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MACHINE FOR MAKING WIRE ROPE

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3 Sheets-Sheet 1

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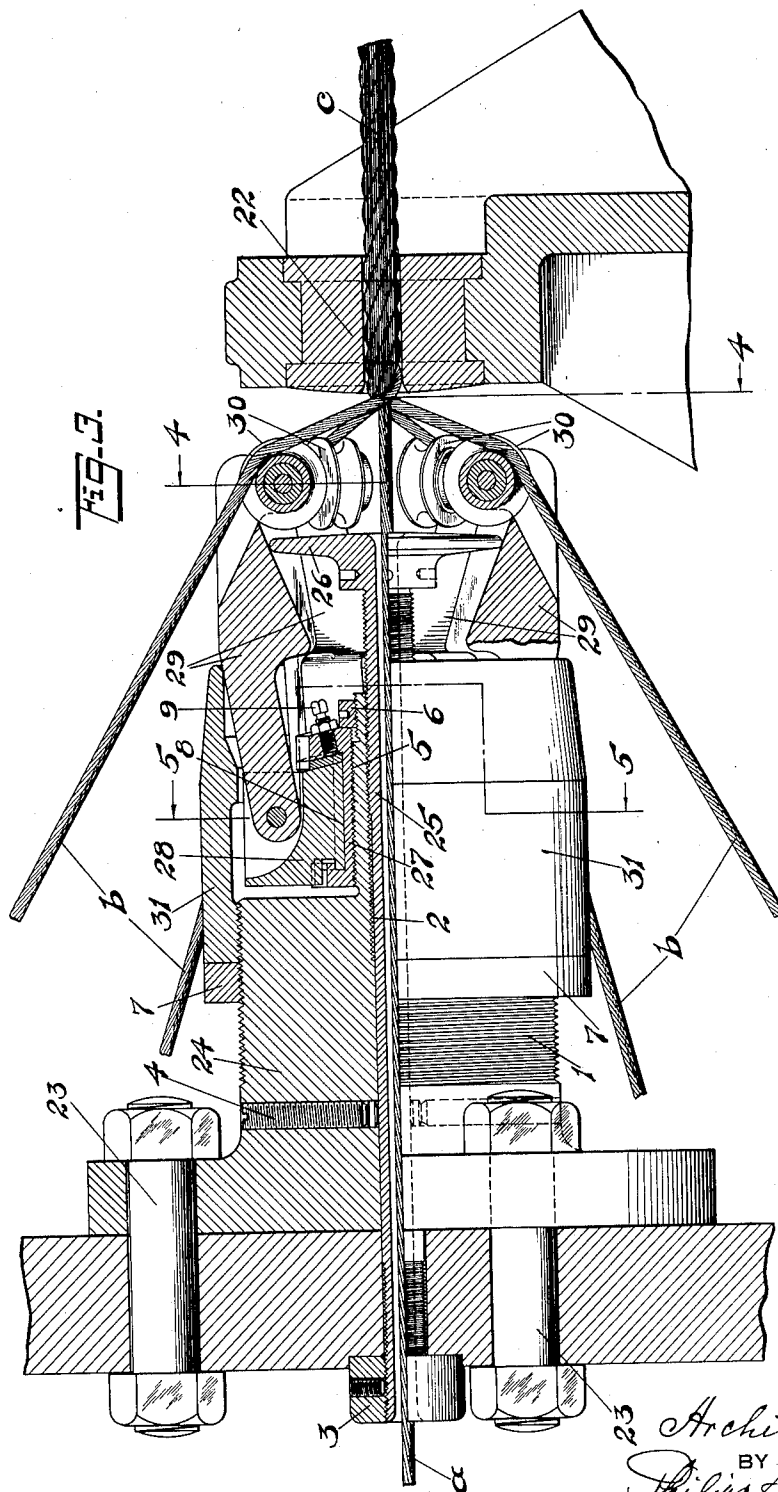
