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A machine for installing a contact wire of an overhead line

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ABSTRACT

A machine (1), mobile on a track, for installing a contact wire (2) of an overhead line (3) of a track (4) is equipped with a machine frame (5), supported on on-track undercarriages (6), and a carrier frame (16) connected thereto. Arranged on the latter are a storage drum (12), containing rolled-up contact wire (2), as well as a tensile stress device (19) provided for generating the prescribed tensile stress. A deflection roller (34) is provided for vertically and laterally guiding the wire. The carrier frame (16) is designed for transverse adjustment horizontally and perpendicularly to the longitudinal direction of the machine relative to the machine frame (5) by means of drives (30,31) and for rotation with regard to a vertial pivot axis (27).

(Fig. 1 and 2)

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Invention Title:

A MACHINE FOR INSTALLING A CONTACT WIRE OF AN OVERHEAD LINE

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The following statement is a full description of this invention, including the best method of performing it known to applicant(s):

The invention relates to a machine, mobile on a track, for installing a contact wire and/or a carrying cable of an overhead line of a track, including a machine frame supported on on-track undercarriages, a carrier frame connected to the machine frame, the carrier frame supporting a storage drum, containing rolled-up contact wire or supporting cable, and a tensile stress device for generating prescribed tensile stress, and a deflection roller for vertically and laterally guiding the wire.

From EP-A1 0 776 780, a machine of this kind is already known in which the carrier frame is designed as a swingingly suspended see-saw pivotable about an axis extending in the longitudinal direction of the machine. In addition to storage drum and tensile stress device, a vertically adjustable guiding device comprising the deflection roller is arranged on the carrying frame. In operation, said guiding device is vertically adjusted in accordance with the desired installation height, and the wire pulled from the storage drum via the tensile stress device is guided over the deflection roller. For the purpose of producing the required, correct zig-zagging course of the installed overhead line, the deflection roller is pivoted or displaced in the transverse direction of the machine by tilting the carrier frame about the said axis by means of a drive, wherein a very slight twisting of the wire with regard to its longitudinal direction must be taken into account.

A further machine, known according to EP-B1 0 416 136, serves to simultaneously install a contact wire and carrying cable of an electrical overhead line which are pulled from a respective storage drum arranged on a separate carrier frame. The two carrier frames are designed to be tiltable in the above-described manner, while the guiding device of this machine consists of a vertically adjustable jib crane which is mounted on the machine frame for rotation about a vertical axis and is equipped at its free end with two deflection rollers for guiding the contact wire and carrying cable. The zig-zagging course of the overhead line is realized by laterally pivoting the crane during continuous forward travel of the machine.

The object of the invention is to provide a machine of the kind described at the beginning with which it is possible to install, in particular, the contact wire of an overhead line while largely avoiding any twisting or warping of the wire.

This object is achieved with a machine of the specified kind in which the carrier frame, supporting the storage drum and the tensile stress device, is transversely adjustable horizontally and perpendicularly to the longitudinal direction of the machine relative to the machine frame by means of drives and is rotatable about a vertical pivot axis.

Designing the carrier frame in such a way makes it possible to align said carrier frame, with regard to its longitudinal direction, in a particularly simple manner exactly parallel to the position of the contact wire which is already in the installation position. In a preferred arrangement of the machine, the axis of rotation of the storage drum and also of rollers forming the tensile stress device extend exactly perpendicularly to the installed contact wire. Moreover, there is no pivoting of the carrier frame about a horizontal axis. As a result, the wire is pulled off in an absolutely straight line in a vertical unwinding plane, regardless of the angle which this plane - due to the zig-zagging course of the contact wire - encloses with the longitudinal axis of the machine at any moment.

Further advantages according to the invention become apparent from the sub-claims and the description.

The invention will be described in more detail with the aid of an embodiment represented in the drawing in which

Fig. 1 and 2 show a schematized side view and top view, respectively, of a machine, designed according to the invention, for installing an overhead line of a track, and

Fig. 3 shows a detail of the bearing support of the displaceable carrier frame.

