

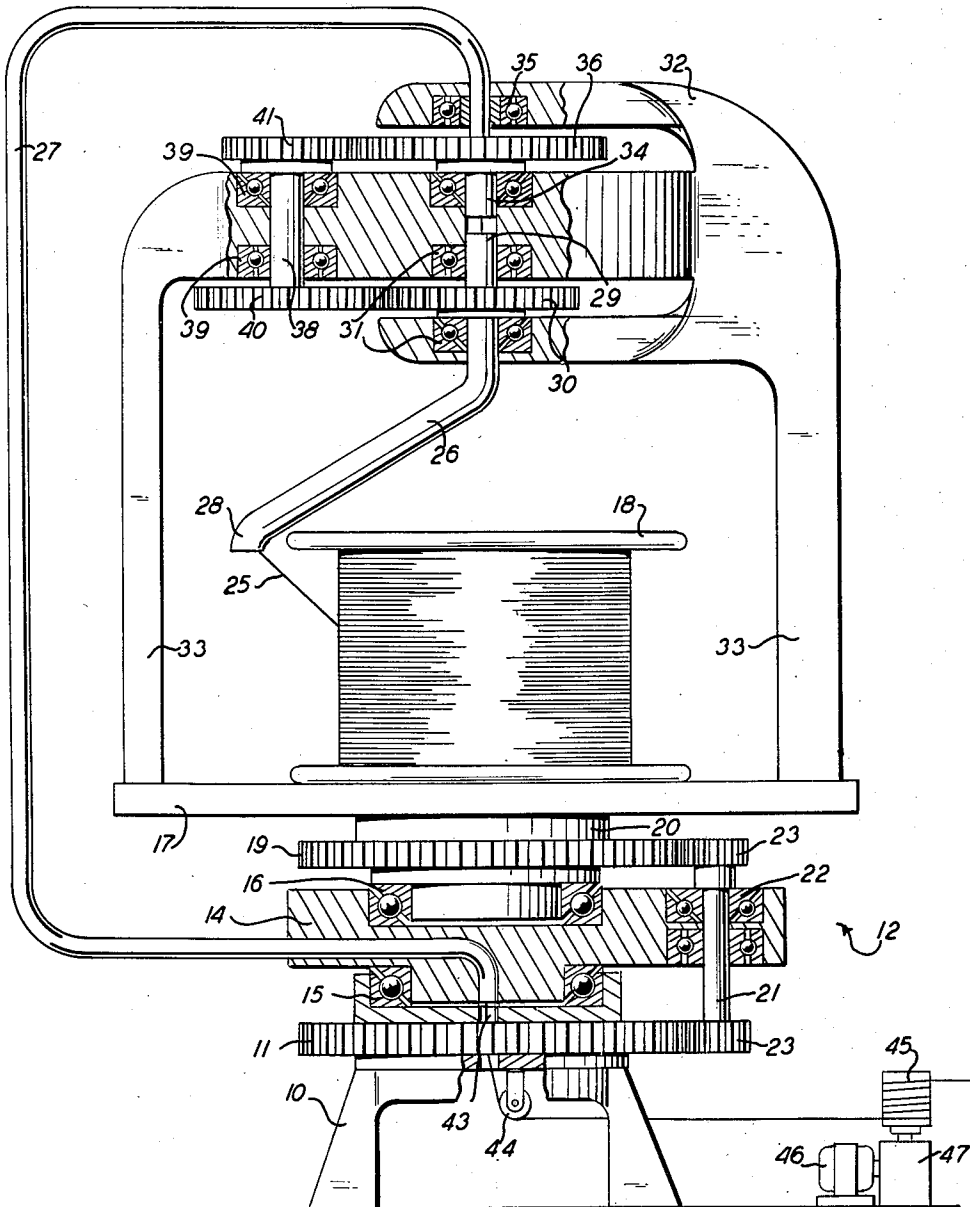
April 22, 1958

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2,831,311

UNCOILING APPARATUS

Filed June 26, 1956



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UNCOILING APPARATUS

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Application June 26, 1956, Serial No. 593,977

7 Claims. (Cl. 57—60)

This invention relates to strand uncoiling apparatus and more particularly to apparatus for removing strand from a stationary coiled supply.

The speed with which operations can be performed on strands, such as insulating, covering, twisting and stranding operations, depends largely upon the ease of winding or unwinding the strands rather than the intermediate steps of processing them. The reason for this is the inertia of the rotating supply usually coiled on a reel, which comes into play during starting and stopping and also during running when the distribution of the strand on the reel is not perfect. This adverse effect is found to be cumulative because higher speeds make larger reels for larger supplies or larger takeups desirable while at the same time at high speeds the reel inertia is more disturbing than at low speeds.

