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MULTISTAGE REEL

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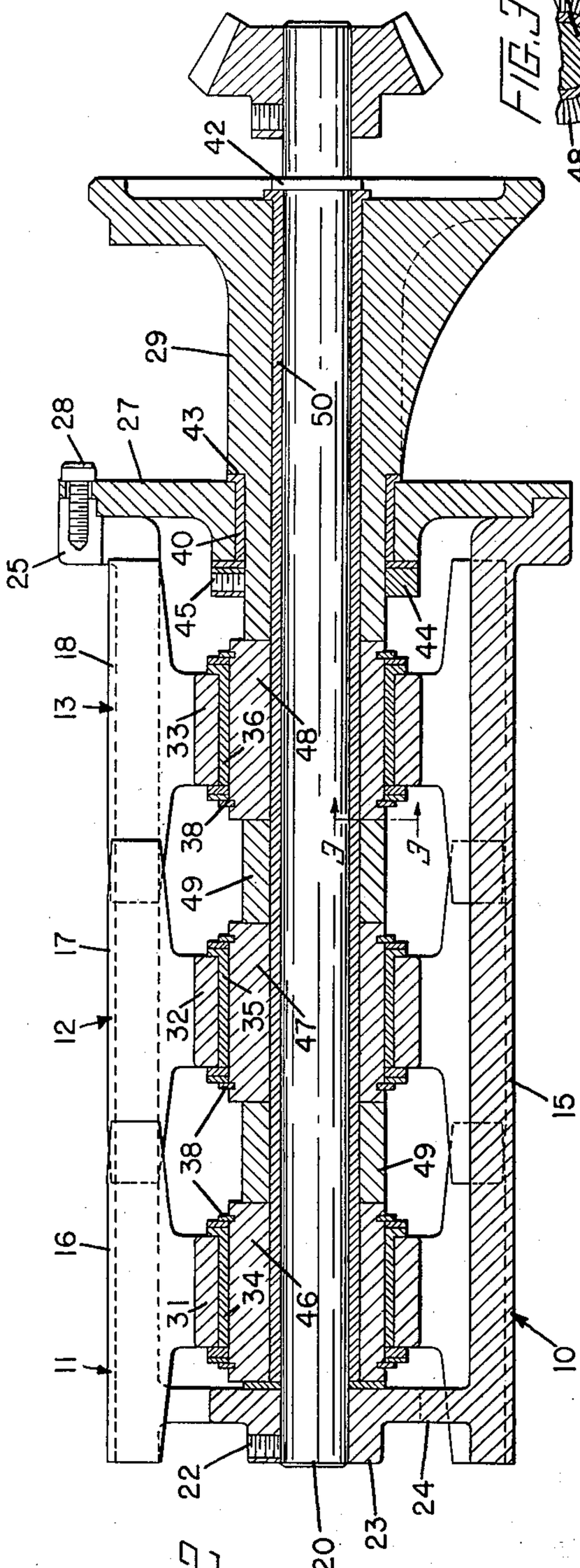

FIG. 2

FIG. 3

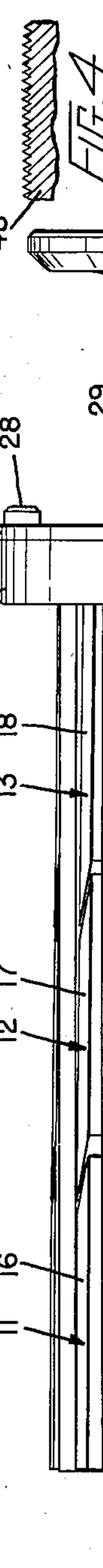

FIG. 4

FIG. 1

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MULTISTAGE REEL

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2 Claims. (Cl. 28—71.7)

1

This invention relates to reels for advancing thread or the like, particularly to a thread advancing reel whereon a plurality of processing steps can be performed.

Reels embodying the principles disclosed in the Knebusch Patent No. 2,210,914 have been found to be advantageous in the continuous manufacture of filamentary material such as rayon thread, or the like. Such reels comprise generally two reel elements whose peripheries are formed of pluralities of longitudinally extending bar members. The bar members are interleaved, and as they rotate on axes that are offset and askew, the thread or the like is advanced in a plurality of generally helical turns over the reel periphery. Where only two elements form a thread advancing reel, then such a reel has been adapted generally to a single processing step. Where it is desired to perform a plurality of processing operations on a single reel, it has been found advantageous to construct the reel so that it has a plurality of eccentric members.

Such a reel upon which a plurality of steps can be performed is disclosed in the Lovett Patent No. 2,167,662. This reel, however, does not provide for a circular adjustment of the offset and askew axes about which the eccentric reel members rotate to enable changes in their position for an improved advancement of the thread. The eccentric reel members in the Lovett patent are mounted upon axes having the same general direction and inclination along the entire length of the reel, that is the inclined axes lie substantially in the same plane. Such a positioning of the eccentric reel members tends to distort the thread helix as it travels from the one eccentric reel member of the reel to the next.

