCESSING OF MULTIPLE FILAMENT THREAD OR THE LIKE

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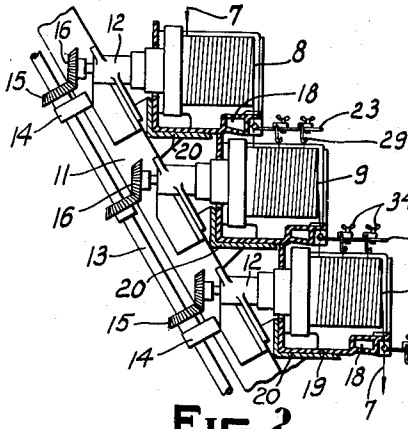


FIG. 2

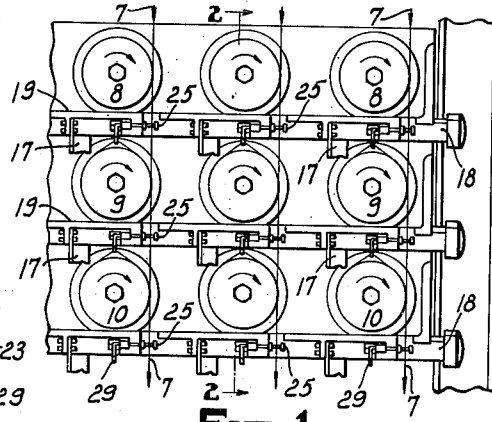


FIG. 1

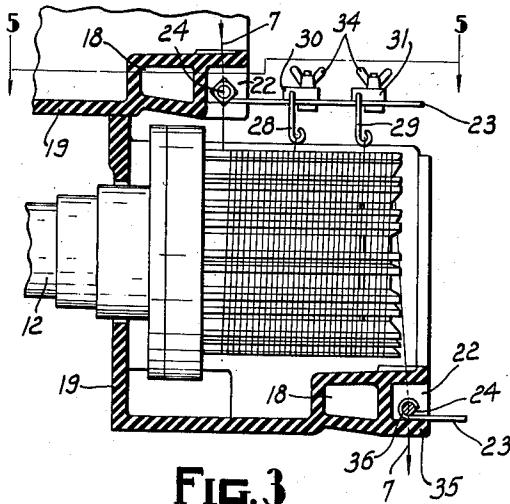


FIG. 3

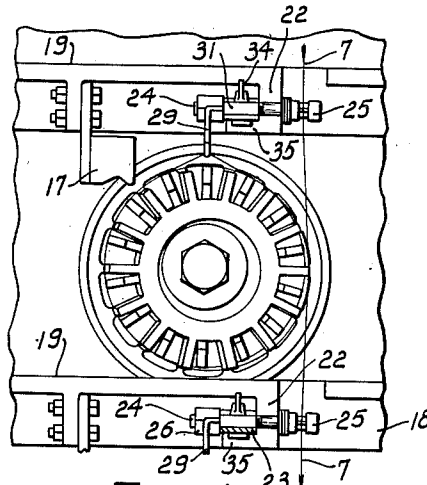


FIG. 4

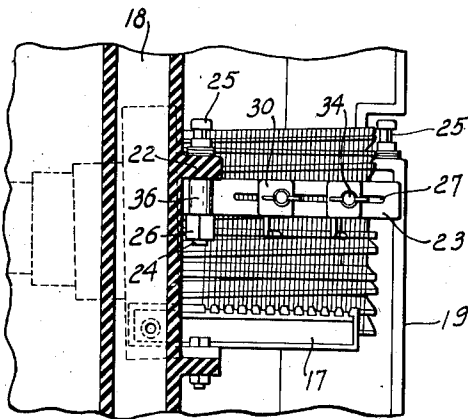


FIG. 5

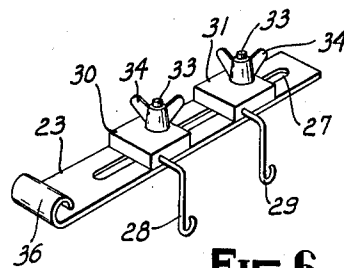


FIG. 6

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APPARATUS FOR THE PROCESSING OF MULTIPLE FILAMENT THREAD OR THE LIKE

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5 Claims. (Cl. 28—57)

The present invention relates to apparatus for the manufacture of multiple filament thread or the like on one or more thread-advancing thread store devices.