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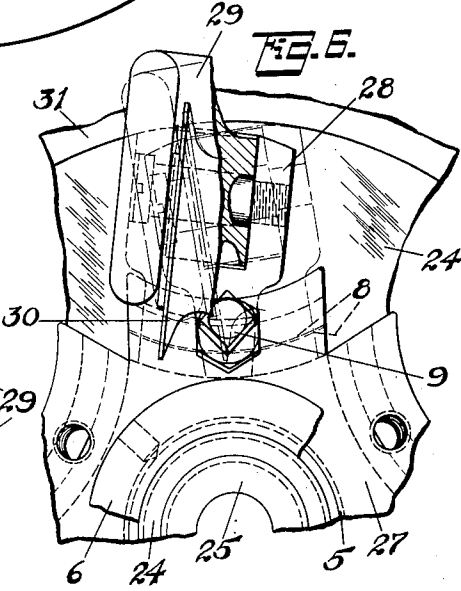
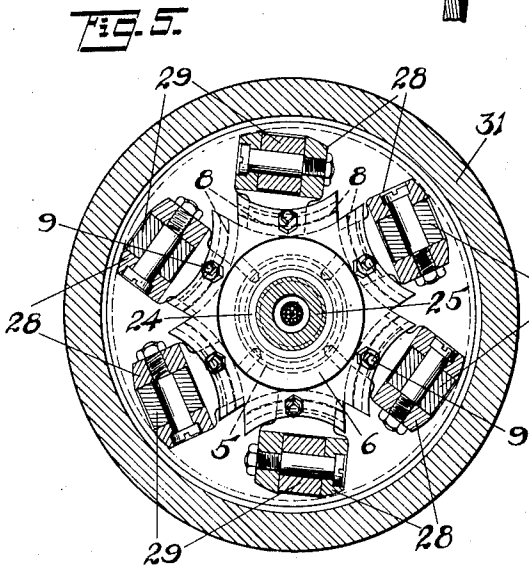
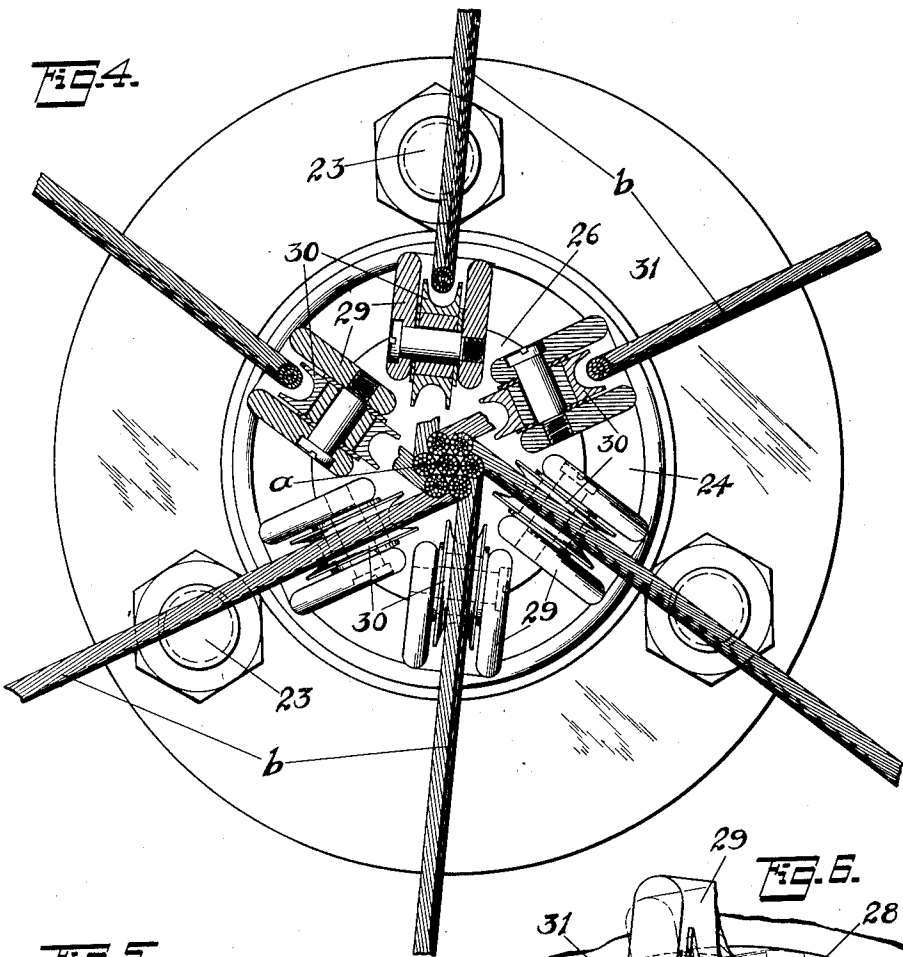
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MACHINE FOR MAKING WIRE ROPE

