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ARBOR FRAME CONTROL FOR WIRE TWISTING APPARATUS

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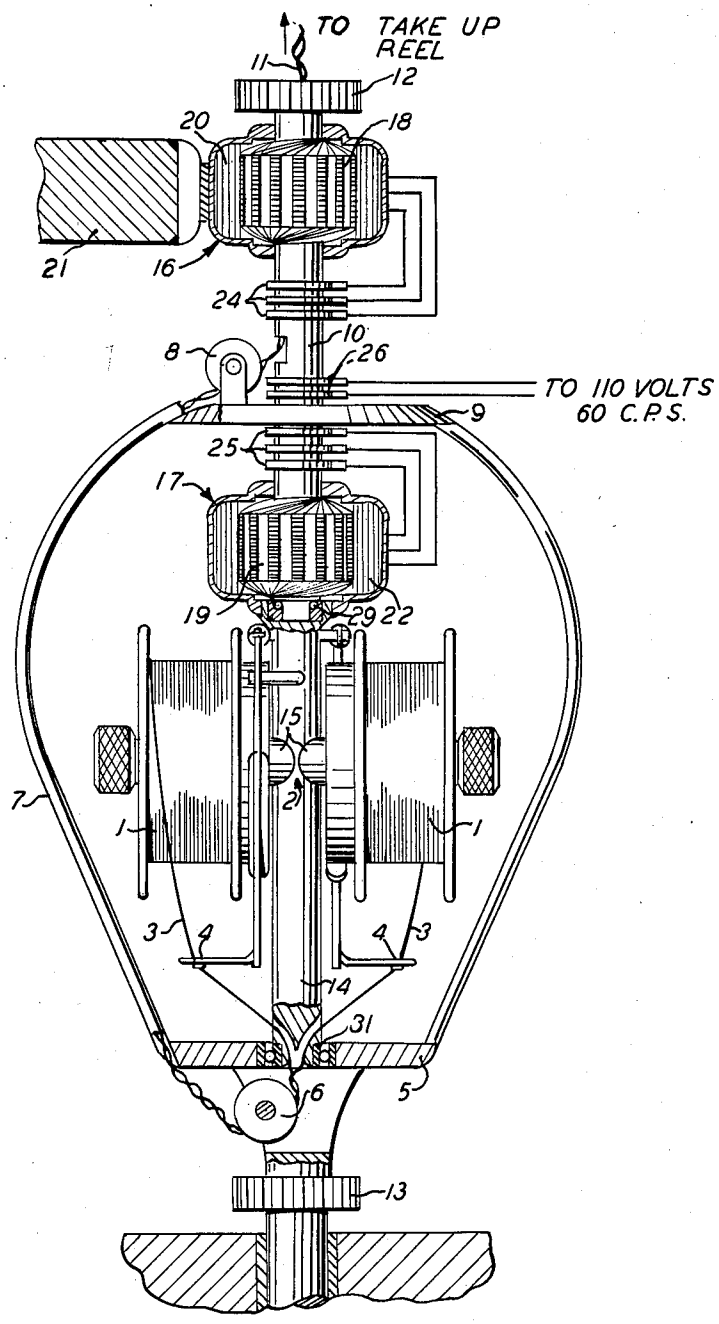

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ARBOR FRAME CONTROL FOR WIRE TWISTING APPARATUS

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This invention relates to a new and useful improvement in flier type twisting machines which put two turns of twist into strands for each revolution of the flier.

In a machine of this type, the twisting action on the strands comes from rotating the flier assembly about strand supply reels which are mounted on a carriage and held stationary within the flier assembly. Correct operation of the machine requires that the twisting take place along the center line of the machine which is the axis of rotation for the flier. One half of the twist is applied at one end of the flier and the other half at the other end. As a result, the carriage must be rotatably mounted within the flier orbit. Since it is not possible to use a rigid connection to keep the supply reel carriage stationary, other means for positively holding this carriage stationary, despite its rotatable mounting, are required.

In wire twisters of this type, planetary gearing has generally been used for this purpose. Due to large centrifugal forces involved at high operating speeds, however, considerable difficulty has been encountered in keeping this gearing in proper alignment and adjustment.

It is, therefore, the principal object of the present invention to overcome the above mentioned difficulties encountered with planetary gearing and provide a simple and efficient means for holding the supply reel support carriage stationary while the flier is operated at high speeds.

Applicant accomplishes his object by utilizing two synchronous control transformers, namely, a transmitter and a receiver unit. The two rotors of these units are both rigidly mounted on the same shaft, the drive shaft of the flier, and rotate with it. The stator of one unit, the transmitter, is mechanically locked to the machine frame and the stator of the other unit, the receiver, is rigidly connected to the center shaft of the supply reel support carriage within the orbit of the flier. The two units are electrically connected through slip rings so that when the flier is rotated, the supply reel support carriage is held stationary with respect to the machine frame by transformer action between the synchronous control transformers.

Other objects and advantages of the invention will be understood from the drawing and detailed description of a flier type wire twister shown by way of illustration in a single figure of the drawing. While the invention is shown and described as being embodied in a wire twisting machine, it is, of course, obvious that it may also be utilized to full advantage in flier type wire stranders as well as in textile twisting and stranding machines of similar flier type.