Certain manipulative difficulties are encountered in the processing of multiple filament thread or the like on thread-advancing thread store devices. Responsibility for such difficulties is attributed to the inherent tendency of the filaments going to make up the thread or the like to spread out and assume the form of a flat, ribbonlike mass. This characteristic of multiple filament thread or the like is advantageous to the thorough processing of the thread or the like, but for other purposes is disadvantageous. If permitted to continue beyond reasonable limits, it results in overriding of the filaments at the outer edges of adjacent thread turns, causing breakage, knotting, snarling, etc.

The present invention contemplates the incorporation in the processing apparatus of means for successfully preventing this spreading of the filaments of a multiple filament thread or the like. The successful prevention of the spreading of such filaments reduces to a minimum the effects upon the thread or the like arising out of the difficulties above mentioned. The means of the present invention may take any convenient form such, for example, as the condensing means shown in the illustrated embodiment of said invention, which are preferably disposed along the longitudinal axis of the thread-advancing thread store device with which they are associated.

While the invention is described hereinafter as applied to the processing of multiple filament viscose artificial silk thread, the term "thread," as used in the claims, is intended to embrace all types of multiple filament thread bundles.

In the accompanying drawing, which represents but one of a variety of possible embodiments of the invention, like reference characters refer to like parts throughout. Figure 1 is a front elevation of a portion of a machine embodying a number of thread-advancing thread store devices arranged in a plurality of descending series, together with their associated distributors, condensing means, guides and troughs. Figure 2 is a sectional elevation taken along line 2—2 of Figure 1. Figure 3 is a side elevation on an enlarged scale of a single thread-advancing thread store device with its associated apparatus. Figure 4 is an end elevation of the apparatus shown in Figure 3. Figure 5 is a plan with parts in section from line 5—5 of the apparatus

shown in Figure 3. Figure 6 is a perspective on an enlarged scale of the condensing means of the invention and the supporting means therefor.

The thread processing apparatus illustrated in Figures 1 and 2 is generally of the type disclosed in application Serial No. 7,114, filed February 18, 1935, in the names of Walter F. Knebusch and Alden H. Burkholder (Patent 2,225,642). The thread-advancing thread store devices employed herein may take the form of and be referred to as thread-advancing reels. Although any desired type of device may be employed, the reels preferably operate on the principle of the thread-advancing reel shown and described in the aforementioned Knebusch and Burkholder application, which constitutes an improvement upon the thread-advancing reel shown, described and claimed in Knebusch application Serial No. 652,089, filed January 16, 1933 (Patent 2,210,914). The apparatus illustrated in Figures 1 and 2 comprises a plurality of thread-producing units each of which includes a thread source, a descending series of processing reels 8, 9 and 10, suitable drying means, and a thread collecting device. A complete machine may comprise as many as 50 to 100 such thread-producing units arranged side by side each of which provides for the complete processing of a single thread. In such apparatus, each thread is passed successively over a plurality of thread-advancing reels preferably arranged in the stepped relation shown in Figure 2.

Upon each of the several thread-advancing reels of the series the thread is subjected to one of the various processing treatments necessary to produce a finished thread. For example, in the portion of the apparatus shown each thread 7 is subjected on reel 8 to the action of sodium sulphide for removing the sulphur from the thread. The thread next passes to reel 9, upon which it is washed. Upon reel 10 it may, if desired, be subjected to the action of a bleaching agent. It is processed in this fashion throughout the entire series of reels, being finally washed, dried and packaged on suitable apparatus.

It is preferable that the reels 8, 9 and 10 of each descending series be arranged as shown in such manner that the thread-receiving end of one reel is directly below the thread-discharge end of the reel thereabove. This arrangement facilitates access to the reels for inspection of the thread, permits manipulation of the thread upon the reels, and provides a direct passage of the thread between succeeding reels. The reels 8, 9 and 10 forming part of a given de-

scending series are supported in such relation by being secured by brackets 12 to inclined members 11, from which shafts 13 are supported by brackets 14 in a manner permitting them to drive the reels through gears 15 and 16.