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,961,379

MACHINE FOR MAKING WIRE ROPE

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Application May 4, 1932, Serial No. 609,080

9 Claims. (Cl. 117—20)

This invention relates to machines for making wire rope or wire strand of that class in which a number of wire strands or wires are wound helically, usually on a metal or hemp core, and relates especially to that part of the mechanism in which the strands or wires are laid up helically on the core and the rope or rope strand closed.

The general object of the invention is to provide such a mechanism which shall be readily and sufficiently adjustable to accurately determine and vary the form of the helices laid up on the core, and so as to produce either right or left lay rope, to be capable of use with larger or smaller rope cores and producing different sizes of rope, and to lay up the helices on the core more or less tightly, as desired.

A further object of the invention is to provide a simple and efficient mechanism for making dead-lay wire rope or strand, that is, rope or strand preformed in permanent helices so as to lie without twisting or uncoiling at the end, and to provide for such adjustment of the mechanism as to secure the exact form of permanent helices desired.

For a full understanding of the invention, a detailed description of a construction embodying all the features of the same in a preferred form, as applied to one type of wire rope machine, will now be given in connection with the accompanying drawings forming a part of this specification, and the features forming the invention then be specifically pointed out in the claims.

In the drawings, which show the invention applied to a wire rope machine of a common horizontal type:

Figures 1 and 1a show the machine in diagrammatic elevation;

Figure 2 is a plan view of the draw-off portion of the machine, on a larger scale than Figure 1;

Figure 3 is an enlarged view of the adjustable head, partly in longitudinal section and partly in elevation;

Figures 4 and 5 are cross sections on the lines 4 and 5 of Figure 3, on an enlarged scale; and

Figure 6 is a detail of one of the roller mountings and adjustments looking to the left in Figure 3.

In the following description and claims, the word "wire" will be used as including both wire and wire strands, and the word "rope" as including both rope formed of strands and strands formed of wires, the invention being equally applicable to both.

The invention has been made in connection

with a horizontal machine of a well known type, generally, as shown, for instance, in patents to Hallidie No. 369,055, Sisum No. 592,453 and Lar-muth No. 1,073,052, and is thus illustrated. It will be understood, however, that the invention is applicable also to other types of machines, for instance, the common vertical planetary type of machine and machines of that type in which the wires are laid up helically by the rotation of the rope closing devices and rope instead of by the rotation of a frame or flyer carrying the wire supply spools.

Referring to the drawings, the horizontal frame or flyer is shown as of common form, consisting of the disks 10 running on rollers 11 and connected by horizontal bars 12. Within this flyer are mounted the frames 13 carrying the wire spools 14, these frames 13 being pivoted axially of the machine and either free to swing transversely to the flyer and weighted for reverse movement as the flyer rotates or positively driven reversely to the flyer with the same result, both constructions being common in this type of machine, this reverse rotation being about one rotation to each revolution of the flyer and acting to prevent or regulate the torsion on the individual wires, as usual in such machines. The flyer is shown as driven from the shaft 15, which drives the draw-off rolls 16 through a train of spur gears 17, and drives the flyer through a reversible bevel gear train 18, shaft 19, extending through the length of the machine and gears 20 acting through the usual change gearing in gear box 21. From the flyer head, the wires as laid up are shown as passed through the usual squeezer 22 forming the closing die to the draw-off mechanism after being laid up on the core, *a* being the core, *b* the wires from the wire supply spools and *c* the completed rope. The machine is shown as producing a rope *X* made of six wires *b* with core *a*, but it will be understood that this is only for illustration and that the invention is applicable in connection with the production of rope of any number of wires. The machine as thus far described is the same as a common type of horizontal machine and may be of any other common or suitable construction.