Referring now to the wire twisting machine of the drawing, supply reels **1** for wires **3** are mounted on arbors **15** of the supply reel support carriage **2** having center shaft **14**. The wires to be twisted **3** may be freely pulled from the reels by a takeup drive (not shown) for the twisted pairs. As the wires are fed from the reels, they pass over corresponding braking devices **4** of a conventional type through a lower yoke head **5** over pulley

6 and up through a tubular yoke or flier **7**. As the pair passes out of the upper end of the yoke **7** it goes under a pulley **8** mounted on an upper yoke head **9** from whence it passes through a hollow shaft **10** along the center line of the machine and out through the top as twisted pair **11**.

The upper yoke head **9** is connected through the shaft **10** to a gear **12** while the lower yoke head **5** is connected to a similar gear **13**. Both gears **12** and **13** are turned by the same drive to cause rotation of the yoke or flier assembly, this being driven simultaneously at both ends to equalize stresses. The twisting action on the wires **3** comes from the rotation of the flier assembly with respect to the supply reel support carriage **2** which is maintained in a stationary position with half of the twisting being applied at the bottom yoke head where the two wires **3** leave the centerline of the supply carriage **2** and the other half being applied at the top yoke head where the pair of wires enters the centerline in shaft **10**. In order to maintain the supply reel support frame **2** stationary with respect to the machine frame **21**, two synchronous control transformer units **16** and **17** are provided. Rotors **18** and **19** of these units are both rigidly mounted on the common shaft **10** and rotate with it. Bearing **29** in the top end of the center shaft **14** supports the lower end of the relatively rotatable shaft of rotor **19**, the other end of which is connected directly to the driven shaft **10**. The lower part of the housing of stator **22** is welded directly to the center shaft **14**, the lower end of which is supported in a bearing **31** in the driven yoke head **5**. With this construction, the entire supply reel support carriage **2**, including the stator **22**, floats by means of the bearing **29** and **31** within the orbit of the relatively rotatable flier assembly and the rotor **19** fixed to shaft **10** is rotatable within the orbit. The housing of the stator **20** of unit **16**, the transmitter, is mechanically locked to the twister frame **21** as shown. Slip rings **24** and **25**, outside of, and within the flier orbit respectively, are provided to enable an actuating signal to be sent from the stator **20** of the transmitter unit **16** to the stator **22** of the receiver unit **17**. Field current for the rotors **18** and **19** is supplied through slip rings **26**. This one pair of slip rings **26** provides excitation for both rotor **18** which is outside the flier orbit as well as for rotor **19** which is within the flier orbit. The conductors from the slip rings **26** to the respective rotors **18** and **19** are embedded in drive shaft **10** and are not shown in the drawing. Conductors interconnecting slip rings **24** and **25** are also embedded in this shaft **10** and likewise are not shown in the drawing.

When the shaft **10** of the flier assembly is turned at its normal speed, in this case about 1,000 R. P. M., the two rotors **18** and **19** which are mounted on the shaft are turned at the same speed. Since the stator **20** is locked to the frame of the twister, its rotor has a speed of 1,000 R. P. M. relative to it. It, therefore, transmits a signal through the interstator connection to cause the stator **22** to assume the same relative speed towards its rotor **19**, and as a rotor **19** is also rotating at 1,000 R. P. M., the stator **22** is caused to remain stationary.

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. In a flier type strand twisting machine the combination with a support frame, a drive shaft rotatably mounted on the frame, a flier member connected to the drive shaft for rotation thereby within an orbit, a supply reel support carriage mounted to the flier within said orbit, the flier being rotatable relative to the carriage,

means for guiding strands drawn from reels mounted on the support carriage to the flier member and guiding means for the strands drawn from the flier, of means for holding the carriage stationary when the flier is rotated by the drive shaft comprising first and second synchronous control transformers, each having a stator and a rotor, the stator of the first transformer being mounted to the frame, the stator of the second transformer being mounted to the carriage within the orbit of the flier, the rotors of the two synchronous control transformers being fixed to the drive shaft, and means including slip rings on the drive shaft for energizing and interconnecting the synchronous control transformers.

2. In a flier type strand twisting machine the combination with a support frame, a drive shaft rotatably mounted on the frame, a flier member connected to the drive shaft for rotation thereby within an orbit, a supply reel support carriage mounted to the flier member within said orbit, the flier being rotatable relative to the carriage, means for guiding strands drawn from reels mounted on the support carriage to the flier member and guiding means for the strands drawn from the flier member, of first and second synchronous control transformers each having a stator and a rotor mounted for rotation about the axis of rotation for the flier member, the stator of the first transformer being mounted on the stationary frame of the machine outside the orbit of the flier, the stator of the second transformer being mounted on the carriage within the orbit of the flier member, the rotors of the two synchronous control transformers being fixed to the flier drive shaft, a common pair of slip rings located on the flier drive shaft outside the orbit of the flier for supplying field currents for the two rotors electrically connected to the two rotors by conductors located within the drive shaft, and two sets of slip rings mounted on the flier drive shaft, one set being connected to the stator of the first transformer, and located outside the orbit of the flier, the other set being connected to the stator of the second transformer and located within the orbit of the flier, and conductors located within the drive shaft connecting the two sets of slip rings.

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