June 3, 1930. J. LAUBENTHAL 1,761,482

APPARATUS FOR MANUFACTURING WIRE ROPE

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Fig. 2.

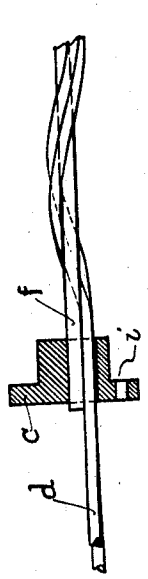


Fig. 1.

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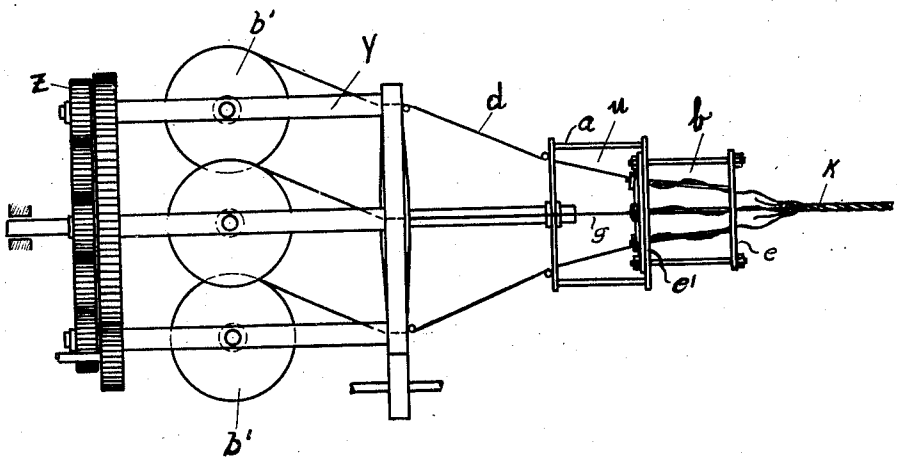
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Fig. 3.



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UNITED STATES PATENT OFFICE

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APPARATUS FOR MANUFACTURING WIRE ROPE

Application filed December 9, 1926, Serial No. 153,675, and in Germany May 31, 1926.

In the manufacture of strands or ropes the individual wires are wound together helically by the stranding operation whilst braiding or laying the wires. This stranding however is not capable of eliminating the resilience in the wire itself to such an extent that the helically bent wire will no longer spring back. Various proposals have already been made in order to prevent or eliminate the springing back of the helically bent wire. For instance, it has been proposed to wind the wires forming the rope individually in a separate machine around the core in the manner of a helical spring and then lay the wires thus treated in the actual stranding machine to form a wire rope. Quite apart from the fact that this method is very complicated owing to the separate treatment of each individual wire, the method is not suitable for preventing internal stresses in the individual wires, since no means are provided for preventing twisting of the wire around its axis. It has further been proposed to cause the wires before being braided or laid to pass through a former by which is imparted to them in advance the helical line or pitch which they are to have in the finished strand or rope. In this former the wires are bent in such a manner that their tendency to spring back is eliminated.

As a former for this purpose it has been proposed to use a sleeve having a helical groove through which the wire is forced for imparting to it the desired helical form. This however, subjects the wire while being bent to considerable friction, causing damage to the wire and a reduction of its tensile strength and great wear on the bending device and also entails an increase in the power required. A further disadvantage is that this arrangement can only be used with advantage in machines in which the bobbins are arranged one behind the other, as only in such machines there is no appreciable twisting of the wires preliminarily formed in this manner.

Fig. 1 shows the device intended for prebending wires before they are stranded into the wire rope, which device is provided on the stranding drum.

Fig. 2 shows a representation of one single prebending member of the preliminary bending head according to Fig. 1.

Fig. 3 shows a stranding machine with the prebending device provided on the stranding head.

The present invention relates to an apparatus, which overcomes these drawbacks.

As will be seen from Fig. 1 on the laying headstock a of the rope laying machine a head b is provided, between the two discs e and e' of which there are provided guiding rods which are symmetrical with respect to the axis of the machine and inclined towards the front and around which the wires are preliminarily bent before being laid. The wires d coming from the bobbins are first guided through nuts c and then around inclined guiding bars f in the interior of the head b, by which means they are bent to the required helical form.

Fig. 2 is a detailed figure showing this operation. The distance between the front disc e and the rear disc e' can be varied, by the bolts h and the guiding rods f being exchanged for shorter or longer ones. By this means the helical form of the wires or their pitch may be made longer or shorter as required. The nuts c are rotatably mounted in the insertion disc e'. As will be seen from Figure 2, each nut is provided, in addition to the hole for the guiding rod passing through the centre, with an eccentric hole for the insertion of the wire d. By means of a screw provided at i the nuts can be adjusted. They are provided for the purpose of preventing the wires being prematurely laid and for introducing them smoothly into the bending head b.

In the constructional form shown two wires are simultaneously preliminarily shaped, but the arrangement may be such that more wires or only one can be shaped. After the wires have been preliminarily bent within the head b into the helical shape or to the pitch which they are to occupy in the finished rope, they are led out through openings in the front disc e and, owing to their helical shape, immediately drop around the rope core g of hemp or wire into the rope

form *k*. The laying operation is effected by the laying headstock *a* and with it the bobbins and the head *b* revolve about the axis of the rope or about the rope core *g*. In the stranding machine shown diagrammatically in Fig. 3, the reels *b'* from which the wires *d* are drawn off are rotatably mounted in the stranding drum *y*. These reels will always maintain their vertical position by means of the planet wheel gearing *z* when the stranding drum rotates. In this way a rotation opposite to the direction of movement of the stranding drum is imparted to the bobbins of the stranding drum for the purpose of avoiding the twisting of the wires, so that the wires do not experience any axial twisting during stranding. *u* represents the stranding head provided on the stranding drum, on which head is secured the prebending device *b*. *k* represents the stranded wire rope in the finished state. The wire ropes made in this way from preliminarily bent wires free from stresses are completely free from twist, in other words, the wires do not seek to turn in the reverse direction and do not spring out of place and the finished rope does not warp or become kinked.

This apparatus is extremely simple and, since it is adjustable, may be used for various pitches and thicknesses of wire. Owing to the friction being so slight, the wires are not unduly worn and the power required is less than in the known kinds of preliminary formers.

What I claim is:

1. A device for prebending rope wires in the helical form which they possess in the completed strand or rope without any twisting around the axes of the wires, comprising a prebending head (*b*) having two discs (*e* and *e'*) and smooth guiding rods (*f*) which are disposed between the said discs and are inclined symmetrically around the axis of the device towards the stranding point, around which rods the wires are intended to be bent whilst passing into the helical form.

2. A device for prebending rope wires as claimed in claim 1, in which the disc (*e'*) of the prebending head has rotatable nuts (*c*) capable of allowing the wires to be inserted into the prebending head and of guiding them therein.

3. A device for prebending rope wires as claimed in claim 1, characterized by this that the prebending head is adjustable in the longitudinal direction by exchanging the guide rods (*f*) and bolts (*h*) for rods and bolts of different length.

In testimony whereof I have signed my name to this specification.

JOHANN LAUBENTHAL.