ABSTRACT OF THE DISCLOSURE

An accumulator strander having two sets of accumulator wheels for guiding strandular material and each set of wheels being mounted in yokes means which have central guide means for guiding the strandular material into and out of the strandular passage. Whereby, the strand is carried by means of driving wheels which rotate freely about an axis coincident with the axis of rotation of the yoke means of the yokes.

This invention relates to strand twisting machines and more particularly concerns twisting machines of the accumulator type.

In known stranding machines, either the elements being stranded are drawn from a rotating supply means and the stranded product is wound on a take-up roller whose rotational axis is fixed in space; or the strand elements are drawn from a stationary, freely accessible supply means and the stranded product is wound on a reel by means of take-up and winding apparatus that rotates about the stranding apparatus. With such a reel the same rotates about its axis and also rotates in a plane at right angles to the stranding assembly.

With machines known as "Yoke" or "Double-lay" machines, one can, however, draw strands from fixed, freely accessible supply means and the axis of the take-up reel is fixed in space. However, such a reel is constantly encircled by the yoke and is therefore, not freely accessible; and further, the dimensions thereof are quite limited. All such machines have a common disadvantage in that, the revolving masses, which are generally quite large, increase or decrease continuously during the stranding operation. Also, the supply of strand elements as well as the stranded product are not freely accessible during the operation. Consequently, take-up speeds, rotational speeds and the lengths of stranded product that can be produced in one run depend on each other reciprocally and can be changed above a maximum value only in individual cases with time consuming interruptions of the operation.

There have, however, become known stranding machines where the stranded product is drawn from fixed, freely accessible supply means and where the stranded product with a given direction of stranding lay, is accumulated in a rotating accumulator device as it rotates. When the accumulator is filled, its direction of rotation is changed, the product therein is payed-off and at the same time and with the same speed stranded product with an opposite direction of stranding lay, is taken up.

With cable or cable rope produced in this manner, the direction of lay changes in fact at linear intervals that correspond to the storage capacity of the accumulator device and care must be taken that at the point where the lay changes direction, no kinking of the strand elements occurs. Nevertheless with such machines it is possible to draw without halt, arbitrary lengths, and, by limiting the capacity of the accumulator device with correspondingly small rotating constant masses, to achieve very high speeds of operation.

In such machines, termed "accumulator-stranding machines," the accumulator device consists of an elongated cage or frame which rotates about an axis parallel to its longest edge. The device has sets of wheels, each set consisting of one or more wheels closely spaced, which are located at the opposite ends thereof. Each set of wheels rotate freely about an axis and their planes of rotation lie in a plane containing the axis of rotation of the frame.

In advance of the accumulator device is a nipple serving as a "stranding point" to which the strand elements are fed. After stranding, they enter the accumulator device and are fed, as by a set of pulleys, alternately on a wheel of the first set, then over a wheel of the second set, then again over a wheel of the first set, etc., until they pass from the last wheel of the second set to means located immediately adjacent the accumulator device for protecting the stranded elements from kinking at the point where the direction of lay changes. Such means can take the form of a belt spinner.

It is evident that the drive mechanism for this type of accumulator stranding machine presents a number of problems. Thus, the machine should be reversible while operating at a given speed in one direction to the opposite direction and at a higher speed than the given speed, in the shortest possible time interval. In known drives which comprise belt means, expensive couplings, brakes and fly wheel masses are required; the same being subject to excessive wear due to frequent actuation.

There are available electric motors which are designed to draw a multiple of their rated current, for short time intervals. Such motors are particularly adapted for use with the drives of the instant invention.

Accordingly, the instant invention is directed to a drive mechanism for accumulator stranding machines whose accumulator element or elements can be rotated about a single common axis by an electric motor drive. Such motor drive has its drive axis coincident with that of the accumulator elements.

An object of this invention is to provide an accumulator device of the character described, in which the usual couplings, brakes, flywheels, belt drives and the like are eliminated; thereby materially reducing the overall mass which is to be set into rotation and minimizing incident wear.

Another object of this invention is to provide a device of the character described in which the length of lay of the cable strands at the point of reversal reaches its desired value in a relatively short distance, thereby materially improving the quality of the resultant cable or rope and leading to improved electrical and mechanical characteristics.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

In the drawings, FIG. 1 is a side elevational view showing one embodiment of the invention; FIG. 2 is a top plan view thereof; FIG. 3 is a side elevational view showing another embodiment of the invention; and FIG. 4 is a top plan view thereof.