The various processing treatments may be accomplished by liquid reagents showered upon the thread 7 by any suitable means such as the distributors 17. The latter are preferably of the type shown, described and claimed in Patent No. 2,054,087 for "Reagent distributor" issued September 15, 1936, to W. F. Knebusch and F. F. Hillix. Liquid reagents are supplied to each of said distributors 17 by a duct 18 incorporated in the trough structure 19 which duct 18 connects with a suitable supply conduit. Troughs 19 supported from inclined members 11 by stringers 20 serve to collect the spent processing liquid and direct it by suitable connecting pipes either to the sewer or, in the event that the reagent is of such nature that it may advantageously be reused, to appropriate make-up reservoirs.

The reel illustrated in detail in Figures 3 to 5, inclusive, which represents a type of thread-advancing thread store device that may be used to advantage in the practice of the present invention, comprises two rigid cage members each of which is made up of a plurality of longitudinally extending bar members. Said cage members are mounted in interdigitating relation with their axes in offset and inclined relation to each other. The offsetting of the axes of the two members results in a relative radial displacement of the bar members which causes the thread to be supported first by one set of bar members and then by the other, while the inclined relation causes the thread to advance longitudinally of the reel. Thus it is possible to advance the thread from one end of the reel to the other in the form of a helix made up of a large number of closely spaced turns.

As already mentioned, it has been found in the processing of thread made up of a large number of filaments that, due in part to the application of the processing liquid and in part to the action of the reel itself, the filaments comprising said thread tend by spreading to assume a flat, ribbonlike form. For this reason, a series of reels adapted to the successful processing of thread of a given filament count may not be applicable to the processing of thread comprised of a different number of filaments. But for the present invention, this fact would necessitate the adjustment, reconstruction or changing of the reels to widen the spacing of thread turns each time it were to be desired to process a larger thread, a procedure which may, under certain conditions, detrimentally affect the quality of the thread in that too little storage capacity is provided to process the thread effectively.

The thread as it contacts the thread-receiving end of the thread-advancing reel has a generally round, ropelike appearance. Due to the action of the reel and the application of processing liquid previously described, the filaments of the thread spread out while the thread is being progressed longitudinally of the reel, causing the thread to assume a flat, ribbonlike appearance. It is the function of the apparatus contemplated by the instant invention to condense these spread filaments and re-form the thread into its original round, ropelike form. The invention contemplates the positioning of one or more suitable condensing means at appropriate intervals axially

of the reel in such manner that the spreading action of the filaments of a thread being processed thereon may be periodically arrested in the course of its advance along said reel.

Thereby a thread-advancing reel of the ordinary type is rendered capable of a wider range of employment in the processing of thread of varying physical characteristics. The introduction of the condensing means of the present invention in apparatus employing a plurality of such thread-advancing reels serves, by means of a structure which is extremely simple in design, to increase the adaptability of such reels and to obviate the necessity of adjustment, reconstruction or change of said reels for each different type of thread. Further advantages in part are obvious and will in part be apparent as the description of the invention proceeds.

In the apparatus of the present invention, lug 22, extending at right angles to the front wall of duct 18 of trough 19, provides a means of attachment for an arm 23. Arm 23 extends outward from the trough 19, being supported in substantially parallel relation to the axis of rotation of the reel by the projecting leg 35 on lug 22. It is mounted upon the bolt portion 24 of thread guide 25 by means of the loop portion 36 at one end thereof in such manner that it may be tilted upward so as to permit free access to the reel in the threading-up operation. By extending the bolt portion 24 of the thread guide 25, nut 26 may be employed to secure both the arm 23 and thread guide 25 in operative relation on either side of lug 22 as illustrated in Figures 4 and 5.

A slot 27 extends longitudinally of said arm 23 and provides freedom of endwise adjustment of the condensing means 28 and 29 mounted in blocks 30 and 31 secured to said arm by bolts 33 and wing nuts 34. This method of mounting permits the adjustment or removal of each of the condensing means 28 and 29 independently of each other. Any convenient number of such condensing means consistent with the size and design of the thread-advancing thread store device with which the apparatus is associated may be employed, two being shown for illustrative purposes in the instant embodiment of the invention.

