Aug. 15, 1933. H. J. TYNAN 1,922,146

THREAD FEEDING MECHANISM

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Fig. 1

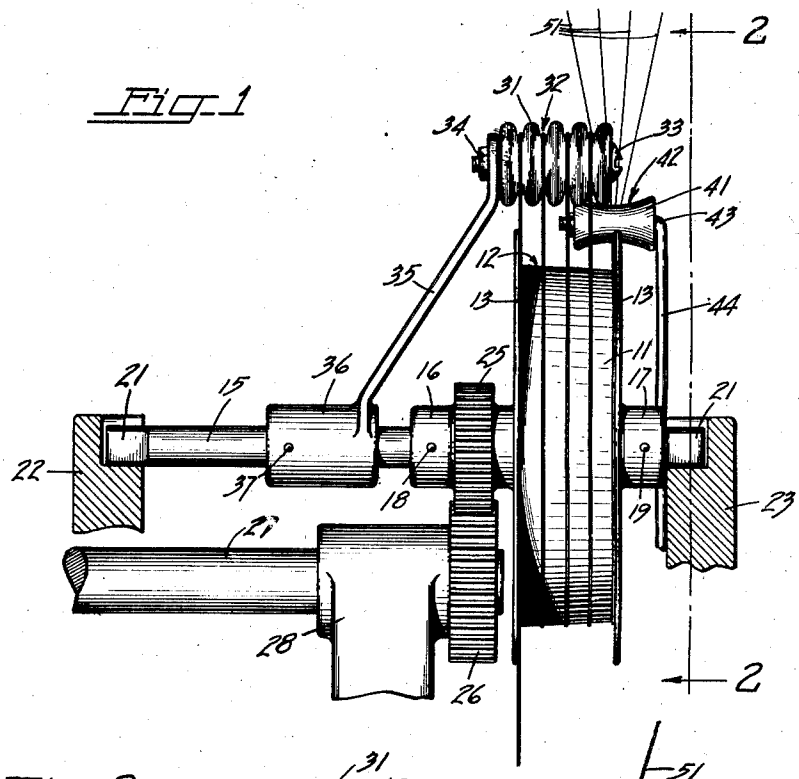
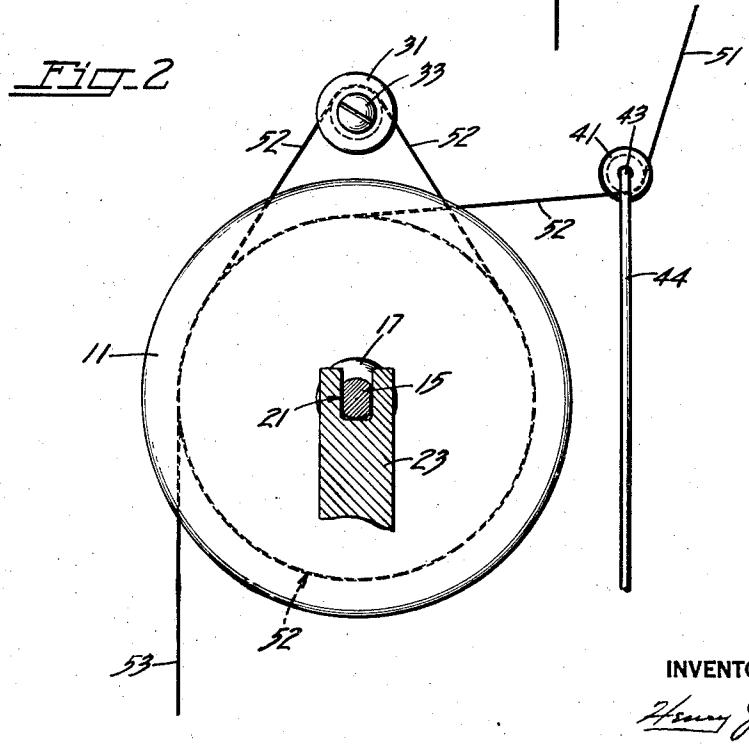


Fig. 2



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THREAD FEEDING MECHANISM

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5 Claims. (Cl. 117—21)

The present invention relates to doubling, doubling and twisting, and analogous machines in which a number of filaments or threads are brought together and are delivered, as a multiple thread of several plies, to a bobbin or other receiver, whether twist be or be not imparted to said multiple thread in the process thus described; and further relates to machines in which an already formed multiple thread is processed to impart twist, or to cause lengthening and attenuation of its constituent filaments, or to accomplish both of these purposes; and specifically it relates to the feeding mechanism and feed roller, or feed rollers, by which the yardage of thread delivered is regulated in such machines.