The object of the present invention is a strand uncoiling apparatus centered about a stationary coiled strand supply.

In one embodiment of the invention, companion flyers are utilized to remove a strand from a stationary coiled supply whereby a twist formed in the strand by one flyer will be removed by the other flyer so that when leaving the apparatus the strand will be free of twist.

In the present embodiment of the invention, a half-flyer mounted with its axis of rotation in alignment with the centerline of a supply reel is caused to rotate by the removal of the strand from the reel giving a single twist for each rotation of the half-flyer. The half-flyer is connected by a gear train at a two-to-one ratio with the full-flyer which will form two twists in the strand with each revolution but as the full-flyer travels at half the speed of the half-flyer and in the same direction, it will remove the twists formed in the strands while being removed through the half-flyer from the reel. A planetary gearing embodied in a supporting means for the reel maintains the reel stationary.

Other objects and advantages will be apparent from the following detailed description when considered in conjunction with the accompanying drawing, wherein: the single figure is a vertical sectional view of the apparatus, portions of the structure being shown in elevation.

The apparatus includes a base 10 having a stationary ring gear 11 mounted thereon which is a part of planetary gearings indicated generally at 12. An intermediate member 14 supported by bearings 15 carries like bearings 16 for supporting a platform or other suitable support 17 for a coiled strand supply such as a reel 18. The platform 17 has a ring gear 19, identical with ring gear 11, mounted on a downwardly projecting portion 20 thereof which is supported directly upon bearings 16. The intermediate member 14 carries a spindle 21 journaled in bearings 22, while like pinions 23, mounted on the ends of the spindle 21, interengage their respective ring gears 11 and 19.

The strand 25 on the reel 18 may be threaded through a half-flyer 26 and a full-flyer 27. The contour of the half-flyer depends largely upon the contour of the reel, or the successive reels 18, so that its outer or entrance end 28 will extend beyond the upper head of the reel. The

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exit end 29 of the half-flyer extends the gear 30, which is mounted thereon, and is supported in bearings 31 mounted in a head structure 32. The head structure is supported at 33 on the platform 17. The aligned adjacent entrance end 34 of the full-flyer 27 is journaled in bearings 35 and has a gear 36 mounted thereon. A spindle 38 journaled in bearings 39 has a gear 40 mounted on the lower end thereof and interengaging the gear 30 while a gear 41, mounted on the upper end of the spindle, interengages the gear 36. The sizes of these gears are such that there will be a two-to-one ratio in the driving connection between the half-flyer 26 and the full-flyer 27.

The exit end 43 of the full-flyer 27 is embodied in the intermediate member 14 of the planetary gearing 12 in alignment with the axis of rotation of the half-flyer 26 and the entrance end 34 of the full-flyer. The strand 25 on leaving the full-flyer 27, passes around the pulley 44 and may continue to any processing apparatus. In the present instance, a capstan 45 driven by a motor 46 and a speed controlling unit 47 constitutes a means for advancing the strand longitudinally and causing its removal from the stationary reel.

Before considering the operation of the apparatus it should be understood that during unreeling each clockwise rotation of the half-flyer (looking down toward the top of the reel) one right hand twist will be formed in the strand and during each clockwise rotation of the full-flyer two left hand twists will be formed in the strand. Also each counterclockwise rotation of the full-flyer will put two right hand twists in the strand.

After the strand has been threaded through the apparatus, this having been accomplished by leaving a length of strand in the apparatus to which a new strand may be attached and pulled through the half-flyer and the full-flyer, the leading end of the strand may be wound in the conventional grooves of the capstan 45 and directed to the machine in which it is to be processed. During continuous advancement of the strand through this or any other advancing means, the half-flyer 26 is caused to rotate clockwise about its axis at a speed controlled by the convolutions of the strand while being removed from the reel, the speed of the cycles of rotation increasing with the decreasing diameters or lengths of the turns on the reels, resulting in a single twist in the strand for each revolution of the half-flyer. Due to the train of gears connecting the half-flyer with the full-flyer, the full-flyer will travel clockwise at half the speed, but, as it would normally place two twists in the strand in a direction opposite those placed in the strand by the half-flyer while rotating within the full-flyer, the twists placed in the strand by the half-flyer are cancelled by the full-flyer leaving an untwisted strand to travel from the apparatus.

