United States Patent [19]

Schoerner

[11] **3,902,307**

[45] **Sept. 2, 1975**

[54] **MODIFIED HIGH SPEED STRANDER**

[75] Inventor: **Roger J. Schoerner,** Carrollton, Ga.

[73] Assignee: **Southwire Company,** Carrollton, Ga.

[22] Filed: **May 2, 1974**

[21] Appl. No.: **466,352**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 38,414, May 18, 1970, Pat. No. 3,827,225.

[52] **U.S. Cl.** **57/13;** 57/58.3; 57/58.36; 57/161

[51] **Int. Cl.**[2] **D07B 3/00**

[58] **Field of Search** 57/3, 13–15, 57/58.3–58.38, 58.52–58.55, 161, 156

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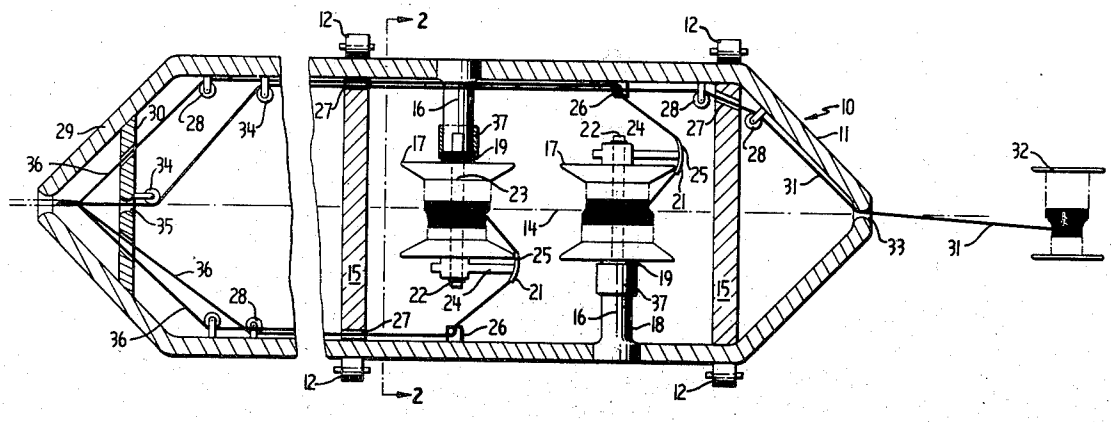
Primary Examiner—John Petrakes

Attorney, Agent, or Firm—Van C. Wilks; Herbert M. Hanegan; Stanley L. Tate

[57] **ABSTRACT**

A high speed cable strander including a rotatable frame and one or more wire carrying bobbins carried by the frame. The bobbins are positioned with their longitudinal axes extending approximately perpendicular to the axis of rotation of the frame, and the wire is paid off the bobbins along the longitudinal axes of the bobbins without requiring the bobbins to rotate.

