April 1, 1930. H. R. MASSINGHAM 1,752,497

APPARATUS FOR PRODUCING ELECTRICAL CABLES

Filed July 19, 1926

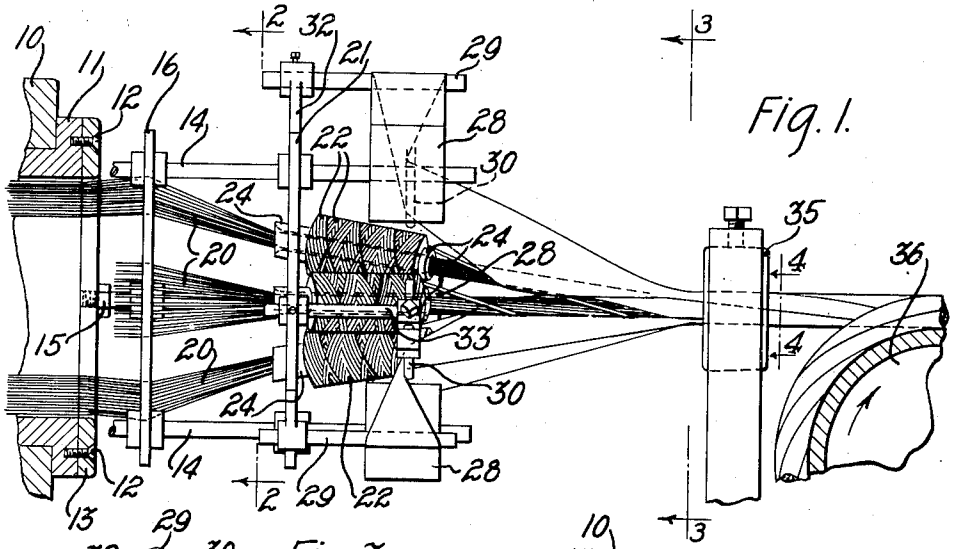

Fig. 1.

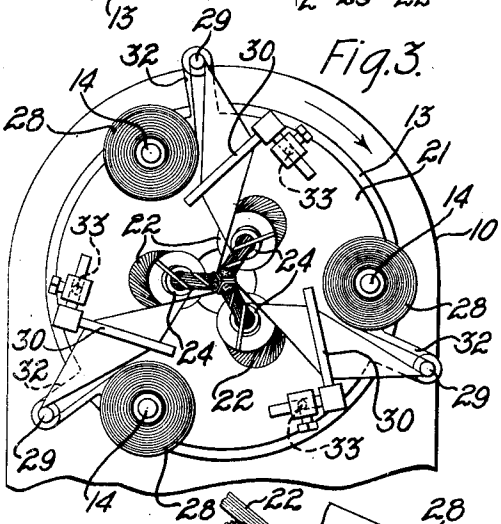

Fig. 3.

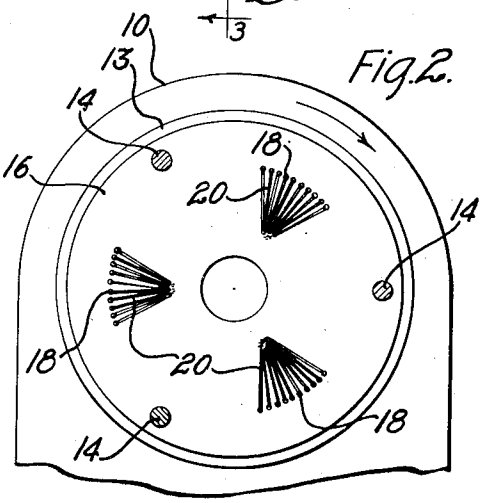

Fig. 2.

