

May 9, 1933.

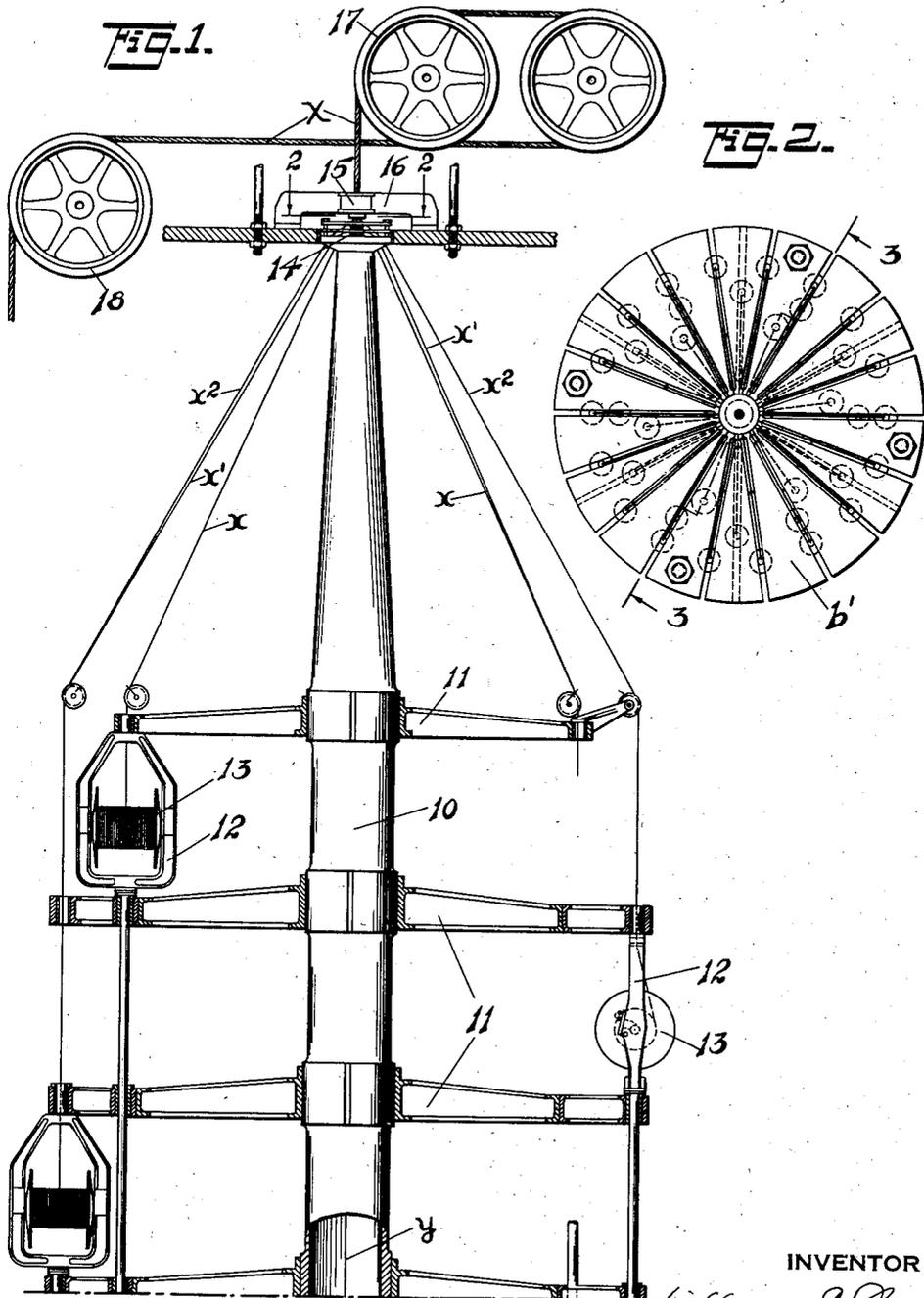
W. E. CRAIG

1,907,744

ROPE MAKING MACHINE

Filed Sept. 16, 1931

2 Sheets-Sheet 1



INVENTOR

William E. Craig

BY his ATTORNEYS

Philip Dawson Rice & Kennedy

May 9, 1933.