12 Claims, 2 Drawing Figures



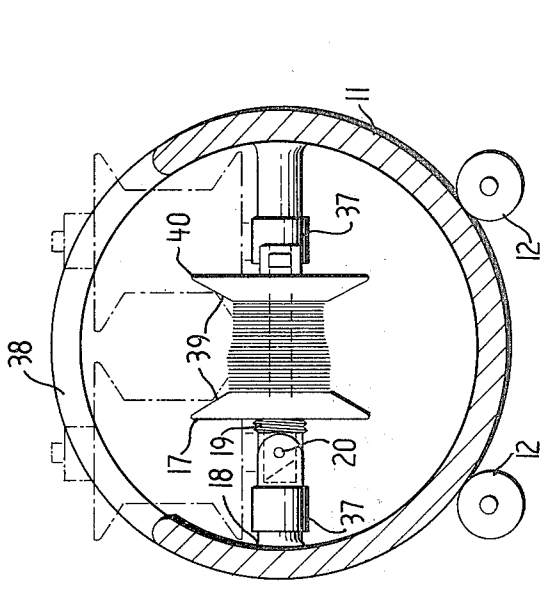

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FIG. 2

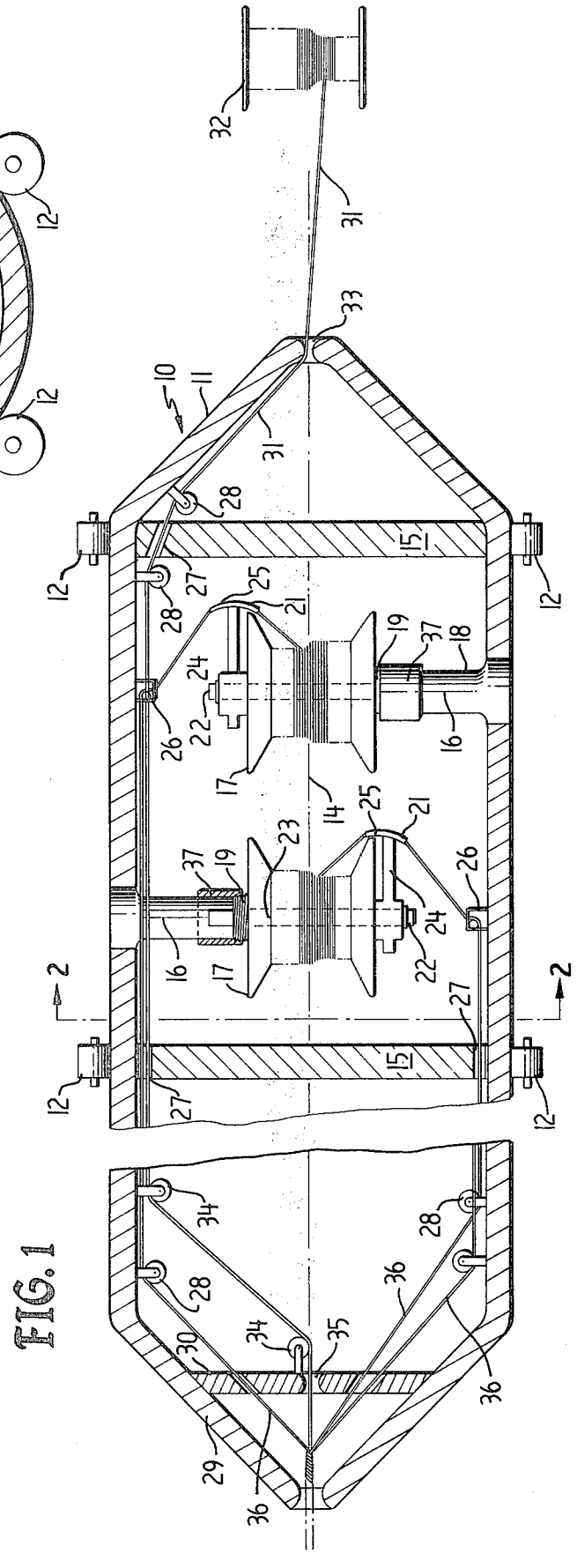

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FIG. 1

MODIFIED HIGH SPEED STRANDER

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of related application Ser. No. 38,414, filed May 18, 1970, and now U.S. Pat. No. 3,827,225.

BACKGROUND OF THE INVENTION

When manufacturing cable from a plurality of wires, a core wire is usually passed through a path and cable wire is wrapped around the core wire as the core wire moves along its path. This function is usually carried out by relatively high speed machinery, which usually includes a rotatable strander frame or housing and a plurality of wire carrying bobbins located within the frame. The core wire is usually taken from a bobbin mounted outside the frame and passed through the frame, and the wires from the bobbins mounted inside the frame are wrapped around the core wire as the bobbins are rotated with the frame about the core wire.

In the past, the wire carrying bobbins mounted on the frame of a strander have usually been mounted so that the bobbins were required to rotate around their own longitudinal axis in order to pay out their wire. This arrangement usually requires some control of the rotation of the bobbins, such as a brake mechanism for each bobbin, so that the bobbins will not continue to rotate when the frame of the strander has stopped its rotation.

