Feb. 18, 1941. C. J. HACKBARTH 2,232,524

METHOD OF AND APPARATUS FOR MAKING AN EXTENSIBLE RETRACTILE CORD

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Fig. 1.

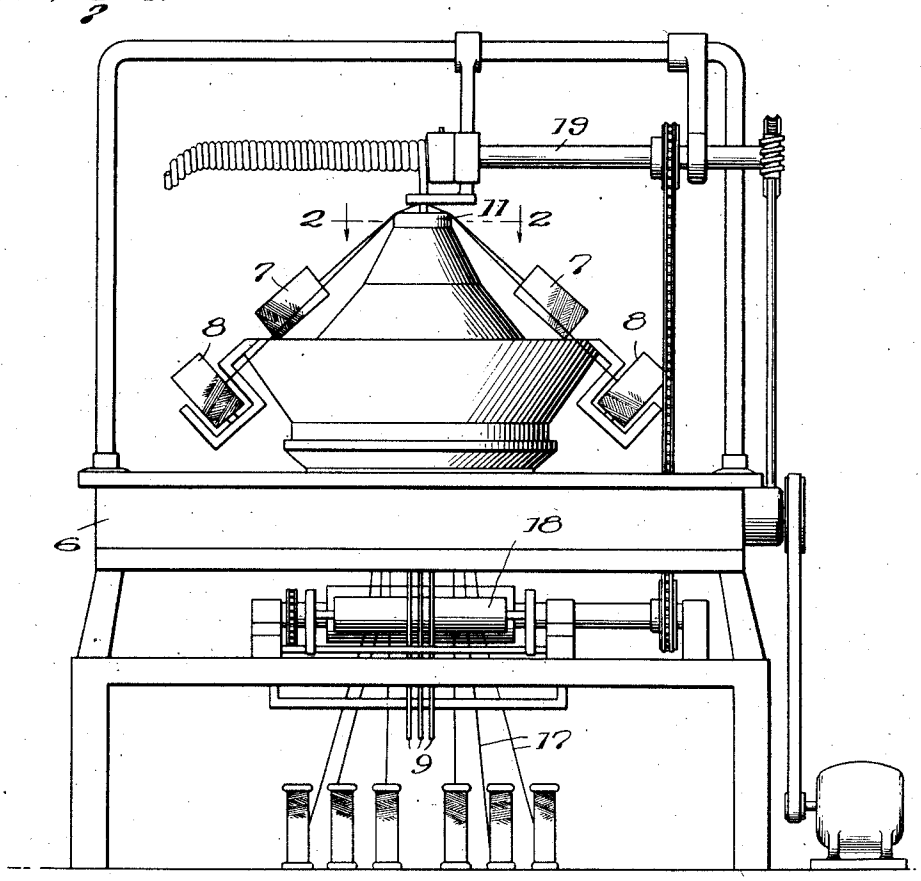
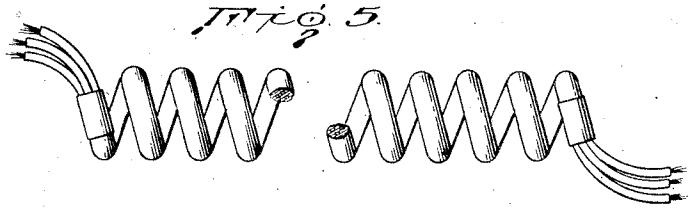


Fig. 5.



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FIG. 3.

