June 15, 1954 T. S. MAYNER 2,681,140

THREAD ADVANCING REEL

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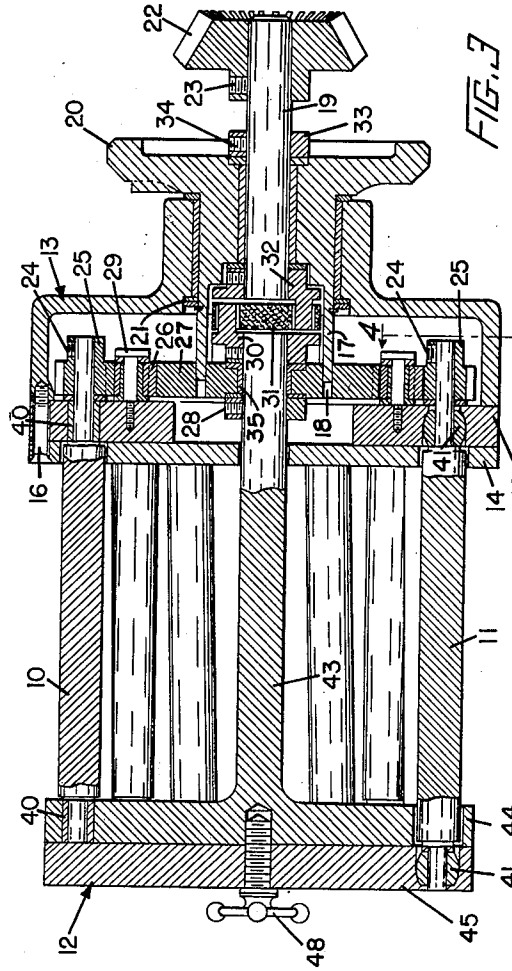