The braking devices cause the tension in the wire extending from the bobbins to vary during the operation of the strander since the braking force required for a full bobbin is significantly more than that required for a partially depleted bobbin. While the initial braking force may be sufficient only to control the bobbins, the same braking force applied to a bobbin with a partially depleted wire supply is frequently sufficient to draw out or stretch the wire to a smaller gage, which causes the cable formed by the strander to be malformed. Also, because of the braking forces being applied to each bobbin before the initial start-up of the strander, there is also a tendency for the wire paying off the bobbins to be drawn before the strander reaches its normal operational speed, and the unnecessary braking of the bobbins during initial start-up of the strander requires more work to operate the strander. Because of the frequent malfunction of the brakes of the stranders, the wire from the bobbins within the frame of the strander occasionally continues to pay out after the operation of the strander has been terminated, and because of the different brake forces applied to different ones of the bobbins and because of the different tensions created in the wire paying out from the bobbins due to the varying effects of the brake forces and supply of wire on the bobbins of the strander, the cable formed by the stranders frequently has one or more cable wires loosely wrapped about the core wire with the remaining wires more tightly wrapped, leading to an inconsistently formed, and therefore, low quality cable product.

SUMMARY OF THE INVENTION

Briefly described, the present invention comprises a strander for forming cable at high speeds substantially without the hazard of forming a cable with loose or drawn wire strands. Wire carrying bobbins are mounted in a rotatable frame with their longitudinal

axes extending approximately perpendicular to the axis of rotation of the frame and the wire is pulled off the bobbins along the longitudinal axes of the bobbins without requiring the bobbins to rotate about their individual axes. The wires drawn from the bobbins in this manner can be withdrawn with substantially the same wire tension throughout the entire pay off from the bobbin without requiring a braking device. In the situations where it is desirable to positively control the tension in the wire being drawn from the bobbins, a simplified control means is positioned adjacent to each bobbin which usually does not require adjustment and which is reliable to impart uniform tension on each wire from each bobbin. The arrangement is such that when the rotation of the frame of the strander is terminated, there is no tendency for the wire to pay out from any of the bobbins within the frame, and when the rotation of the frame is begun, there is virtually no static brake friction to overcome.

Thus, it is an object of this invention to provide a high speed strander for forming cable wherein the cable wires are withdrawn from bobbins without requiring the bobbins to rotate.

Another object of this invention is to provide a high speed strander that is reliable, inexpensive, easy to maintain and tends to form a cable having cable wires each wrapped about a core wire with approximately the same wrapping tension.

Another object of this invention is to provide a high speed strander with a small number of moving parts, which is easy to load with wire.

Other objects, features and advantages of the present invention will become more apparent upon reading the following specification when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a top view of a high speed strander having its bobbins positioned perpendicular to the longitudinal axis of the strander.

FIG. **2** is a partial cross section view of the high speed strander of FIG. **1**, but showing only the details of the bobbin support means.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in more detail to the drawing, in which like numerals indicate like parts throughout the several views, FIG. **1** shows high speed strander **10** which includes a frame or barrel **11** mounted on a plurality of roller bearings **12** so that it rotates on its longitudinal axis **14**. Frame **11** is divided along its length by support and wire guide partitions **15**.

Rigidly mounted to the frame is a plurality of bobbin support means **16** arranged to maintain a wire carrying bobbin **17** with its longitudinal axis extending approximately perpendicular to the axis of rotation **14** of said frame. Each bobbin support means includes a hub **18** and a bobbin support stem **19** pivotally connected to each hub **18** by means of pivot pin **20**. Stems **19** and hubs **18** extend perpendicular to the axis of rotation **14** of frame **11**, and stems **19** are pivotal to a position perpendicular to axis **14** about pivot pins **20**. A wire carrying bobbin **17** is mounted on each stem **19** by pivoting the stem 90 degrees, extending a bobbin through an opening in frame **11**, and pivoting the bobbin and stem 90° back into the operating position. A lightweight ten-