This invention advantageously provides for a reel whereon a plurality of processing stages can be performed without substantial distortion of the thread helix. Substantially uniform travel of the thread over a reel having a plurality of reel members is effected by a proper arrangement of the eccentric and skewed members by circularly arranging them in a longitudinal direction so that their axes do not lie in the same general direction but may have the same inclination. A desired thread transfer position from one section of the reel to another can readily, empirically, be determined by a rotation of the axes of the eccentric reel members. The axes, for best thread travel, are arranged in non-parallel planes. Also, means are provided after such an advantageous arrangement of the reel member axes to lock them in their position

2

against any subsequent dislodgement. Further, by circularly arranging the eccentric reel member axes one after another in a series relation there will be provided as many individualized processing stages as desired.

The reel of the invention is described in greater detail in the following specification and the accompanying drawing, where: Figure 1 is a plan view of the multiple stage reel; Figure 2 is a cross-section of the reel of Figure 1; and Figures 3 and 4 represent a form of locking means utilized for securing the eccentric reel member axes.

Referring to the drawing the multi-stage reel comprises at least four individual reel members **10**, **11**, **12** and **13** respectively. A lesser or a greater number of reel members can be utilized, if so desired, the final number being dependent on the number of stages required. Of the four reel members, reel member **10** has a periphery of a plurality of longitudinally extending bar members **15** of a continuous length. Interleaved with the bar members **15** of reel member **10** are shorter bar members **16**, **17** and **18** of the three eccentrically mounted reel members **11**, **12**, and **13** arranged in substantially an end-to-end relation. The total length of the bar members of the eccentric reel members equals substantially the length of the bar members of the concentric reel member.

A common shaft **20** supports all of the reel members. Reel member **10** is concentrically mounted about the shaft and is fixed to it by means of a set screw **22** which is threaded through the reel hub **23**. The hub **23** through radially extending members **24**, supports one end of the reel member **10**. The other end is supported by a flange **25** into which the bar members **15** merge. Flange **25** is, in turn, secured to a hub **27**, which rotates about a stationary sleeve **29**, by means of bolts **28**. Further, the hub **27** rotates on an anti-friction bearing **40** which is concentrically mounted about the reel supporting sleeve **29** and the shaft **20**. The supporting sleeve **29** is desirably flanged at one end to provide a means by which it can be mounted on the face of a processing machine (not shown) and thus support the reel. Lateral displacement of the hub **27** is prevented by a shoulder **43** of the sleeve **29** and a collar **44** which has a set screw **45** threaded through it to bear against the sleeve **29**.

Within the sleeve **29** and fixed thereto against rotation there is provided for substantially the full length of the shaft **20** an anti-friction bear-

ing type sleeve 50. The sleeve abuts a shaft collar 42 on one end of the shaft 20 and the concentric reel member hub 23 at its other end. All of the eccentric reel member hubs 31, 32, and 33 are also supported by the sleeve 50. The hubs 31, 32 and 33, in turn, rotate on anti-friction bearings 34, 35, and 36 which are mounted about the eccentrics 46, 47, and 48 whose axes are off-set and askew to the reel shaft 20. Further, the eccentric reel members are kept in position on the eccentrics by means of spring retaining rings 38.

The eccentrics 46, 47, and 48 are arranged in end-to-end relation on the sleeve 50 with, however, spacing collars 49 inbetween them. After the eccentrics have been properly positioned, their rotation from such predetermined positions, relative to the shaft and their mountings, is prevented by serration of ends of the eccentrics and collars, especially at abutting points. The serrations, shown in Figures 3 and 4, advantageously, will permit a rotation of the eccentrics to a desired position, and then hold the entire assembly against circular displacement. Heretofore, no rotational adjustment of the eccentric members was provided, and the thread or the like advanced over a plurality of permanently fixed axes. The reel of this invention, in view of the aforesaid disclosure, provides for an advantageous adjustment of the eccentric members to thereby facilitate thread travel over the reel.

I claim:

1. A thread-advancing reel comprising, a stationary reel support, a shaft positioned in said support, a reel member concentrically positioned about said shaft and having a plurality of longitudinally extending bar members, a plurality of eccentric sleeves and spacing collars positioned about said shaft in an abutting relation, said spacing collars being positioned between each pair of said eccentric sleeves, the axes of said sleeves being eccentric to the axis of said shaft, means for preventing rotation of said eccentric sleeves and collars relative to each other and said support, said means including serrated end surfaces of said support and eccentric sleeves and collars, and a plurality of reel members having longitudinally extending bar members positioned for rotation about said stationarily held eccentric sleeves, said plurality of reel members being disposed in an end-to-end relation and their bar members being in an alternate relation with the bar members of concentrically positioned reel member.

2. A thread-advancing reel comprising, a stationary reel support, a shaft positioned in said support, a reel member concentrically positioned about said shaft and having a plurality of longitudinally extending bar members, a plurality of eccentric sleeves positioned about said shaft in a series relation, the axes of said sleeves being off-set and askew to the axis of said shaft, spacing collars positioned between each pair of said eccentric sleeves, means for preventing rotation of said eccentric sleeves and the spacing collars relative to each other and said support, said means including serrated end surfaces of said support and spacing collars and eccentric sleeves, and a plurality of reel members having longitudinally extending bar members positioned for rotation about said stationarily held eccentric sleeves, said plurality of reel members being disposed in an end-to-end relation and their bar members being in an alternate relation to the bar members of said concentrically positioned reel member.

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