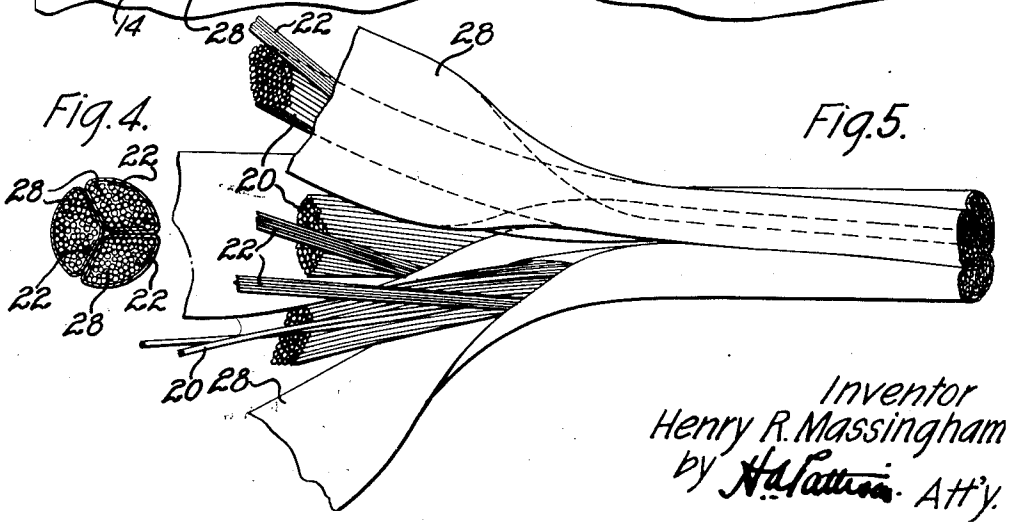

Fig. 4.

Fig. 5.

Inventor
Henry R. Massingham
by H. R. Patterson. Att'y.

Patented Apr. 1, 1930 1,752,497

UNITED STATES PATENT OFFICE

HENRY ROGERS MASSINGHAM, OF LA GRANGE, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

APPARATUS FOR PRODUCING ELECTRICAL CABLES

Application filed July 19, 1926. Serial No. 123,329.

This invention relates to an apparatus for producing electrical cables, and more particularly to an apparatus for producing electrical cables of the type employed for the transmission of intelligence telephonically.

In one form of the aforementioned type of cables, a plurality of twisted pairs of insulated conductors are loosely stranded into a group, the insulation of one conductor of each of the pairs of the group having definite color combinations and the whole being served by a suitably colored textile strand applied in an open helical formation thereto. The groups so formed may each be provided with a metallic sheath for preventing the absorption of moisture and in some types of cables as a protector from the inductive influence of the circuits including the wires contained in the other groups of conductors in a multigroup cable, the sheaths generally being composed of thin strips of tin or lead foil helically applied thereto. A plurality of such groups, each group having a strand of a different color, are stranded together to form a single composite cable. The color combinations of the pairs of conductors within each group and the differently colored strand applied to each group serve to identify the different circuits contained in each group and the different groups of circuits respectively, all contained in the single composite cable.

Heretofore in forming cables of the aforementioned type, it has been the usual custom to employ a plurality of separately operated and different mechanisms, one for forming the individual groups and applying the identifying strand and the metallic sheath, from a plurality of previously twisted insulated conductors and another for compacting and stranding the plurality of distinct groups into a single composite cable of predetermined cross-section. The forming of the cable in this manner using different mechanisms each separately driven and operated, it will be evident, necessitates the use of a considerable amount of floor space, a large number of attendants and a loss of operating time incident to the transfer of the groups as formed and their separate assembly upon the group stranding and compacting apparatus for stranding into the final composite cable.

The object of this invention is to provide an improved apparatus for economically and expeditiously forming electrical cables of the hereinbefore described type, wherein the different operations are performed simultaneously.

In accordance with one embodiment of this invention as practiced in connection with the forming of telephone switchboard cables, a plurality of twisted pairs of insulated conductors are simultaneously withdrawn from a plurality of supply sources, uniformly distributed around and revolvable about an axis upon which the conductors finally converge, drawn through a grouping means revolvable with the supply sources to form the separate groups, thence each group is drawn through the axis of an individual cop of multiple end cotton thread also revolvable with the supply sources where an identifying strand is applied thereto in helical formation. Simultaneously with the foregoing operation a thin metallic tape is applied longitudinally thereover to form a continuous sheath thereon and finally the several distinct groups are stranded and compacted into a composite cable of predetermined cross-section.

Other objects and advantages of this invention will more fully appear from the accompanying detailed description taken in connection with the accompanying drawings which illustrate one embodiment thereof.

In the accompanying drawings,

Fig. 1 is a fragmentary side view, partly in section, of the outlet end of a wire twisting or stranding apparatus embodying the features of this invention;

Figs. 2 and 3 are vertical sectional views on the lines 2—2 and 3—3 respectively, thereof, looking in the direction indicated by the arrows;

Fig. 4 is an enlarged vertical sectional view on the line 4—4 of Fig. 1 looking in the direction indicated by the arrows showing in detail a telephone switchboard cable after leaving the compacting means, and

Fig. 5 is a fragmentary side elevation thereof.

