Jan. 8, 1924. 1,480,207

C. G. HOLMBERG, JR

STRAND TWISTING MACHINE

Filed Aug. 5, 1921 2 Sheets-Sheet 1

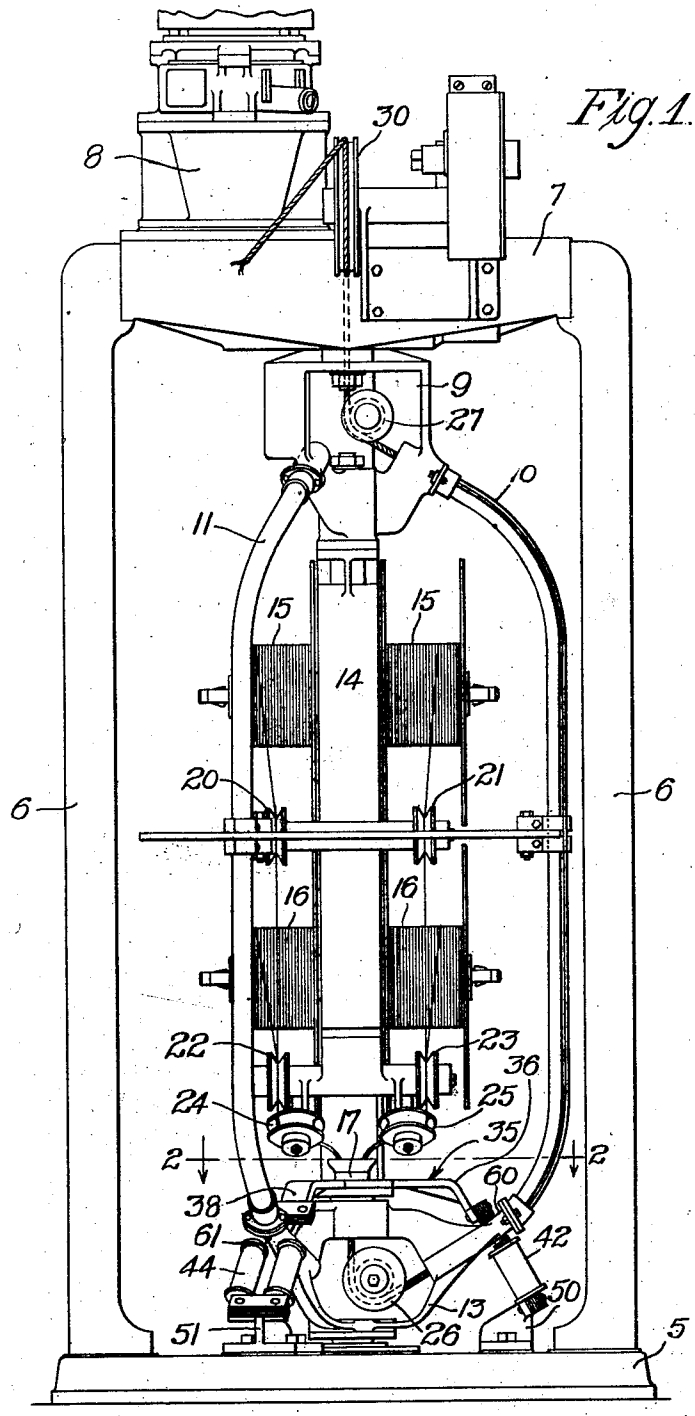


Fig. 1.

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Fig. 2.