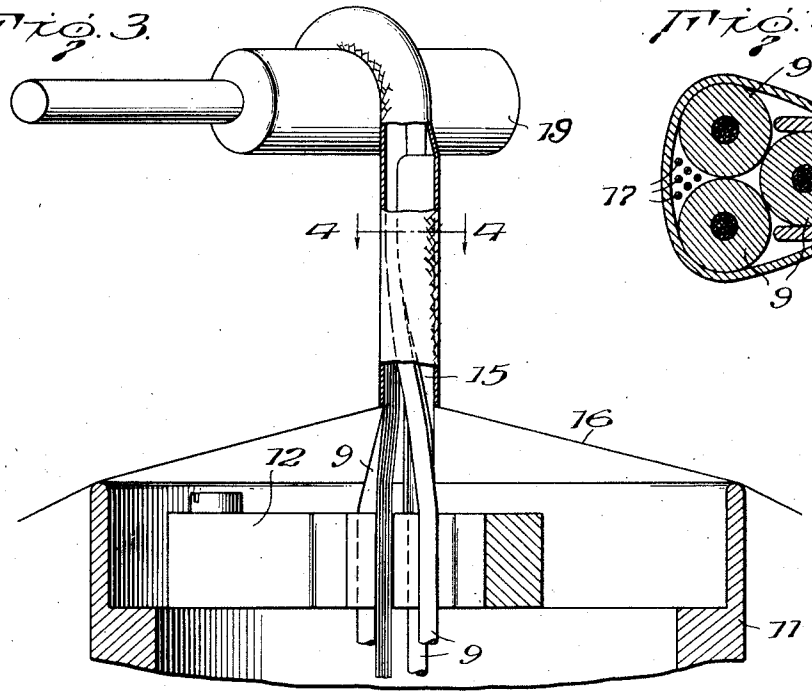
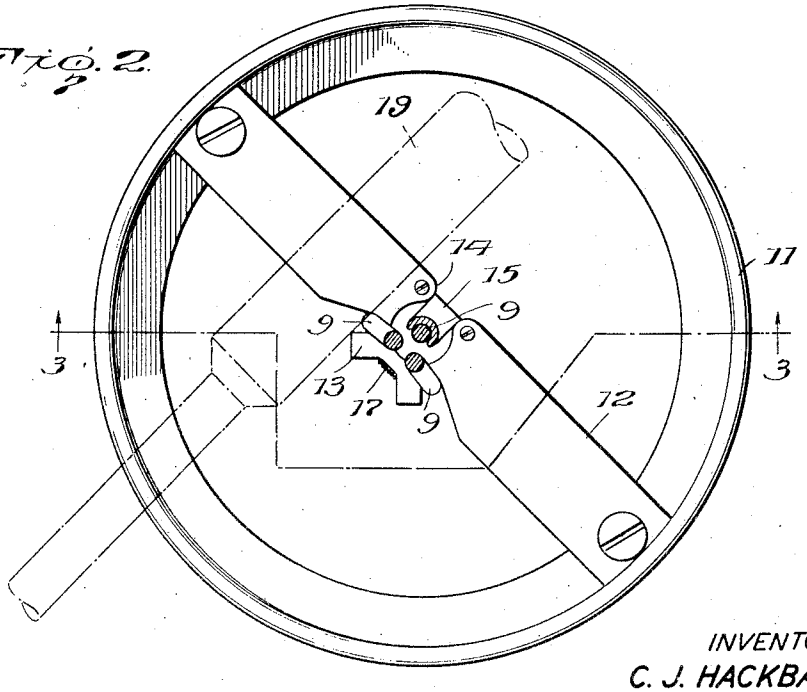


FIG. 4.

FIG. 2.



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METHOD OF AND APPARATUS FOR MAKING AN EXTENSIBLE RETRACTILE CORD

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Application March 3, 1939, Serial No. 259,506

12 Claims. (Cl. 96—3)

This invention relates to a method of and apparatus for making an extensible retractile cord.

Objects of the invention are to provide a method of and apparatus for imparting an inherent tendency to bend to a conductor.

In accordance with one embodiment of the invention a greater length of conductor is supplied in one of the conductors of a multiple cord so that when the conductors are bound together by a covering, the cord thus formed has a tendency to coil.

A complete understanding of the invention may be had by reference to the following description taken in conjunction with the accompanying drawings, in which

Fig. 1 is a front elevation of a machine for making the conductor of this invention;

Fig. 2 is a fragmentary sectional plan view taken on the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2;

Fig. 4 is a sectional view showing a cross section of the cord taken on line 4—4 of Fig. 3; and

Fig. 5 is a detail view of the cord.

Referring now more in detail to the drawings, a braider is shown in Fig. 1 having a frame 6. The braider has a rotating braider head carrying a series of cops 7 of yarn rotating in a counterclockwise direction and a second series of cops 8 rotating in a clockwise direction looking at the machine from above.

The details of the mechanism of this machine are more fully disclosed in the patent to Miller, 1,602,442 of October 12, 1926, and will not be described herein.