FIG. 3

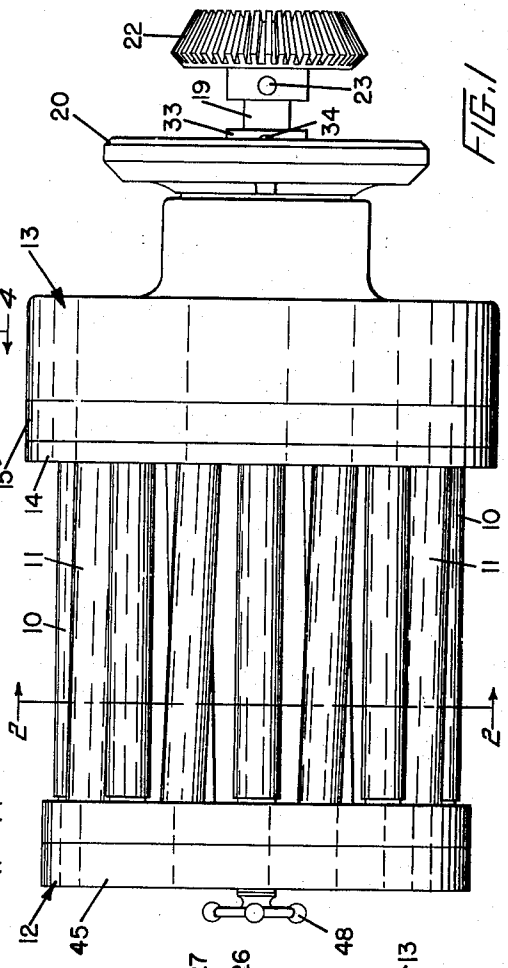

FIG. 1

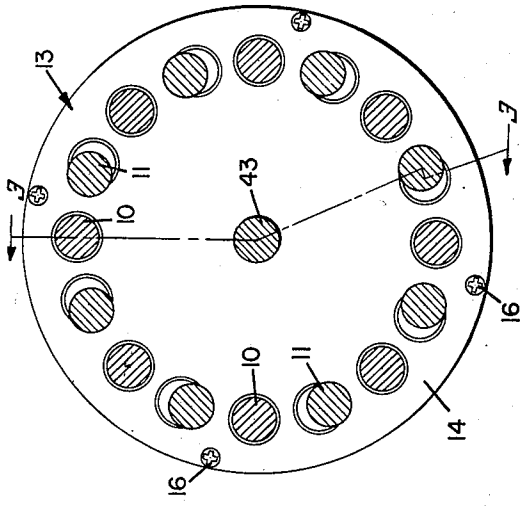

FIG. 2

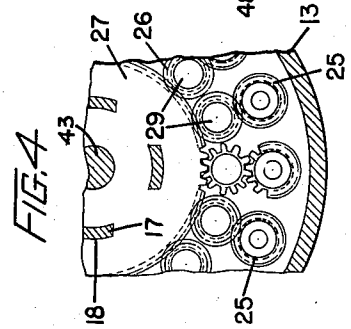

FIG. 4

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THREAD ADVANCING REEL

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7 Claims. (Cl. 203—180)

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This invention relates to thread-advancing reels, and more particularly to reels adapted to advance thread and the like in the form of a general helix.

In the manufacture of thread, yarn and the like it is advantageous to utilize a unitary thread advancing device capable of storing and advancing thread in a plurality of generally helical turns. Then, while the store of yarn is advanced a treatment or a plurality of treatments can be applied. Such reels are useful in continuous spinning processes since a plurality of them can be positioned in a manner so that a desirable sequence of processing steps can be made.

Various types of reels are utilized in continuous spinning processes. Some operate upon the principle where one of two reel members rotates about an axis that is eccentric to the other. In such reels the eccentric set of bar members is actuated in a generally forward direction relative the other set of bars to effect an advance of the thread or yarn. Other reels use a screw thread type of periphery; and still others comprise offset and askew rollers.

The reel of this invention is a compact unit that advantageously utilizes two sets of bar members that are equidistant from a common axis. The plurality of bar members that comprise each set are circumferentially spaced about the common axis at substantially equal radii. One of the sets of bar members advantageously is skewed to the other set; and since the bar members of the one set are interleaved with the bar members of the other set the skewed relationship between the two will cause thread and the like to advance longitudinally of the reel in the form of a general helix.

The reel of this invention will be further described in the following specification and in the accompanying drawing where:

Figure 1 represents a plan view of the reel;

Figure 2 represents a sectional view of the reel along line 2—2 of Figure 1;

Figure 3 is a sectional view of the reel 1 along lines 3—3 of Figure 2; and

Figure 4 is a partial cross-sectional view of the driving arrangement for the reel bar members along lines 4—4 of Figure 3.

Generally, as shown in Figure 1 the reel comprises a plurality of circumferentially spaced bar members 10 and 11 supported in end supports 12, 13. The bar members 10, 11 comprise the reel periphery and they rotate about a common axis. The end supports 12, 13 are concentrically mounted about a reel shaft 19 that is adapted

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to be driven by a gear 22 positioned at the end of the shaft 19 and secured thereto by a set screw 23. Each bar member 10 and bar member 11 is individually rotated and each is part of a set, that is, the bar members 10 are all parallel to the reel shaft 19 while the bar members 11 are positioned askew and alternately with the parallel bar members, or at an angle in a horizontal plane to the reel shaft 19. By being alternately positioned the askew and parallel bar members, upon rotation, effect a displacement of a thread from bar to bar to advance it over the reel periphery in a general helix. The travel of thread over the reel, because of the concentric and askew bar members, is gradual and more readily controllable since only the position of one group of bars is adjustable. Displacement of thread is effected only when the thread is transferred from a concentric to an askew bar member, and by controlling the askew angle of the bar members 11 a very close pitch can be maintained which is advantageous for economically treating the thread, since a close pitch will permit the formation of a fluid blanket and thus substantial thread coverage. Should all the reel members be angularly positioned relative to the reel axis in a plane parallel thereto then the displacement of thread for each revolution would be substantial for there would be an advance from bar member to bar member.