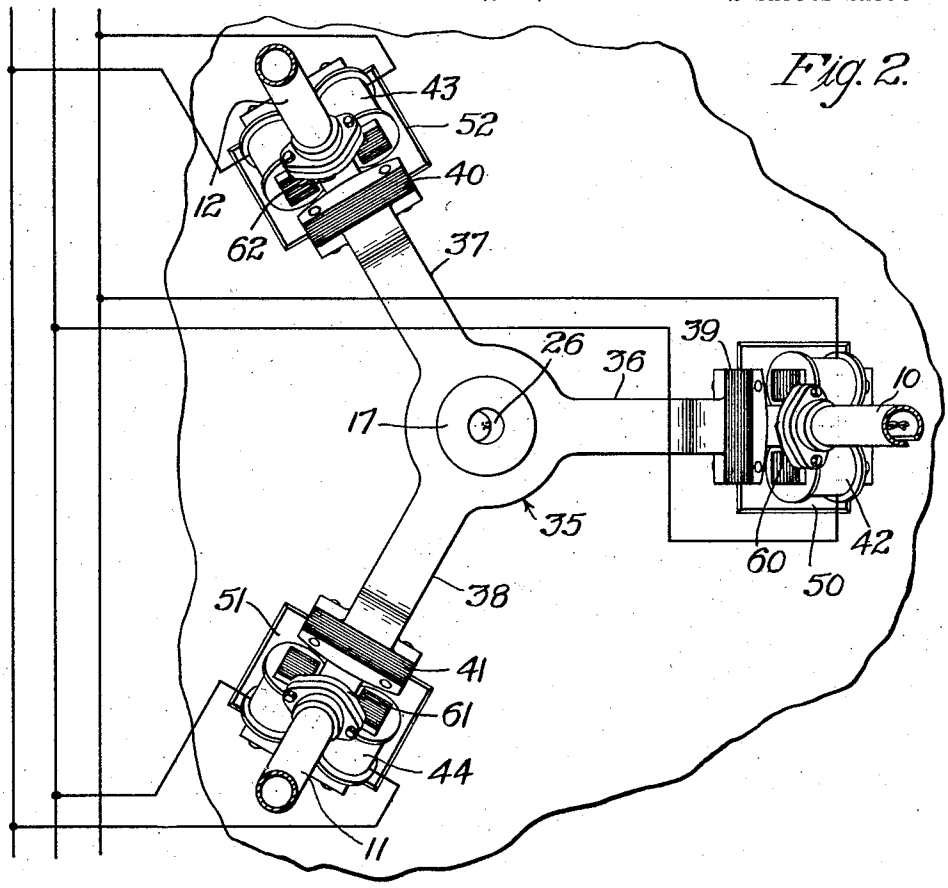
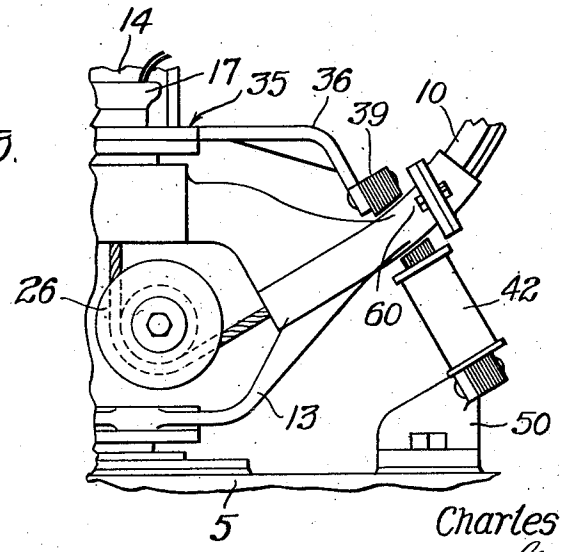


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES GUNNAR HOLMBERG, JR., OF OAK PARK, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

STRAND-TWISTING MACHINE.

Application filed August 5, 1921. Serial 489,974.

To all whom it may concern:

Be it known that I, CHARLES GUNNAR HOLMBERG, Jr., a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Strand-Twisting Machines, of which the following is a full, clear, concise, and exact description.

This invention relates to strand twisting machines, and more particularly to strand twisting machines of the type shown in the H. H. C. Grondahl Patent No. 1,263,405 of April 23, 1918, in which a flier and a strand supply reel support are rotatable relative to each other to put two twists into strands for each revolution of the movable part.

The object of this invention is to simplify and improve the operation of the mechanism shown in the above mentioned patent whereby noises will be eliminated and an increase in the speed of the operation will be made possible.

In the mechanism of the patent the flier and the strand supply reel supporting member are mounted concentrically with each other and have a common axis of rotation. In order to prevent the rotation of the reel support there is provided in the patent a plurality of gears and pinions which intermesh. These gears and pinions, however, are noisy when operating at a high speed and also tend to limit the speed of rotation of the flier.

In accordance with the features of this invention, these gears are eliminated by the use of magnetic means for causing relative movement of the flier and reel support. This magnetic means may be applied in any suitable manner, but in the preferred form of the invention there are provided a plurality of pole pieces secured to the lower end of the reel support and extending radially therefrom, which co-operate with electromagnets secured to the main frame outside of the flier arms. In this construction there are preferably provided three flier arms and three electromagnets which may be operated from a three-phase commercial circuit.

In the drawings illustrating this invention;

Fig. 1 is a view in front elevation of the mechanism;

Fig. 2 is an enlarged sectional view taken upon line 2—2 of Fig. 1, and

Fig. 3 is an enlarged fragmentary detail view of the lower end of the mechanism illustrating the application of the electromagnet thereto.