sion control means and wire guide means such as rotatable guide **21** is mounted on the end of each stem and remains attached thereto by cap **22.** The arrangement is such that the longitudinal axis **23** of each bobbin extends perpendicular to the axis of rotation **14** of frame **11.** Each rotatable guide **21** includes a support arm **24** which extends out beyond the periphery of its bobbin **17** and a U-shaped tubular guide **25** is connected to the remote end of arm **24.** Each U-shaped guide **25** is arranged to lift the wire from its bobbin **17** without causing the wire to engage the end flanges of the bobbin. Guides **21** are arranged to rotate freely about the axis **23** of its hub **18,** stem **19** and bobbin **17** so that when its bobbin is full the U-shaped guide will rotate relatively slowly, and when its bobbin is substantially depleted of wire the guide will rotate at a higher angular velocity.

The wires paying off bobbins **17** are threaded through guide means **26** which are rigidly attached to frame **11** and openings **27** in the wire guide partitions **15** which are aligned with the axis of rotation **14** of the frame, so that the wire from each bobbin **17** is withdrawn from the bobbin along the longitudinal axis of the bobbin. Thus, the bobbins are not required to rotate to allow the wire to pay out.

The wires passing through guide means **26** and openings **27** of support and wire guide partitions **15,** then pass through guide pulleys **28** connected to frame **11.** The wires then move toward the winding end **29** of the frame, where they are received by closing head **30.** Core wire **31** pays off a bobbin **32** mounted outside frame **11** and enters the frame through rear opening **33.** Core wire **31** is guided through the aligned openings **27** in the support and wire guide partitions **15** along the length of frame **11** until it reaches the winding end of the frame, whereupon it passes about guide pulleys **34** which return the core wire to the axis of rotation of the frame. The core wire pays out through the winding end of the frame through opening **35** and the cable wires **36** are wound about the core wire.

FIG. **2** is a cross sectional view of the invention showing bobbin **17** in the operating position with locking means **37** engaging hub **18** and stem **19** to secure the bobbin in its operating position. Also shown in phantom line is bobbin **17** pivoted 90 degrees on stem **19** about pivot pin **20,** to facilitate its removal through opening **38** of frame **11.** The bobbins used with the present invention may be of the type having sloped inner surfaces **39** on their end flanges **40** to assist the pay off wire from the bobbin.

It should be noted that the wire pays off the bobbins along the longitudinal axes of the bobbins without requiring the bobbins to rotate, and virtually no variable tension is experienced in the wire in spite of the varying supply of wire present on the bobbin. The result is that the cable formed by the wire is more likely to have uniform tension in its wound wires, and virtually no drawing of the wound wires will be experienced. Moreover, the cable wire is twisted along its length as it pays off a bobbin **17,** and a full 360° twist is applied to the cable wire upon each withdrawal of the wire from about the supply of wire on the bobbin. The cable wire maintains this twist or torsion after it has been wound upon the core wire **31.** Thus, the twist in the cable wire has a tightening effect with respect to the cable formed by the wires, and this torsion or tightening effect prevents the cable from "bird caging" or becoming unwound. Thus, the mounting of the bobbins within the housing with the axis of the bobbins extending perpendicular to the axis of rotation of the housing functions to cause the cable so manufactured to be more tightly wound.

While this invention has been described in detail with particular reference to preferred embodiments thereof, it will be understood that variations and modifications can be effected within the spirit and scope of the invention as described hereinbefore and as defined in the appended claims.

What is claimed is:

1. A strander for forming cable or the like comprising a generally cylindrical rotatable frame, wire guide means for passing a core wire into one end of said frame, through said frame and out the other end of said frame as said frame rotates, at least one bobbin support means supported by said rotatable frame to maintain a wire carrying bobbin rotationally fixed as regards rotation about the bobbin's longitudinal axis and to maintain said wire carrying bobbin in such orientation that the bobbin's longitudinal axis extends generally perpendicular to the axis of rotation of said frame and wire feed out guide means for guiding wire from the bobbin and through said rotatable frame without requiring the bobbin to rotate about its longitudinal axis as the wire pays off the bobbin.