In this manner, an untwisted strand may be supplied to any processing unit at any desired speed as the former problems linked with rotating supply reels no longer exist. Furthermore, lighter and less expensive reels may be employed, reducing the reel structure to the simplest form possible and if desired to a mere core for a coil. Regardless of the number of revolutions of the half-flyer and the number of twists it forms in the strand while removing the strand from the reel, the full-flyer follows efficiently removing the twists from the strand so that through this mechanism an untwisted strand may be removed from a stationary reel.

It is to be understood that the above described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. An apparatus for removing a strand from a station-

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ary coiled strand supply comprising means to support the coiled strand supply stationary with a centerline thereof extending in a given direction, means to remove the strand from the stationary coiled supply by advancing the strand longitudinally, a flyer, through which the strand advances longitudinally, supported for rotation about an axis substantially aligned with the centerline adjacent the supply and caused to rotate one revolution for each coil of strand removed from the supply and to thereby form successive twists in the strand, and means controlled by the flyer to remove the twists from the strand.

2. An apparatus for removing a strand from a stationary coiled strand supply comprising means to support the coiled strand supply stationary with a centerline thereof extending in a given direction, means to remove the strand from the stationary coiled supply by advancing the strand longitudinally, a flyer, through which the strand advances longitudinally supported for rotation about an axis substantially aligned with the centerline adjacent the supply and caused to rotate one revolution for each coil of strand removed from the supply and to thereby form successive twists in the strand, and a second flyer, through which the strand advances, driven by the first flyer to remove the twists formed in the strand by the first mentioned flyer.

3. An apparatus for removing a strand from a stationary coiled strand supply comprising a stationary support for the coiled strand supply, means to remove the strand from the coiled supply by advancing the strand longitudinally, a half flyer, through which the strand advances longitudinally, rotatably supported adjacent the coiled supply and caused to rotate one revolution for each coil of strand removed from the supply and to thereby form a full twist in the strand for each revolution of the half flyer, and means controlled by the half flyer to remove the successive twists from the strand.

4. An apparatus for removing a strand from a stationary coiled strand supply comprising a stationary support for the coiled strand supply, means to remove the strand from the coiled supply by advancing the strand longitudinally, a half flyer, through which the strand advances longitudinally, rotatably supported adjacent the coiled supply and caused to rotate one revolution for each coil of strand removed from the supply and to thereby form a full twist in the strand for each revolution of the half flyer, and a full flyer, through which the strand advances, driven by the half flyer at half the speed of the half flyer to thereby remove two twists from the strand during each revolution of the full flyer.

5. An apparatus for removing a strand from a stationary coiled strand supply comprising a stationary sup-

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port for the coiled strand supply, means to remove the strand from the coiled supply by advancing the strand longitudinally, a half flyer, through which the strand advances longitudinally, rotatably supported adjacent the coiled supply and caused to rotate one revolution for each coil of strand removed from the supply and to thereby form a full twist in the strand for each revolution of the half flyer, a rotatable full flyer through which the strand advances after leaving the half flyer, and means driven by the half flyer to drive the full flyer one revolution for each two revolutions of the half flyer to thereby remove two twists during each revolution of the full flyer to leave the strand untwisted.

6. An apparatus for removing a strand from a stationary coiled strand supply comprising a stationary support for the coiled strand supply, means to remove the strand from the coiled supply by advancing the strand longitudinally and operatively connected rotatable flyers through which the strand advances successively and thereby caused to rotate by the removal of successive coils of the strand from the supply to form like reverse twists in the strand, whereby the twists formed in the strand by one flyer will be removed by the reverse twists of the other flyer.

7. An apparatus for removing a strand from a stationary coiled strand supply comprising a stationary base, a support for the coiled strand supply positioned above the base, a planetary gearing unit interposed between the base and the support including a rotatable element and adapted to hold the support stationary, means to remove the strand from the coiled supply by advancing the strand longitudinally, a half flyer, through which the strand advances longitudinally, rotatably supported adjacent the coiled supply and caused to rotate one revolution for each coil of strand removed from the supply and to thereby form a full twist in the strand for each revolution of the half flyer, a full flyer having one end rotatably supported in alignment with the half flyer to receive the strand therefrom and the other end carried by the rotatable element of the unit, and means operatively connecting the flyers whereby the half flyer will cause the full flyer to rotate at half the speed of the half flyer and in the same direction to cause the full flyer to remove twists formed in the strand by the half flyer.

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