A plurality of cords 9, to be covered with braiding, pass upwardly through the braider head. The upper portion 11 of the braider head is stationary and has a cross piece 12 provided with a Y-shaped fork 13 and a cut out portion 14 forming triangularly spaced guides for the three conductors. Attached to the cross piece is also a member 15, a portion of which is U-shaped. From the position shown in Figure 2 the conductors and braided covering rotate 90° in a clockwise direction before reaching the capstan and the upper portion of the member 15 is twisted so as to substantially follow the twist in one of the conductors. The twist thus placed in the cord assists in the helical coiling of the cord. As the yarn 16 is interbraided on the conductors it contacts with two of the conductors but is prevented from contacting the third conductor by the guide 15 until it is close to an axial delivery take-up capstan 19. In passing over the capstan the two inner conductors lie substantially against the outer periphery of the capstan and the third conductor lies radially outward therefrom. Due to this arrangement it will be seen that the outer conductor forms a convolution of greater diameter than the inner conductors and should be longer than the inner conductors. The outer conductor, therefore, slips through the member 15 and moves at a greater speed than the inner conductors. This is possible due to the member 15 which spaces the braid from the outer conductor and permits it to move within the braid. Since the outer of the three conductors is of a greater length than the inner conductors it therefore has a natural tendency to form a helical coil.

After the braided covering has passed above the upper end of the member 15 it contacts all of the conductors and holds them together so that there is substantially no slippage between the braid and the conductors. In Fig. 2 the upper end of member 15 has been shown as extending substantially to the lower level of the take-up capstan 19. In some cases this member has been extended to a higher level and it may extend over the capstan in a semi-circular form following the contour of the cord on the capstan. A cord made in this manner with the outer conductor of greater length than the inner conductors has a natural or inherent tendency to coil. However, in many cases it is desirable to incorporate elastic material in the cord. This may be done by passing elastic strands 17, of rubber or other suitable elastic material, between the tension rolls 18, which are driven at a predetermined speed in relation to the capstan 19, to apply a tension of approximately 180° to the elastic strands. These elastic strands are fed upwardly between the arms of the fork 13 of the crosspiece 12 as shown in Fig. 4.

The member 15 also serves the additional function of softening the braid which might otherwise be applied too tightly to the cord. By braiding over the guide, the withdrawal of the guide tends to loosen or soften the braid on the cord which is desirable.

While particular embodiments of the invention have been described herein it will be evident that many changes and modifications may be made therein without departing from the spirit and scope of the invention.

What I claim is:

1. A method of making a coiled cord which comprises applying a fabric covering over a plurality of conductors, forming the conductors into

a curved form, and holding the covering spaced from one of the conductors to allow a longer length of said conductor to be supplied.

2. A method of making a coiled cord which comprises applying a fabric covering over a plurality of conductors, holding the fabric covering spaced from one of the conductors, and bending the covered cord to draw a longer length of the conductor from which the covering is spaced.

3. A method of making a coiled cord which comprises braiding a covering over a plurality of conductors, forming the conductors so that one conductor has a greater length than one of the other conductors, and spacing the braided covering from said conductor to allow said conductor to be supplied in greater length.

4. In a strand covering machine, means for applying a tubular interbraided fabric covering on a strand, and a member partially surrounding the strand while the braiding is being applied.

5. In a strand covering machine, means for applying a tubular interbraided fabric covering on a strand, and a spacing element for spacing the covering from the strand while it is being covered.

6. In a strand covering machine, means for braiding a covering on a strand, and a U-shaped element partially surrounding the strand while it is being covered.

7. In a braiding machine for a cord, means for supplying a plurality of conductors, means for applying a tubular interbraided fabric covering to said conductors, and a member partially surrounding one of said conductors while the braid is being applied.

8. In a braiding machine for a cord, means for supplying a plurality of conductors to be covered with braid, means for applying a braid over the conductors, a cylindrical take-up means for forming the conductors into a coil, and means for spacing the braid from one of the conductors to allow a greater lengtn of said conductor to be supplied as the coil is formed.

9. In a braiding machine for a cord, means for supplying a plurality of conductors to be covered with braid, triangularly spaced guides for positioning the conductors to be covered with braid, a cylindrical take-up capstan, said conductors being received on the capstan with two conductors adjacent the capstan and a third conductor spaced radially outward from the first two conductors, and means for causing said third conductor to be supplied at a faster rate than the first two conductors.

10. In a braiding machine for a cord, means for supplying a plurality of conductors to be covered with braid, triangularly spaced guides for positioning the conductors to be covered with braid, a cylindrical take-up capstan, said conductors being received on the capstan with two conductors adjacent the capstan and a third conductor spaced radially outward therefrom, and means for spacing the braid from said third conductor between the braiding point and said capstan.

11. In a braiding machine, means for supplying a plurality of conductors to be covered with braid, a take-up capstan, means for applying a tubular braided fabric covering to the conductors, and means operative between the braiding point and the capstan to prevent contact of one of the conductors with the braided covering.

12. In a braiding machine, means for applying a tubular braided fabric covering to a core, and means operating externally of the core and underneath the braided covering to soften the braid.

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