As shown in the drawings, there is provided a main frame comprising bottom frame member 5, side frame members 6—6 and top frame member 7. Secured to the top frame member 7 is a housing 8 for a suitable motor which is connected by means of suitable gears (not shown) to the upper end of a yoke 9 of the flier. Flier arms 10, 11, and 12 are connected at their upper ends to the yoke member 9 and at their lower ends to a second yoke member 13, which is rotatably supported upon the lower frame member 5. Rotatably supported between the upper and lower yoke members 9 and 13 is a supply reel supporting member 14 upon which may be mounted a plurality of strand supply reels 15—15 and 16—16. A tubular member 17 upon the lower yoke member 13 extends upwardly through the lower end of the reel supporting member 14 and provides a passage for the strands of the supply reels 15—15 and 16—16, which may be led thereto over suitable pulleys 20, 21, 22, 23, 24, and 25. A pulley 26 is secured to the lower yoke member 13 in line with an opening in the tubular member 17 and the strand from the reels 15—15 and 16—16 pass over this pulley and into the tubular member 10 and over a second pulley 27 secured to the upper yoke member 9 and in line with an opening through which the strand passes to a capstan 30 which may be secured to the upper frame member 7 in any suitable manner and driven by gears from the motor in the housing 8. After passing over the capstan 30 the strand is led to a suitable take-up reel which is not shown.

Secured to the lower end of the supply reel supporting member 14 is a spider member 35 carrying three arms 36, 37, and 38 which extend outwardly with their free ends just within the circle described by the inner faces of the flier arms 10, 11, and 12. Secured to the outer ends of these arms 36, 37, and 38 are the laminated pole pieces 39, 40, and 41 which cooperate with electromagnets 42, 43, and 44 secured to the lower

frame member 5 by suitable brackets 50, 51, and 52. The pole pieces of the electromagnets 42, 43, 44 extends to within a very short distance of the outer faces of the flier arms 10, 11, and 12 and in line with the pole pieces 39, 40, 41 upon the arms 36, 37, 38. The energization of the electromagnet 42, 43, 44 sets up a field which attracts the pole pieces 39, 40, 41 with sufficient attraction to prevent any rotation of the reel supporting member 14 while the flier arms 10, 11, 12 are being rotated.

In order to avoid undue distortion of the magnetic field during the rotation of the flier arms and to prevent creeping of the reel supporting member 14, due to such distortion, the lower ends of the flier arms 10, 11, 12 are coupled with the lower yoke member by means of coupling joints 60, 61, 62 of non-magnetic material such as phosphor bronze which may be formed integrally with the lower yoke member 13.

The flier is made with three arms for the purpose of obtaining a better balance in the high speed rotation of the device, and the invention is illustrated with three electromagnets, although it will be evident that the number of electro-magnets may be the same or an even multiple of the number of arms on the flier so long as the spacing of the magnets with respect to the arms is such that the attractive force upon all of the arms will be substantially the same at any instant.

The operation of this mechanism for twisting strands is substantially the same as that described in the Grondahl patent above mentioned.

What is claimed is:

1. In a strand twisting mechanism, a flier and a strand supply reel support normally rotatable about the same axis, and magnetic means for securing the relative rotation of the flier and the strand reel support.

2. In a strand twisting mechanism, a rotatable flier and a strand supply reel support normally rotatable about the same axis, means for rotating the flier, and magnetic means for preventing the rotation of said strand reel support.

3. In a strand twisting mechanism, a rotatable twisting flier comprising a plurality of arms, a strand supply reel support located between the arms of the flier and rotatable about the same axis, and magnetic means located outside the arms of the flier and adapted to hold the strand supply reel support against rotation.

4. In a strand twisting mechanism, a rotatable flier comprising a plurality of equally spaced arms, a strand supply reel support located between the arms of the flier and rotatable about the same axis, magnetic poles secured to said reel support, and magnets located outside the arms of said flier and co-operating with said poles to prevent the rotation of the reel support.

5. In a strand twisting mechanism, a rotatable flier comprising a plurality of equally spaced arms, a strand supply reel support located between the arms of the flier and rotatable about the same axis, a plurality of magnetic pole pieces secured to the reel support, and electro-magnets located outside the flier arms and co-operating with said pole pieces to prevent the rotation of the reel support during the rotation of the flier.

6. In a strand twisting mechanism, a rotatable flier comprising three equally spaced arms, a strand supply reel support located between said arms, three equally spaced pole pieces secured to and projecting from said reel support, and three electromagnets located outside the arms of said flier and co-operating with said pole pieces to prevent the rotation of the reel support during the rotation of the flier.

7. In a strand twisting mechanism, a rotatable flier comprising a plurality of tubular arms, an upper and a lower supporting yoke for said arms, projections of non-magnetic material carried by the lower yoke to which the lower ends of the flier arms are coupled, a reel supporting member located between the flier arms, magnetic pole pieces secured to the reel supporting member and located adjacent to the non-magnetic projections of the lower yoke member, and magnets located outside the flier arms and co-operating with said pole pieces.

In witness whereof, I hereunto subscribe my name this 20th day of July, A. D., 1921

CHARLES GUNNAR HOLMBERG, JR.