2. The strander of claim **1** wherein said bobbin support means is rigidly attached to said frame and includes locking means for maintaining said bobbin support means and the bobbin supported thereby in a generally fixed position while said frame rotates.

3. The strander of claim **1** further including guide members mounted at intervals along said rotatable frame defining guide openings for receiving and guiding the wire pulled from the bobbin.

4. The strander of claim **1** wherein said bobbin support means is constructed and arranged to pivot its associated bobbin from the operating position of said bobbin into a position approximately perpendicular to the longitudinal axis of said bobbin when the bobbin is in the operating position.

5. The strander of claim **1** wherein said at least one bobbin support means comprises a plurality of bobbin support means spaced along the axis of rotation of said frame.

6. The strander of claim **1** wherein said bobbin comprises a spool including a generally cylindrical body and end flanges extending generally radially outward from the ends of said cylindrical body with at least one of said end flanges defining a generally conical shaped surface sloped outwardly from said cylindrical body.

7. The strander of claim **1** wherein said cylindrical rotatable frame defines openings along its length at the position of each bobbin carrried in said frame, and wherein said bobbin support means comprises a stem member pivotal at one of its ends from a position approximately parallel to the openings to a position approximately perpendicular to said opening.

8. A stranded for forming a cable or the like comprising a rotatable frame, wire guide means arranged to pass a core wire into one end of said frame at the axis of rotation of said frame, then along the frame through a path displaced from the axis of rotation of said frame, then out the other end of said frame at the axis of rotation of said frame, a plurality of bobbin support means supported by said frame arranged to support wire carrying bobbins at intervals along the axis of rotation of

said frame rotationally fixed as regards rotation about the respective longitudinal axes of said bobbins and with the longitudinal axis of each of said wire carrying bobbins oriented approximately perpendicular to the axis of rotation of said frame, and wire feed out guide means for guiding wire from each bobbin in a direction substantially perpendicular to the direction of movement of the core wire through said frame, first from the periphery and about one end of the bobbin and toward the longitudinal axis of the bobbin without requiring the bobbin to rotate about its longitudinal axis, then along the frame through a path displaced from the axis of rotation of said frame and about any other bobbins and toward the other end of said frame, then out the other end of said frame at the axis of rotation of said frame.

9. The strander of claim **8** wherein said bobbin support means is pivotally supported by said frame and includes locking means for maintaining said bobbin support means and the bobbin supported thereby in a generally fixed operating position while said frame rotates.

10. The strander as set forth in claim **8** wherein said feed out and guide means includes a guide member mounted adjacent to one end of each bobbin and rotatable about the longitudinal axis of said bobbin and defining a wire guide opening beyond the periphery of the bobbin for receiving and guiding the wire from the bobbin and about the end of the bobbin.

11. A strander as set forth in claim **8** including wire feed out guide means mounted for rotation about the longitudinal axis of the bobbin for guiding wire withdrawn generally axially therefrom as the bobbin is restrained from rotation about its longitudinal axis, whereby the tension on the wire as it is withdrawn from the bobbin will be substantially constant irrespective of the wire supply remaining thereon.

12. A method of stranding cable or the like from a plurality of wires comprising moving a core wire through a path extending along an axis of rotation of a rotating bobbin support frame from outside the bobbin support frame into the bobbin support frame, then parallel to and displaced from the axis of rotation of the bobbin support frame along the length of the bobbin support frame, then along the axis of rotation of the bobbin support frame from inside the bobbin support frame to outside the bobbin support frame while revolving that portion of the core wire in the portion of the path displaced from the axis of rotation of the bobbin support frame about the axis of rotation of the bobbin support frame, paying out wires from the ends of bobbins located inside the path of revolution of the core wire and oriented in a direction perpendicular to the path of revolution of said core wire without requiring the bobbins to rotate about their longitudinal axes and guiding the bobbin wires along their lengths through paths extending parallel and displaced from the axis of rotation through the bobbin support frame and then along the axis of rotation of the bobbin support frame while revolving those portions of the bobbin wires in the portions of their paths displaced from the axis of rotation of the bobbin support frame about the axis of rotation of the bobbin support frame.

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