The askew relation between the bar members 10 and 11 is more aptly shown in Figure 2. All of the bar members comprising the reel are substantially equidistantly positioned about the common shaft 19 and, also, the bar members 11 are angularly positioned to assume an askew relation with the parallel bars 10. The askew relation will cause a thread on the reel, when the bar members are rotated, to advance in a plurality of helical turns, longitudinally of the reel. The askew relation effects a displacement of the thread from bar member to bar member over the reel circumference.

The end supports 12, 13 contain the necessary bearings and driving gears for the bar members. The support 13 comprises a housing that is adapted to rotate about the reel supporting sleeve 20. In the housing 13 there are positioned a plurality of driving gears 25, 26, 27. The sun gear 27 is positioned about the reel shaft 19 and it is supported by the radially positioned longitudinally extending members 17 which form a part of the supporting sleeve 20. Recesses 18 in the sun gear 27 are provided for the extending members 17. The sun gear 27 is thus held stationary by

the members 17 while the shaft section 43 is adapted to rotate in a bushing 35 in the sun gear and about the shaft. The bushing is maintained in position by the collar 28 secured to the reel shaft 43. About the sun gear 27 there are positioned, in a meshing relation, a plurality of intermediate power transmitting gears 26. The gears 26 are supported in a ring 15 by threaded stud shafts 29, and the ring 15 is fixed to the housing 13 by means of a collar 14 and screws 16 that extend through the collar 15 and into the housing 13. Further, the gears 26 are in driving contact with the bar member driving gears 25. The bar driving gears 25 are positioned about the ends of the bar members 10 and 11 and they are secured to the bar ends by means of set screws 24. Thus, when the reel shaft 19 is rotated reaction stationary gear 27 will cause the rotation of gears 26 and gears 25 to drive the bar members 10 and 11.

There is provided, further, a jaw clutch generally comprised of jaws 30, 32 and coupling 31 within the housing 13 and about the split ends of the shaft 19 and secured to each shaft end by a suitable means such as, for instance, set screws. As shown in the drawing the shaft section 43 is joined to the inner bar supporting section 44. This inner shaft section is, of course, a continuation of the shaft 19 being connected by the jaw clutch. The jaw clutch advantageously permits a quick assembly or disassembly of the reel within the housing 13. Also, the housing 13 terminates at one end in a hub rotating about the reel supporting sleeve 20 having a flange which can be positioned in the face of a machine, if desired. The housing 13 is maintained on the sleeve 20 by means of a ring or collar 21, and the sleeve 20 is maintained against displacement by the collar 33 and set screw 34. In a somewhat similar manner the driving gear 22 is fastened to the shaft 19. A set screw 23 is threaded through the hub of the gear into the reel shaft. Then, when the reel driving gear 22 is rotated the reel is also rotated and the bar members 10 and 11 turn in the opposite direction about their own axes to the direction of the reel. If thread is applied to the bars 10, 11 it will advance lengthwise of the reel in a plurality of generally helical turns.

As shown in Figure 3 the entire reel is driven. Thread may be also advanced by driving the bar members only. The askew relation between the bars will cause thread to be displaced in the longitudinal direction of the reel.

The askew relationship between the bar members 10 and 11 advantageously may be adjusted and the pitch of the turns of thread regulated by a circular adjustment of one set of the bar members. In the reel of Figure 3 the bar members 10 are fixed in position and rotate in sleeve bearings 40 positioned in the concentric supporting section 44 of the end support 12. The end support is comprised of two sections 44, 45. Of these two, section 44 is desirably fixed to the reel shaft 19. Further, the bar members 10 are supported by this section and in the housing 13 so as to be concentric and parallel to the reel shaft.

The askew bar members 11 extend through the section 44 into an adjacent supporting section 45 which is adapted to be rotated relative to the section 44 about a threaded pivot 48. The bar members 11 are supported in the section 45 and in the collar 15 of the housing 13 in adjustable bearings 41. Since section 45 is adapted to be moved relative to the section 44 the bars 11 can also be moved and their positions fixed by the adjusting pivot clamp screw 48. The askew relationship between the reel bar members 10 and 11 can thus be readily altered to suit desired conditions. Through such an adjustment the travel of thread can be regulated to whatever spacing is desirable.