It is desirable, in order to achieve best results with reels of the type shown herein, to arrange said condensing means so as to divide the longitudinal dimension of the thread package being formed on each of the reels in approximately equal segments. Thus condensing means 28 would be advantageously placed, where two such means are used, at a point about $\frac{1}{3}$ of the distance from the thread-receiving end toward the thread-discharge end of the reel. Condensing means 29 then will be positioned at a point about $\frac{2}{3}$ of the distance from the thread-receiving end toward the thread-discharge end of the reel. The thread is thus permitted to flatten out only to a certain extent or to a point upon the reel coincident with the location of a condensing means, where a turn of thread is disengaged by the condensing means from the reel periphery.

The thread processing apparatus illustrated in Figures 1 and 2 is readily placed in operation, the actual threading up of the reels being best illustrated by reference to Figure 3.

The free end of a thread 7 is led either from a supply source or from a reel thereabove over the thread guide 25 (Figure 4), is grasped by the operator, and is then passed once or twice about the periphery of the reel. Due to the construction of the reel, the thread will be automatically

advanced from the thread-receiving toward the thread-discharge end thereof. When the first thread turn reaches a point approximately coincident with the location of condensing means 28, the operator passes a single thread turn over said condensing means and takes another turn about the reel with the thread. The thread is again permitted to advance along the reel to a point adjacent the next succeeding condensing means and the procedure repeated until the reel is threaded up.

From this reel the thread is now passed over the lower thread guide 25 and started upon the next reel therebelow, the threading process being repeated until all of the reels in the series are completely threaded up.

The apparatus of the invention may assume any of several different forms. The mounting and adjustment of the condensing means, for example, may be accomplished by supporting said condensing means from telescoping rods employed in place of the arm 23. The blocks 30 and 31, bolts 33 and wing nuts 34 may thus be eliminated and thumb screws used in their stead. A further modification may be made in the substitution of rotatably mounted grooved guide rollers for the hook type condensing means of the illustrated embodiment of the invention. Numerous other minor changes will readily suggest themselves but will not in any way alter the scope of the invention.

It is intended that the patent shall cover, by suitable expression in the appended claims, whatever features of patentable novelty reside in the invention.

What is claimed is:

1. In the manufacture of multiple filament thread or the like, the combination of a unitary thread-advancing thread store device upon the periphery of which the thread or the like is advanced in a series of generally helical turns and, disposed intermediate the thread-receiving and thread-discharge portions of the periphery of said device, means adapted to condense the filaments of one or more of said turns into a generally round bundle.

2. Apparatus for the processing of multiple filament thread or the like comprising a unitary

thread-advancing thread store device upon the periphery of which the thread or the like is advanced in a series of generally helical turns; means for processing the thread or the like on said device; and, disposed between the first of said turns adjacent the thread-receiving portion of said device and the last of said turns adjacent the thread-discharge portion of said device, means adapted to condense into a round bundle the filaments going to make up the thread or the like.

3. Apparatus for the processing of multiple filament thread or the like comprising a unitary thread-advancing reel of cantilever construction upon the periphery of which the thread or the like is advanced in the form of a helix characterized by a large number of closely spaced turns; means for processing the thread or the like on said reel; and, disposed between the first of said turns adjacent the supported end of said reel and the last of said turns adjacent the unsupported end of said reel, means adapted to condense into a round bundle the filaments going to make up the thread or the like.

4. Apparatus for the processing of multiple filament thread or the like comprising a unitary thread-advancing thread store device upon the periphery of which said thread or the like is advanced in a plurality of closely spaced, generally helical turns; means for processing the thread or the like on said device; and, disposed between the thread-receiving and thread-discharge portions of the periphery of said device, means for disengaging one or more turns of the thread or the like, condensing the filaments thereof into a generally round bundle, and returning thread or the like to said device.

5. In the manufacture of multiple filament thread or the like, the combination of one or more unitary thread-advancing thread store devices upon the periphery of which the thread or the like is advanced in a plurality of traveling helices and, disposed intermediate the turns of said helices, means for condensing into a generally round bundle the filaments going to make up the thread or the like.

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