Represented in Fig. 1 and 2 is a machine 1, mobile on a track, for installing a contact wire 2 (or a carrying cable, as the case may be) of an overhead line 3 of a track 4. The machine 1 has a machine frame 5 which is supported on the track 4 via two on-track undercarriages 6 and comprises a driver's or working cab 7 at each longitudinal end and a coupling 8 for the incorporation into a train formation. An energy source 9 is provided for supplying energy to a motive drive 10 of the machine 1 and to all further drives, yet to be described, which are operable or remotely controllable by means of a control device 11.

The contact wire 2 to be installed is rolled up on a storage drum 12 which, by means of bearing blocks 13, is mounted on a sliding carriage 15 for rotation about a horizontal axis of rotation 14 extending in the transverse direction of the machine. The sliding carriage 15, for its part, is mounted on a carrier frame 16 and is displaceable relative thereto in the transverse direction of the machine on glide poles 17 by means of adjustment drives 18. Provided on the carrier frame 16, beside the storage drum 12, is a tensile stress device 19 formed by two rollers 20 which are distanced from the storage drum 12 in the longitudinal direction of the machine. Said rollers 20 - likewise fastened to the carrier frame 16 by means of bearing blocks 21 - are rotatable about axes 22 extending parallel to the axis of rotation 14, one of the rollers being equipped with a brake device 23. In order to maintain a constant tensile stress, the rollers 20 can be acted upon by a hydraulic motor 24.

The carrier frame 16 is connected to the machine frame 5 by means of two horizontal guides 25 which are arranged on the machine frame spaced from one another in the longitudinal direction of the machine and extend in the transverse direction of the machine. Mounted in the two guides 25 - displaceable in the longitudinal direction thereof - is a carriage 26 on which a respective one of the ends 28 and 42, spaced from one another in the longitudinal direction of the machine, of the carrier frame 16 is supported and mounted for rotation about a vertical pivot axis 27.

As can be seen in more detail particularly in Fig. 3, each carriage 26 has track rollers 29 designed to roll in the guide 25. In addition, each carriage

26 is equipped with a pinion 32, rotatable by means of a drive 30 (or 31), which meshes with a rack 33 mounted in the guide 25 and extending in the transverse direction of the machine, and which causes a transverse displacement of the carrier frame 16 relative to the machine frame 5 perpendicularly to the longitudinal direction of the machine. The two ends 28, 42 of the carrier frame 16 are transversely displaceable independently of one another by activation of the respective drive 30 or 31. For that reason, the bearing support of the one end 28 of the carrier frame 16 is designed in such a way that it permits a small equalizing movement or displacement of the carrier frame in the longitudinal direction of the machine relative to the associated carriage 26 by means of a fulcrum pin 43.

Alternatively to the above-described structure, a number of other variants for the design of the guide 25 are, of coure, also conceivable, like, for example, in the shape of a sliding bearing on which the carrier frame is supported for displacement by means of a hydraulic cylinder-piston drive, etc.

The machine 1 is further equipped with a deflection roller 34 provided for vertically and laterally guiding the contact wire 2. This deflection roller 34, vertically adjustable by means of a drive 35, is fastened to the carrier frame 16 and positioned at the forward end 42 thereof with regard to the direction of travel of the machine 1, indicated by an arrow 36. The storage drum 12 and the tensile stress device 19 are arranged on the carrier frame 16 so as to precede the deflection roller 34 in the direction of pulling of the contact wire 2. The deflection roller 34 is fastened in a fork-like bracket 37 at the upper end of a vertical mast 38 which is telescopically extensible by means of the drive 35. Mounted to the bracket 37 also is a feeler member 39 for tracing a wire section 41 of the contact wire 2 leading away from the deflection roller 34 in the pulling direction, the feeler member having a feeler 40 touching the contact wire 2. The feeler member 39 is designed for controlling the transverse displacement of the carrier frame 16 and is connected for this purpose via the control device 11 to particularly the drive 30 which is provided for the transverse displacement of the end 28 of the carrier frame 16 lying opposite the deflection roller 34 in the longitudinal direction of the machine.

During working operations for installing the contact wire 2, the deflection roller 34 is brought into the correct vertical position by means of the drive 35, and the contact wire 2 is guided from the storage drum 12 over the tensile stress device 19 and the deflection roller 34. In order to produce the prescribed zig-zagging course of the installed overhead line 3 or contact wire 2, the forward end 42 of the carrier frame 16 with regard to the travel or working direction (arrow 36) is now adjusted to and fro in the transverse direction of the machine - while the machine 1 moves forward continuously - by an operator situated in the forward driver's or working cab 7 correspondingly activating the associated drive 31 by means of the control device 11 (see position of the carrier frame 16 shown in dash-dotted lines in Fig. 2).