In many machines of the types referred to there is a single feed roller for each set of threads, these threads being lapped several times about said feed roller, either on its straight face or (with the aid of an appropriate and adjacent guide or guides) in grooves, the circumference of the feed roller being the same at each point of lapping; while in other machines of the types referred to there is more than one feed roller for each set of threads, usually a pair, which are approximately parallel and have either plain or grooved faces, all of the circumferences of the rollers at the points of lapping being alike so that each circle of the thread as it embraces the pair of rollers is substantially of the same length as each other circle.

It transpires frequently, using either the single feed roller or the pair of feed rollers, that, because of irregularities in the tensions on the several threads or filaments forming the multiple thread, one or more of said threads or filaments enter the multiple thread in a slacker state than do their companion threads or filaments, with the result that an imperfect multiple thread is formed, with small loops on component strands often protruding from the body of the multiple thread.

The principal object of the present invention is to provide a feeding mechanism which will eliminate the defects referred to and which, when so desired and if the threads or filaments are in a ductile state, will serve to extend the lengths of such threads or filaments and so lessen their diameters. These objects are accomplished by the following means:

(*a*) By providing, when a single feed roller is used, that said roller shall have increasing diameters at the successive points of lapping as the threads or filaments progress from the point at which they initially enter or embrace the feed roller toward the point at which they depart, as a multiple thread, from the feed roller and are fed to the bobbin or other receiver; and

(*b*) Similarly, when more than one feed roller is used, by providing that said rollers shall have increasing diameters at the successive points of lapping.

Other objects of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawing, discloses a preferred embodiment thereof.

Referring to the drawing:

Figure 1 is a side elevation of the mechanism embodying the present invention, parts being broken away; and

Fig. 2 is a transverse section taken substantially along the line 2—2 in Fig. 1.

The ends sought in the present invention are accomplished by creating a condition in which the feed roller or feed rollers are continually engaged in an effort to increase the length of the individual strands composing the multiple thread, having received said strands at the point of smallest roller diameter and finally delivering them, after several lappings and as a multiple thread, from the point of greatest roller diameter. The effect of this action upon the several strands is as follows:

(1) When the strands being processed are of a kind having only a small degree of ductility, or if otherwise ductile strands are being processed while in a dry and less ductile state, then those strands which have come to the feed roller under correct tension may be slightly stretched temporarily, but more usually the increasing demand of the feed roller or feed rollers will cause the withdrawal of slight additional lengths of such correctly tensioned strands from the supply sources, while the strands which have been lacking in tension, which are too slack, will be freed from loops and brought to approximately the same tensional condition as their companion strands. The result upon the multiple thread is that in its finished state it is free from the defects described earlier herein.

(2) When the strands being processed possess a considerable degree of ductility, then not only will the effect described in the preceding paragraph be secured but also, when desired, a definite increase in the lengths of the strands and a corresponding and substantially uniform decrease in their diameters may be obtained, the degree of attenuation thus effected being dependent upon

the number and extent of the diameter increases in the feed roller or feed rollers used.

An adjacent grooved guide is provided to lead the several lappings of the thread to their correct respective positions on the feed roller or feed rollers and to keep them substantially in said positions without such conflict as might otherwise result from the rolling of the thread, when feed rollers without grooves are used and any considerable twist is being imparted.

In the form shown herewith a grooved guide roller, revolved by the tension of the thread, holds the several lappings of the thread to their respective positions on the sloping face between the outer retaining flanges of the feed roller; and the strands, having been brought together, pass first partially about the feed roller only and then progress, through several lappings about the feed roller and the grooved guide roller, to the point at which they leave the feed roller and pass downward to the take-up bobbin or other receiver. Also, in the form shown, the feed roller and the grooved guide roller are both mounted on a holder which may be lifted from the machine when the operator wishes to lap the thread about them.

For the purpose of exemplifying the present invention there is disclosed in the drawings a feed roller designated by the numeral 11 having a sloping face 12 which terminates at either extremity in a flange 13. The feed roller 11 is loosely mounted for rotation on a short stationary shaft 15, being confined against longitudinal movement along the shaft by the collars 16, 17 which are secured to the shaft by pins 18, 19 respectively. The shaft 15 at each end is flattened as at 21 and held against rotation in blocks 22, 23 which may be a part of the frame work of a machine.

A gear 25 is positioned adjacent the feed roller 11 integrally formed on the hub thereof and meshes with a gear 26 mounted on the end of a driving shaft 27 journalled in a bearing 28 which may be part of the frame work of the machine. The drive shaft 27 is driven from any suitable source of power (not shown) and thus through the medium of the meshed gears 25, 26 imparts rotating motion to the feed roller 11.

