Title (en)

Method and device for preforming steel wires

Title (de)

Verfahren und Vorrichtung zur Vorformung von Stahldrähten

Title (fr)

Procédé et dispositif de préformage de fils en acier

Publication

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Application

EP 01107145 A 20010322

Priority

DE 10014043 A 20000323

Abstract (en)

[origin: DE10014043A1] To maintain the character of steel wires (21) as they are drawn off their supply bobbins (20) for cable twisting, and keep them free of any twist before the cable twisting point (18) at a cable twisting machine (1), force components are applied to the wire (21) in a number of successive stages according to the wire diameter to impose a defined and durable spiral shape. On stretching out a coil in an axial and radial direction, the shape and dimensions match the laying length and the radial gap between the wire in its layer from the center axis of the cable, with the wire length in a coil within its twisted layer in the finished cable structure. The force components applied to the wire (21), to give the spiral structure, are applied by simultaneous and defined draw forces with bending and friction and twisting on the wire (21) surface. The number and strength of the force components applied to the wire (21) in the successive stages, and the spatial gaps between the stages and between them and a torsion block are set according to the required expansion of the spiral coils in the wire (21). A constant and accurate draw tension on the wire (21) is maintained, as it is drawn off its bobbin, by control of the bobbin brake (25) or the bobbin drive. An INDEPENDENT CLAIM is included for a cable twisting machine assembly (1) with a torsion block in the path of the wire (21) from the supply bobbin (20) to the cable twisting point (18). It has one or more guide rollers and a suitable number of fixed and adjustable shaping pins. The wire (21) is wound around the torsion block in one or more coils and in a serpentine path between the pins, on a path with narrow axial restrictions and in contact with the pins. The draw tension on the wire (21) as it is taken from the bobbin (20) is held to 100% accuracy and constancy by control of the bobbin brake (25) or the bobbin drive system. Preferred Features: The diameter of the rollers at the torsion block is set according to the wire diameter, so that the wire (21) around the rollers is brought to the threshold of plastic distortion after elastic distortion. The number of wire coils around the torsion block rollers is set so that the wire rotation around its longitudinal axis does not travel back as far as the supply bobbin (20). The diameter (D) of the guide rollers, according to the diameter (do) of the steel wire (21), is set to meet the conditions: 50Xdo=D=70Xdo. The adjustment range for the wire structuring section (19) includes the radial gap (z) from the center of the final guide roller of the torsion block to the leading shaping pin, the gap (y2) between the final guide roller and the leading shaping pin, the diameter (d) of the pin and the gap (y1) between the shaping pins according to the diameter (do) of the steel wire (21), the length (l) of the wire (21) within the twisted cable in its layer and the laying length (s) to satisfy the conditions: D/2X2do=z=D/2do/2 5do=d=7do 0.9X1/3=y1=s/3 y2=2y1 The shaping pins are deployed exactly in succession in a line or with side offset displacements, according to the number of pins used and the force components to be applied to the wire (21). The pins are of a wear resistant material with a density of 12-15 g/cm3> and a surface roughness of 0.15=Rz1=1.5. The assembly has a number of wire structuring units (19) to process a number of steel wires (21) for the twisted cable, at a fixed structuring head (37). A number of structuring heads (37) are used to match the number of twisted wire layers in the twisted cable, arranged in succession in the wire take-off direction. Each structuring head (37) is a compact unit, with a number of axially neighboring disks rotating on a common axis and which can be locked, for the array of guide rollers and the selected number of shaping pins. The controlled bobbin brake (25) is a dancer control with a swing lever (26) and a dancer roller (27) with a coupled brake belt (28), and a suitable number of brake pads (29) with a brake lining. A brake disk (30) is keyed to the bobbin (20), with a brake surface which is chromed, ground and polished to give a surface roughness of Rz2=10. The control circuit for the bobbin drive system has a frequency converter with analog processing and a proportional integral derivative (PID) control and a bus connection. The setting unit is a three-phase induction motor followed by a gearing. The feedback is taken from the draw forces on the steel wire (21) taken from the bobbin by a measurement roller and an amplifier for the measurements.

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Citation (search report)

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