Referring now to the construction illustrated for the embodiment of the present invention, the flyer head from which the wires *b* pass to the closing point carries fixed thereto, as by bolts 23, a cylindrical block 24 having screw thread 1 on its outer side and having a central passage formed with inner screw thread 2 through which passes a sleeve 25 threaded for adjustment in thread 2,

and through which the core *a* passes, this sleeve being locked in adjusted position by lock nut 3 on the screw threaded end of the sleeve 25 and set screw 4 in block 24.

5 The sleeve 25 carries at its outer end a disk 26 adjustable axially of the machine with sleeve 25. On the reduced outer end of the block 24 is mounted a sleeve 27 adjustable in the block axially of the machine by screw threads 5 and locked in adjusted position by lock nut 6, and upon this adjustable sleeve 27 are mounted for swinging adjustment transversely to the sleeve individual roll carriers 28, in which levers 29 are pivotally mounted to swing radially of the machine and at the outer ends carry the wire guides in the form of sheaves or rolls 30, over which the wires *b* pass to the closing point.

20 The radial position of the levers 29 and rolls 30 is adjusted by the disk 26 on the sleeve 25 against which disk the inner sides of the levers 29 bear and the levers thus adjusted radially in accordance with the position of disk 26 are locked in position by adjustable clamping ring 31, screw threaded on thread 1 of block 24 and bearing on the upper inclined sides of the levers 29, the clamping ring 31 being locked in adjusted position by lock nut 7. The rolls 30, as shown in Figure 4, and their levers 29 are not mounted exactly radially of the machine, but are off-center so as to direct the wires properly at the side of the core *a* for closing.

35 The roll carriers 28 and the sleeve 27 are formed with coacting convex and concave surfaces 8, so that the roll carriers 28, levers 29 and rolls 30 may be adjusted to vary the angle and position of the rolls relatively to the machine axis and the roll carriers 28 are locked in adjusted position by set screws 9 passing through the undercut walls on sleeve 27 at the front end of the roll carriers 28.

40 It will be seen that by adjusting the roll carrying levers 29 radially by disk 26 and clamp 31 the rolls may be adjusted and rigidly held in adjusted position radially of the machine, this adjustment also moving the rolls somewhat axially of the machine, so that the distance from the rolls 30 to the closing point and the angle at which the wires pass from the rolls to the closing point are varied, and the helices thus varied accordingly. The adjustment of the roll carriers 28 and levers 29 by the convex and concave surfaces 8 varies the position and angle of the rolls 30 and the lead of the wires relatively to the core, so that the angle of the lay of the wires on the core may be varied, and, with the proper adjustments, the machine may be used in making rope of either right or left lay and with either a tight or a loose wrap of the wires on the core and with cores of different sizes. The adjustment of sleeve 27 axially of the machine secures the accurate axial positioning of the parts in their desired adjusted position, so as to assure the exact laying up of the wires into helices having the desired characteristics according to the angular, radial and axial adjustment of the rolls 30.

65 The invention is applicable generally in rope making machines, whether the wires are to be formed into permanent helices to produce dead lay rope, or to be laid up without the formation of such permanent helices, but the invention is especially intended for use in machines for making dead lay rope, and of especial value in such machines. As shown in the drawings, the angle of the wires *b*, in passing over the rolls 30 to the closing point and the position of the rolls 30

relatively to the squeezer 22 are such as to form permanent helices and dead lay rope, and the adjustments illustrated and above described enable the permanent helices to be accurately formed with the desired characteristics. The permanent helices may be formed to the exact form that they have in the finished rope or may be formed of somewhat smaller diameter so as to hug the core, or of larger diameter so as to provide a loose or elastic wrapping on the core. It will be understood that the invention is not limited to the specific form or arrangement of the adjusting mechanism shown, but that modifications may be made therein while retaining the invention defined by the claims.