Referring to the drawings, and particularly to FIGS. 1, 2, 10 designates an accumulator embodying the invention. The same comprises an elongated tubular member 11 which is supported at one end in a housing 12 and at the other end in a housing 13 which has mounted therein an electric motor 14. Motor 14 has a tubular shaft 15 in which is fixed the left hand end portion 11A of member 11 to rotate the same.

The elements 16 to be stranded pass from a stranding nipple 17 into the end portion 11A of member 11; said elements passing outwardly of said member 11 by way of
a slot 18 in the wall thereof and a guide roller 19 jour-nalled within member 11 in advance of slot 18. Sets of wheels 20, 21 are rotatably mounted on opposite sides of tubular member 11 adjacent housing 13, by a shaft member 22 projecting from opposite sides of said member 11. Similarly, sets of wheels 20A, 21A are rotatably mounted on member 11 adjacent housing 12 by projecting shafts 22A. Tubular member 11 is provided with a second slot 18A longitudinally displaced from slot 18, together with a guide roller 19A within member 11 and adjacent slot 18A.

Thus, the strand elements 16 may pass through the left end of the tubular member 11 and outwardly therefrom via slot 18 and guide roller 19 in succession in a back and forth manner; and thence inwardly of tubular member 11 via slot 18A and guide roller 19A in an axial path outwardly of the far end of member 11 to the caterpillar drawoff means 23.

Alternatively, as shown in FIGS. 3, 4, in lieu of the single tubular member 11, as shown in FIGS. 1, 2, forked members 25 are provided which have parallel arms 26 for mounting shaft members 22 therein which carry sets of wheels 20, 21; and shaft members 22A which carry sets of wheels 20A, 21A. Each of the forked members 25 include centrally located and axially extending tubular portions 26 which are in axial alignment with each other.

Members 25 further include extensions 27 of tubular portions 26 which are received in tubular shaft portions 28 of electric motors 29 mounted longitudinally displaced housing means 30. Guide roller 31 is provided at the open ends of tubular portions 26. Thus, the strand elements 16 are passed between sets of wheels 20, 21; 20A, 21A, as previously described, the tubular portions 26 being rotated in synchronism by synchronized motors 29.

It will be apparent that the arrangement of parts as herein described, allows for minimizing mass and associated components, particularly since the motor drives directly rotate tubular members which also provide the input and output of the strand elements and the stranded product.

As various changes might be made in the disclosed embodiments of the invention herein without departing from the spirit thereof, it is understood that all matter herein shown or described shall be deemed illustrative and not by way of limitation except as set forth in the appended claims.

What is claimed is:

1. An accumulator strandng apparatus, a pair of longitudinally displaced housing means, tubular means extending between said housing means and arranged for rotation about the longitudinal axis thereof, first and second sets of accumulator wheels, shaft means extending from said tubular means and at right angles to the longitudinal axis thereof for mounting said sets of accumulator wheels, said first and second sets of accumulator wheels being in longitudinally displaced relation to each other, said tubular means being arranged to pass strand input through one end portion thereof and output through the other end portion thereof, outlet means on said tubular means for passing strand outwardly thereof toward said accumulator wheels and inlet means on said tubular means for passing strand output from said accumulator wheels inwardly thereof, and means on at least one of said housing means for rotating said tubular means, said rotating means including drive means whose rotational axis is coincidental with the longitudinal axis of said tubular means.

2. In apparatus as in claim 1, wherein said drive means comprises a tubular shaft, one end of said tubular means being fixed within said tubular shaft.

3. In apparatus as in claim 1, wherein said tubular means comprises a pair of longitudinally aligned tubular portions respectively mounted in said housing means, said rotating means comprising a pair of motor means respectively mounted in said housing means and respectively coupled to said tubular portions, said pair of rotating means being operable in synchronism.

4. In apparatus as in claim 1, wherein said tubular means comprises a single tubular member having opposite end portions thereof respectively mounted on said housing means, said outlet and inlet means comprising a pair of longitudinally displaced slots formed in the wall of said tubular member, and guide roller means journaled within said tubular member on axes at right angles to the longitudinal axis thereof, said guide roller means being located adjacent the respective slots in said tubular member.

5. In apparatus as in claim 1, wherein said tubular means comprises a pair of forked members, said sets of accumulator wheels being mounted between arm portions of said forked members, said forked members including centrally located tubular portions extending in longitudinally aligned relation to each other, the outer ends of said tubular portions being mounted in the respective housing means, rotating means comprising motor means mounted in each of said housing means, each motor means being coupled to the outer end of the respective tubular portions.

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