By means of the feeler 40 which touches the contact wire 2 in the wire section 41 thereof already situated in the installing position, the feeler member 39 registers the present position of the contact wire and, by activating the drive 30 - associated with the rearward end 28 of the carrier frame 16 - controls the carrier frame 16 by rotating the same about the vertical pivot axis 27 so as to automatically follow accordingly, so that the longitudinal axis of the carrier frame 16 always extends parallel to the installed contact wire 2. Since the deflection roller 34 and the rollers 20 of the tensile stress device 19 lie in a common vertical plane, said plane is consequently pivoted about the two vertical pivot axes 27 and matched to the position of the installed contact wire 2 until the latter also extends in said vertical plane and thus the contact wire 2 is not subjected to any rotation or twisting at all.

The claims defining the invention are as follows:

1. A machine, mobile on a track, for installing a contact wire and/or a carrying cable of an overhead line of a track, including a machine frame supported on on-track undercarriages, a carrier frame connected to the machine frame, the carrier frame supporting a storage drum, containing rolled-up contact wire or supporting cable, and a tensile stress device for generating prescribed tensile stress, and a deflection roller for vertically and laterally guiding the wire, characterized in that the carrier frame, supporting the storage drum and the tensile stress device, is transversely adjustable horizontally and perpendicularly to the longitudinal direction of the machine relative to the machine frame by means of drives and the carrier frame is rotatable about a vertical pivot axis.

2. A machine according to claim 1, characterized in that the drives for displacing the carrier frame are controllable by means of a feeler member which is designed for tracing a wire section of the contact wire leading away from the deflection roller in the puling direction.

3. A machine according to claim 2, characterized in that the feeler member is mounted on a bracket supporting the deflection roller and is designed as a feeler touching the contact wire.

4. A machine according to any one of claims 1 to 3, characterized in that the storage drum and the tensile stress device are positioned on the carrier frame so as to precede the deflection roller in the direction of pulling of the contact wire.

5. A machine according to any one of claims 2 to 4, characterized in that the feeler member is designed for activation of that drive which is provided for transverse displacement of the end of the carrier frame lying opposite the deflection roller in the longitudinal direction of the machine.

6. A machine according to any one of claims 1 to 5, characterized in that the deflection roller, vertically adjustable by means of a drive, is fastened to the carrier frame.

7. A machine according to claim 6, characterized in that the deflection roller is positioned at the forward end of the carrier frame with regard to the direction of travel of the machine.

8. A machine for installing a contact wire and/or a carrying cable of an overhead line of a track, substantially as hereinbefore described with reference to any one of the embodiments shown in the accompanying drawings.