What I claim is:

1. In a machine for making wire rope, the combination with means for laying up the wires helically on a core, of guides over which the wires pass directly to the closing point and means for adjusting said guides radially and axially to vary the angle and length of the path of the wires from the guides to the closing point and angularly to vary the path of the wires transversely of the core from the guides to the closing point.

2. In a machine for making wire rope, the combination with means for laying up the wires helically on a core, of guides over which the wires pass directly to the closing point, and means for adjusting said guides radially and axially to vary the angle and length of the path of the wires from the guides to the closing point and angularly to vary the path of the wires transversely of the core from the guides to the closing point, said angular adjustment being sufficient to provide for the production of either right or left lay products.

3. In a machine for making dead lay wire rope, the combination with the flyer and rope closing devices, of guides over which the wires pass directly to the rope closing devices, said guides being arranged to bend the wires over the guides inward toward the machine axis at such an angle as to coact with the rope closing devices to form permanent helices in the wires, and means for adjusting said guides radially and axially to vary the angle and length of the path of the wires from the guides to the closing point and angularly to vary the path of the wires transversely of the core from the guides to the closing point.

4. In a machine for making dead lay wire rope, the combination with the flyer and rope closing devices, of guides over which the wires pass directly to the rope closing devices, said guides being arranged to bend the wires over the guides inward toward the machine axis at such an angle as to coact with the rope closing devices to form permanent helices in the wires, and means for adjusting said guides radially and axially to vary the angle and length of the path of the wires from the guides to the closing point and angularly to vary the path of the wires transversely of the core from the guides to the closing points, said angular adjustment being sufficient to provide for the production of either right or left lay products.

5. The combination with a wire supply and rope closing die, of means for producing relative rotation between the wire supply and closing die to lay the wires up helically, guides 30 over which said wires pass to the closing die, levers 29 pivoted to swing radially for adjustment of the radial angle at which the wires pass to the closing die and carrying the guides, and means for holding said levers in adjusted position.

6. The combination with a wire supply and rope closing devices, of means for producing relative rotation between the wire supply and closing devices to lay the wires up helically, guides 30 over which the wires pass to the closing point, levers 29 pivoted to swing radially for adjustment and carrying the guides, said levers being pivoted on carriers 28 mounted to swing transversely to the wires for angular adjustment of the levers and means for holding said levers and carriers in adjusted position.

7. The combination with a wire supply and rope closing devices, of means for producing relative rotation between the wire supply and closing devices to lay the wires up helically, guides 30 over which the wires pass to the closing point, levers 29 pivoted to swing radially for adjustment and carrying the guides, said levers being pivoted on carriers 28 seated on sleeve 27 by curved surfaces 8 to rock transversely to the wires for angular adjustment of the levers, and means for holding said levers and carriers in adjusted position.

8. The combination with a wire supply and rope

closing devices, of means for producing relative rotation between the wire supply and closing devices to lay the wires up helically, guides 30 over which the wires pass to the closing point, levers 29 pivoted to swing radially for adjustment and carrying the guides, said levers being pivoted on carriers 28 seated on axially adjustable sleeve 27 by curved surfaces 8 to rock transversely to the wires for angular adjustment of the levers, and means for holding said levers and carriers in adjusted position.

9. The combination with a wire supply and rope closing devices, of means for producing relative rotation between the wire supply and closing devices to lay the wires up helically, guides 30 over which the wires pass to the closing point, levers 29 pivoted to swing radially for adjustment and carrying the guides, axially adjustable disk 26 inside the levers and axially adjustable clamp 31 outside the levers, and means for locking the disk and clamp in adjusted position.

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