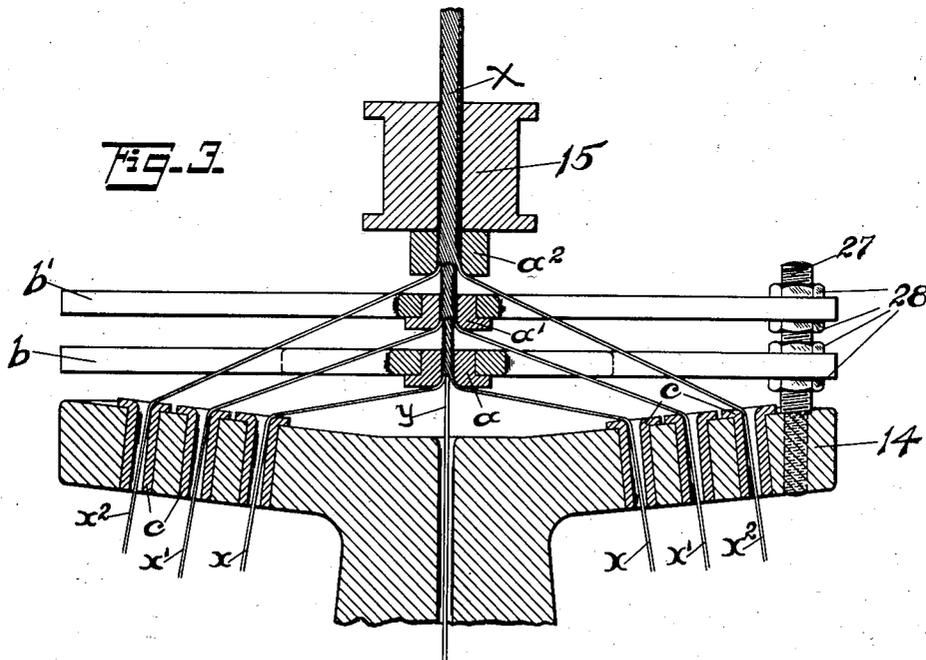
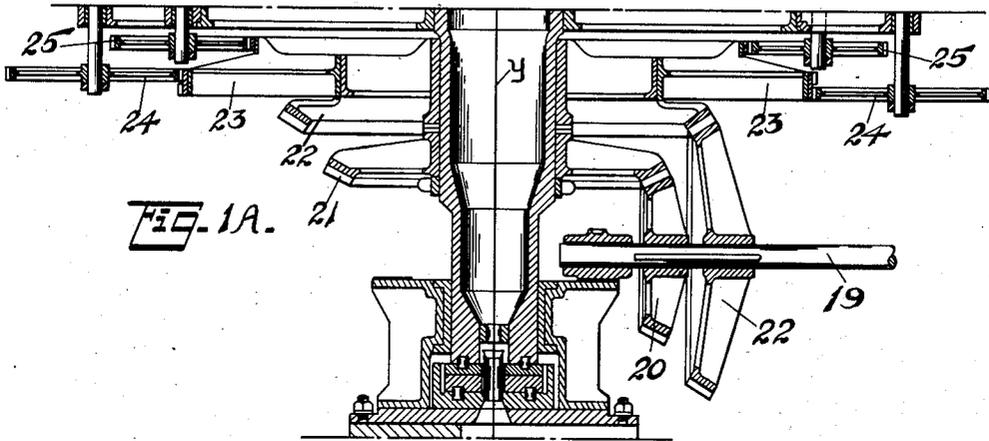
W. E. CRAIG

1,907,744

ROPE MAKING MACHINE

Filed Sept. 16, 1931

2 Sheets-Sheet 2



INVENTOR

William E. Craig

BY HIS ATTORNEYS

Philip Sweeney & Co. Kennedy

UNITED STATES PATENT OFFICE

WILLIAM E. CRAIG, OF TRENTON, NEW JERSEY, ASSIGNOR TO JOHN A. ROEBLING'S
SONS COMPANY, OF TRENTON, NEW JERSEY, A CORPORATION OF NEW JERSEY

ROPE MAKING MACHINE

Application filed September 16, 1931. Serial No. 563,076.

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 on the core and the rope or rope strand closed.

The object of the invention is to provide an improved laying up and closing mechanism for multiple layer ropes or strands, in which a better control of the strand or wires may be secured, so as to enable the production of a rope of the characteristics desired and maintain the strands or wires in the condition required for the best service and greatest durability of the rope under its service conditions.

For a full understanding of the invention, a detailed description of a construction embodying all the features of the same in a preferred form will now be given in connection with the accompanying drawings forming a part of this specification, and the features forming the same than be specifically pointed out in the claims.

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

Figures 1, 1A show a vertical machine of common type in diagrammatic sectional elevation, Figure 1A showing the lower or gearing portion of the machine, being on a larger scale than Figure 1;

Figure 2 is an enlarged plan of the laying up portion of the machine, looking downward from the line 2 of Figure 1; and

Figure 3 is an enlarged vertical section on the line 3 of Figure 2.

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

Referring to the drawings, the flyer is shown as of common form, consisting of a rotating standard 10 carrying the spiders 11, in which are mounted the bobbin frames 12 carrying the bobbins 13, this flyer being

shown as carrying at the top of the standard 10 the head 14 with inclined guides through which the wires w , w' , w^2 of the three layer rope shown pass with the core y to the squeezer 15 held in fixed position by the supports 16 and from which the finished rope X passes to the usual draw-off roll 17 and around guide roll 18 to the wind-up reel. The flyer and bobbin frames are shown as driven by the usual planetary gearing from the driving shaft 19, which drives the flyer through gears 20, 21 and the bobbin frames through gears 22, 23, 24, 25, so that the bobbin frames are rotated reversely during their revolution with the flyer, 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. Any other suitable mounting and driving means for securing the required movement of the flyer and bobbin frames may be used, with the bobbin frames mounted either off center or axially relatively to the flyer as common in the art.