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Fig.1

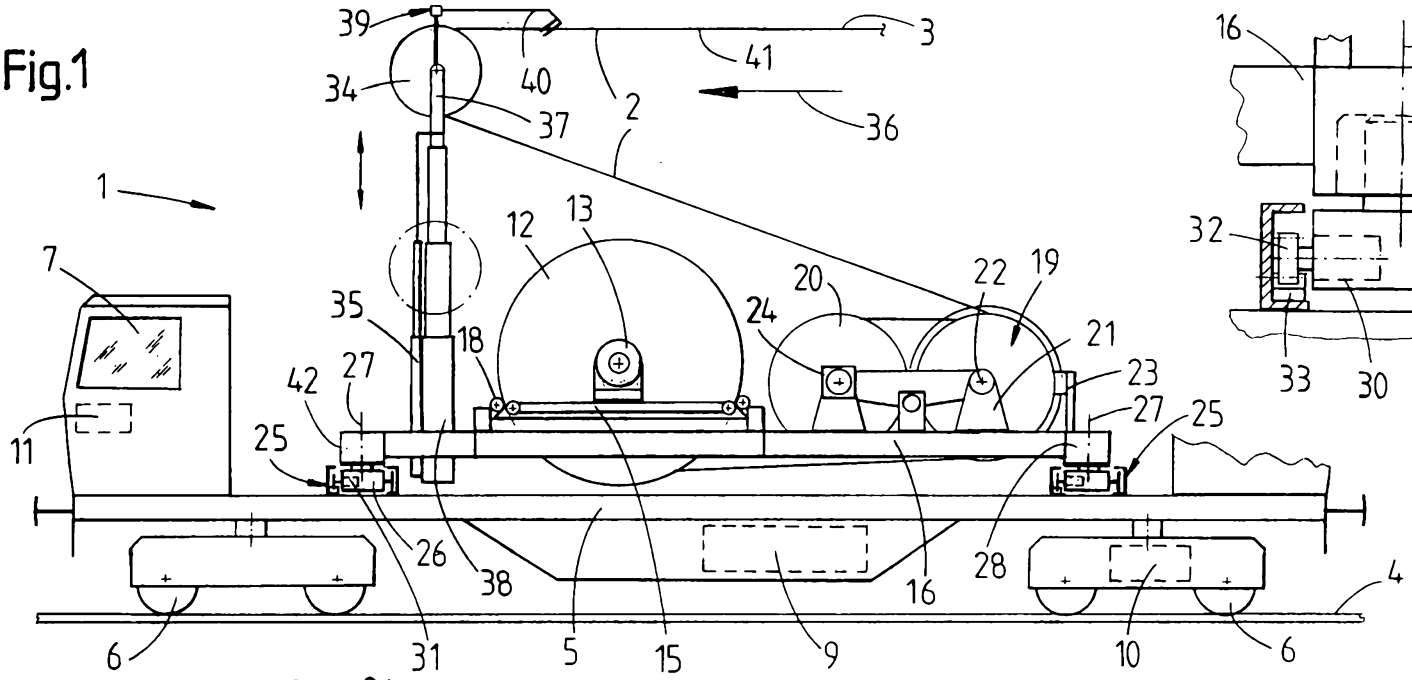
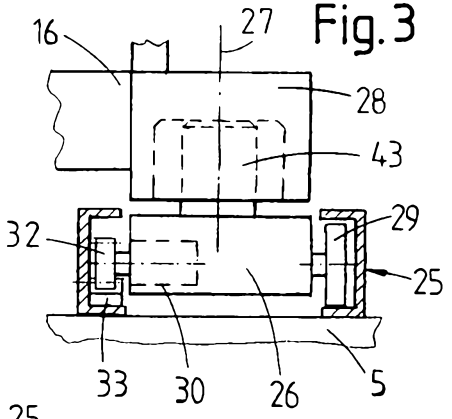


Fig.3



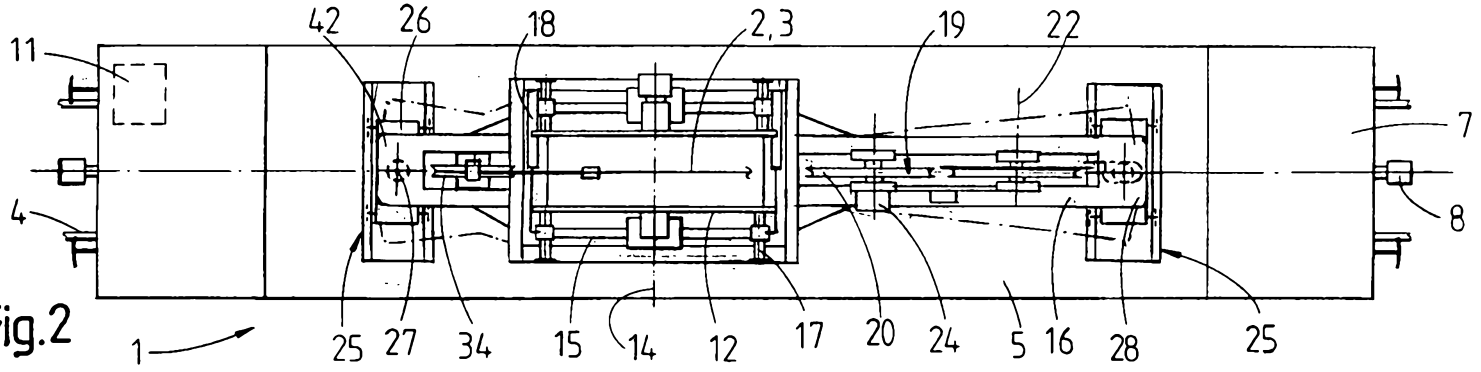


Fig.2