A guide roller 31 having a number of annular grooves 32 therein is mounted for rotation on a screw 33 secured by a nut 34 to one end of an arm 35 extending upwardly from the hub 36 mounted on the shaft 15 adjacent the feed roller 11. The hub 36 is secured to the stationary shaft 15 by a pin 37 which holds the arm 35 in a fixed position. The arm 35 is formed at such an angle as to hold the guide roller 31 directly over the feed roller 11 and parallel with its axis as shown in Fig. 1.

An auxiliary guide roller 41 having a concave shaped surface 42 is mounted on a shaft 43 formed integrally with and extending at right angles to a rod 44 which may be secured in any suitable manner to the frame of a machine (not shown).

In operation a number of threads or filaments 51 pass under the roller 41 and due to the concave shape of its surface the filaments are brought together and leave the roller as a single thread 52. The thread 52 then passes over and around the feed roller adjacent the flange 13 at the lowest point of the sloping face 12 of the feed roller. This is the right hand flange as viewed in Fig. 1.

The thread 52 after passing around the feed roller leaves it and extends upwardly to the guide roller 31 and into the first groove 32 (the extreme right hand groove as viewed in Fig. 1). The thread passes over the roller 31 and then extends downwardly to engage the feed roller again, only this time at a point spaced away from the flange 13 and a little higher on the incline of the sloping face 12. In this manner the thread 52 is wound around the feed roller face 12 and over the guide roller 31 in the grooves 32 until the free end of the thread engages the highest point on the sloping face 12 which is adjacent the left hand flange 13. At this point the thread also lies in the last groove 32 of the roller 31, these grooves guiding the thread on the face of the feed roller 11 so that the several lappings of the thread do not conflict or become entangled.

The thread 52 is a continuous thread and is wrapped around the feed roller and guide roller by hand; the feed roller and guide roller at this time being lifted out of the blocks 22, 23 as a unit. After placing the unit back into its blocks 22, 23 the gear 26 imparts rotating motion to the feed roller which pulls the thread over the guide roller 31 and auxiliary guide roller 41, thus effecting rotation of said guide rollers. As the feed roller thus rotates it causes the thread to advance around the feed roller and over the guide roller 31 and transversely up the sloping face and increasing diameters of the feed roller, thus straightening its various filaments and resulting in multiple thread of even lying and equally tensioned component strands, attenuated to the required degree when attenuation is sought and finally leaving the feed roller as the thread 53 to be taken up by the bobbin or other receiver.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim as my invention:

1. In machines of the character described, a thread feeding mechanism comprising in combination a feed roller of which the effective diameters become progressively greater as the threads of filaments in their several lappings advance thereover from substantially the point at which they are initially received by said feed roller to substantially the point at which they depart therefrom toward the take-up bobbin or other receiver, and a guiding member associated therewith to maintain the several lappings of said threads or filaments in substantially constant relative positions as they pass about said feed roller.

2. In machines of the character described, a thread feeding mechanism comprising in combination a feed roller of which the effective diameters become progressively greater as the threads or filaments in their several lappings advance thereover from substantially the point at which they are initially received by said feed roller to substantially the point at which they depart therefrom toward the take-up bobbin or other receiver, a non-rotatable holder on which said feed roller is mounted, and a grooved guiding member to maintain the several lappings of said threads or filaments in substantially constant relative positions as they pass about said feed roller.

3. In machines of the character described, a thread feeding mechanism comprising in combi-

nation a feed roller of which the effective diameters become progressively greater as the threads or filaments in their several lappings advance thereover from substantially the point at which they are initially received by said feed roller to substantially the point at which they depart therefrom toward the take-up bobbin or other receiver, a non-rotatable holder on which said feed roller is mounted, a bracket attached to said holder, and a grooved guiding member supported by said bracket to maintain the several lappings of said threads or filaments in substantially constant relative positions as they pass about said feed roller.

4. In machines of the character described, a thread feeding mechanism, removable from the machine to permit placing of threads and comprising in combination a feed roller of which the effective diameters become progressively greater as the threads or filaments in their several lappings advance thereover from substantially the point at which they are intitially received by said feed roller to substantially the point at which they depart therefrom toward the take-up bobbin or other receiver, a non-rotatable holder on which said feed roller is mounted, a bracket attached to said holder, and a groove guide roller supported by said bracket to maintain the several lappings of said threads or filaments in substantially constant relative positions as they pass about said feed roller.

5. In machines of the character described, a thread feeding mechanism comprising a feed roller of progressively greater diameter from substantially the point at which the threads or filaments are received by the roller to substantially the point at which they depart therefrom, and a grooved guiding roller in spaced relation to said feed roller to maintain the several convolutions of the threads in spaced relation, said guiding roller having the axis thereof substantially parallel with the axis of said feed roller, so that the feed roller taper is effective to progressively increase the tension on the threads or filaments.

HENRY J. TYNAN.