Dies a , a' , a^2 , are provided for the wires w , w' , w^2 , of the respective layers, through which dies the wires pass from the guides a to the squeezer 15, the die a thus acting to close the wires w on the core y , die a' acting to close the wires w' on the wires w and the die a^2 acting to close the wires w^2 on the wires w' , thus forming a closed three-layer rope passing to the squeezer. The dies a , a' are mounted on suitable stationary supports b , b' and the die a^2 on the squeezer or its support. The supports b , b' consist of discs slotted radially so as to provide for passage of the wires w' , w^2 through them in the proper position and on the proper angle, these discs forming the supports b , b' being adjustably held in position on adjusting screws 27 by nuts 28, so that the dies may be adjusted in position toward and from the head 14 and toward and from each other as desired. The inclined guides in the head 14 through which the wires pass to the dies a' , a^2 are preferably formed, as shown, by nozzles c , one set of nozzles for each layer of wires, and these nozzles may be stationary

or mounted to rotate and free to rotate or rotated positively in the head 14, and the dies a , a' , a^2 may be mounted free to rotate or rotated positively by any suitable means, if desired.

The dies a , a' , a^2 are formed on the side at which the wires enter with surfaces rounded at the proper curve to form the wires as they reach the closing point and with the nozzles c to secure the characteristics desired in the finished rope. The nozzles and dies will be positioned relatively to each other as desired, according to the characteristics of the rope to be made, and they may be so positioned that the helices formed in the wires as they are laid up on the core will be permanently formed to produce dead lay rope and avoid or reduce tendency of the wires to untwist, as they do in the usual process of laying up the wires on a wire rope core. For this purpose, the wires must be bent at suitable angles in passing over the nozzles c and into the dies a , a' , a^2 , the angle and length of helix being determined by the lay desired in the completed rope. It will be understood, however, that the nozzles and dies may be so arranged as not to make the dead lay rope, but only control the wires to secure other characteristics desired in the finished rope. The separate closing dies are especially important in connection with wires varying in characteristics in the different layers.

The invention has been illustrated and described as applied to one of the common types of wire rope machines, in which the relative rotation between the core and wire supply is secured by the usual rotating flyer carrying the wire spools, but it will be understood that the invention is applicable, also, to other classes of rope machines including that in which the wire supply is stationary and the rope rotated for laying wires up helically on the core.

It will be understood, also, that the invention is not limited to the exact construction and arrangement shown, but many modifications may be made therein, while retaining the invention defined by the claims.

What I claim is

1. In a multiple layer rope making machine, the combination with the wire supply and means for relatively rotating the wire supply and rope to lay the wires up helically, and the guiding head through which the wires pass to the closing point, of a closing die for each layer of wires, and separate disks carrying the dies for the wires of the inner layer or layers of wires slotted radially for the passage of the wires of the outer layer or layers.

2. In a multiple layer rope making machine, the combination with the wire supply and means for relatively rotating the wire supply and rope to lay the wires up heli-

cally, and the guiding head through which the wires pass to the closing point of a closing die for each layer of wires, separate disks carrying the dies for the wires of the inner layer or layers of wires slotted radially for the passage of the wires of the outer layer or layers, and means for adjusting said disks to vary the distance between the dies and the distance between the dies and guiding head.

3. The combination with the rotating flyer head 14 having inner and outer guide passages for the wires of inner and outer wire layers, of dies a , a' , etc. for the inner and outer layers of wires, disks b , b' etc. carrying said dies and having radial slots for the passage of the wires of the outer layer or layers, and supports for said disks mounted on the flyer head outside the wires and adjustable to vary the distance between said dies and between the dies and flyer head.

4. In a machine for making multiple layer dead lay wire rope, the combination with the wire supply and means for relatively rotating the wire supply and rope to lay the wires up helically, of a closing die for each layer of wires, bearing surfaces for each layer of wires over which the wires are led directly to the die for that layer and bent at such an angle as to form permanent helices in the wire.

5. In a machine for making multiple layer dead lay wire rope, the combination with the wire supply and means for relatively rotating the wire supply and rope to lay the wires up helically, of a closing die for each layer of wires, bearing surfaces for each layer of wires over which the wires are led directly to the die for that layer and bent at such an angle as to form permanent helices in the wire, and means for adjusting the dies to vary the distance between the dies.

6. In a machine for making multiple layer dead lay wire rope, the combination with the wire supply and means for relatively rotating the wire supply and rope to lay the wires up helically, of a closing die for each layer of wires, bearing surfaces for each layer of wires over which the wires are led directly to the die for that layer and bent at such an angle as to form permanent helices in the wire, and means for adjusting the dies to vary the distance between the dies and between the dies and said bearing surfaces.

In testimony whereof, I have hereunto set my hand.

WILLIAM E. CRAIG.