I claim:

1. A thread advancing reel comprising a plurality of end supported rotating bar members circumferentially spaced about a common axis, driving means on one end of each of said bar members, means for rotating said bar member driving means, each alternate member of said plurality of bar members being parallel to said common axis and each interdigitating bar member of said plurality being askew to said common axis, adjustable supporting means for said askew bar members at their other ends, said adjustable supporting means being adapted to be rotated to vary the askew angle between the askew bar members and said common axis.

2. A thread advancing reel comprising a plurality of end supported rotating bar members circumferentially spaced about a common axis, means for driving said bar members from one end, means for rotating said bar member driving means, each alternate member of said plurality of bar members being parallel to said common axis and each interdigitating bar member of said plurality being askew to the said common axis, an adjustable supporting means for said askew bar members at the other end of said bar members, said adjustable supporting means being adapted to be rotated to vary the askew angle between the askew bar members and said common axis, and a housing enclosing said bar member driving means.

3. A thread-advancing reel comprising a plurality of end supported bar members rotating about their own axes and circumferentially spaced about a common reel axis, alternate bar members of said plurality being parallel to the reel axis and the remaining alternate bar members being positioned at an askew angle relative to said parallel bar members, means for varying the angularity between the askew positioned bar members and the reel axis, means for driving each of said plurality of bar members, and means for driving the reel.

4. A thread advancing reel comprising, a plurality of circumferentially positioned rotating spaced bar members concentrically mounted for rotation about an axis, an alternate plurality of said bar members being parallel with said axis and the interdigitating plurality of bar members being positioned at an askew angle to said reel axis, end supporting means for said bar members, a sleeve adapted for stationary mounting for supporting said reel, and a shaft extending through said sleeve mounting said bar end supporting means for rotating said reel.

5. A thread advancing reel comprising, a plurality of rotating circumferentially positioned spaced bar members concentrically mounted for rotation about an axis, an alternate plurality of said bar members being parallel with said axis, the interdigitating plurality of bar members being positioned at an askew angle to said axis, end supporting means for said bar members, driving means in said end supporting means for said bar members, a sleeve adapted for stationary mounting for supporting said reel, and a shaft extending through said sleeve mounting said bar supporting means for rotating said reel.

6. A thread advancing reel comprising, a plu-

rality of rotating circumferentially positioned spaced bar members concentrically mounted for rotation about an axis, an alternate plurality of said bar members being parallel with said axis, the interdigitating plurality of bar members being positioned at an askew angle to said axis, supporting means at each end for said bar members, said plurality of bar members rotating in said end supporting means, driving means for said bar members in one of said end supporting means, a sleeve for supporting said reel, a shaft for rotating said reel extending through said sleeve and mounting bar end supporting means, the other of said end supporting means adapted to separately support the alternate parallel plurality of bar members and the interdigitating plurality, and the said other end supporting means being angularly adjustable to vary the askew angle between the alternate parallel plurality of bar members and the interdigitating askew plurality of bar members.

7. A thread advancing reel comprising, a plurality of rotating circumferentially positioned spaced bar members concentrically mounted for rotation about an axis, an alternate plurality of said bar members being parallel with said axis, the interdigitating plurality of bar members being positioned at an askew angle to said axis, end supporting means for each end of said bar members, said plurality of bar members rotating in said end supporting means about their individual

axes, driving means in said end supporting means for said bar members, a shaft for driving said reel and said driving means in said bar end supporting means, one of said end supporting means being formed of separate sections adapted to separately support the alternate plurality of parallel bar members and the interdigitating plurality of askew bar members, and the said separate sections of the one end supporting means being circularly adjustable relative to each other to vary the askew angle between the alternate parallel plurality of bar members and the interdigitating askew plurality of bar members.

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