This invention will be described in connection with a wire twisting or stranding apparatus, such as is used in the manufacture of telephone cables of the type described and claimed in the co-pending application of J. H. Biggar, Serial No. 745,096, filed October 22, 192x. In order to simplify the disclosure of the present invention only such elements of a stranding or serving apparatus have been shown as are necessary to a full and complete understanding of the invention. For a complete illustration and description of a stranding apparatus with which the present invention is particularly applicable, reference may be had to the co-pending application of C. R. Avery, Serial No. 709,332, filed April 28, 1924.

Referring now to the drawing in detail, a portion of the frame of a stranding apparatus is indicated at 10 with a hollow rotatable shaft 11 journaled therein. Attached concentrically to the end of the hollow shaft 11 by a plurality of screws 12 is a mounting ring 13 carrying three studs 14 spaced 120° apart, the studs each being suitably secured to the ring 13 as indicated at 15. Mounted upon the studs 14 a suitable distance from the ring 13 is a guide or grouping plate 16 provided in the present instance, as clearly shown in Fig. 2, with three uniformly spaced groups of apertures 18, each group comprising 10 apertures through each of which is threaded a pair of individually insulated twisted wires 20. In the operation of the stranding apparatus each pair of the wires 20 is drawn from a freely rotatable supply spool (not shown) and advanced toward the right as viewed in Fig. 1 at a predetermined rate and through its respective aperture 18 in the grouping plate 16. Also carried upon the studs 14 and in suitable spaced relation from the plate 16 is a plate 21 mounting in the present instance three uniformly spaced cops 22 of differently colored multiple end cotton threads. The cops 22 are fixed relative to the plate 21, a hollow axial core (not shown) formed from compressed cardboard or other suitable material and upon which the cotton thread is wound being pressed over a plurality of radially extending fins (not shown) extending from the peripheral wall of a sleeve 24, which is secured at the desired angle to the right flat face of the plate 21 (Fig. 1) and projecting through the plate to the opposite side thereof. The longitudinal axial passageways of the sleeves 24 at their left end are bell mouthed to facilitate the threading and passage of the grouped pairs of wires 20 which converge thereinto as they are drawn therethrough in the operation of the apparatus from the apertures 18 in the plate 16 and are thus formed into a group of substantially circular cross-section. The cops 22 are mounted upon their supporting sleeves 24 so that the threads thereof unwind in a clockwise direction as viewed in Fig. 3, the rotating parts of the apparatus also revolving in the same direction as indicated by the arrows in Figs. 2 and 3.

Mounted for free rotation upon each of the studs 14 to the right of the cops 22 as viewed in Fig. 1, is a roll of thin lead tape 28 which in the operation of the apparatus is served longitudinally to the group of wires in such a manner that the line of the overlap, as clearly indicated in Fig. 5, is disposed parallel to the longitudinal axis thereof, the tape being guided to its respective group of wires 20 by guide pins 29 and 30. The guide pins 29 over which the tape is first led are mounted upon ears 32 formed integral with the plate 21, while the guide pins 30 are adjustably carried upon rods 33 in turn adjustably mounted upon the plate 21 and parallel to the studs 14. The pins 30 are set at such an angle to the right face of the plate 21 that the tape after passing over the pins 30 is not led at an abrupt angle from its line of travel to the guide pin 29. In some instances it may be found desirable to substitute rollers for the guide pins 29 and 30, depending upon the type and strength of the tape 28 being served. A stationary sleeve 35 in axial alinement with the stranding apparatus is provided with an aperture having a contour corresponding to the desired shape of the finished cable, which may be drawn therethrough by a usual capstan mechanism 36. The sleeve 35 functions to compact the several groups of wires, in the present instance three, into the cylindrical composite form, as illustrated in Fig. 4. This is due to the fact that each group is relatively soft, caused by it being formed loosely in the stranding operation, and also that the identifying strand 22 and the thin lead tape 28 of each group are applied loosely thereon.

The operation of the cable forming apparatus hereinbefore described is as follows:

The paired wires 20 are drawn manually from their respective supply spools (not shown) and threaded through their respective apertures 18 in the plate 16 and thereafter through the axial passageways of the sleeves 24. Each of the resulting groups of conductors is then identified by attaching a different colored thread from the cops 22, thereafter a lead tape 28 is suitably attached to each group and the several groups passed through the compacting sleeve 35 and around the capstan 36 several turns. It will be apparent upon causing the hollow shaft 11 and the capstan 36 to rotate in the direction indicated by the arrows (Figs. 1 to 3, inclusive) that the twisted paired wires 20 will be drawn longitudinally through the apparatus continually being divided into separate groups, each group being served with an identifying thread applied in an open helical formation therealong and immediately thereafter sheathed with the lead tape 28 applied longi-

tudinally thereover in the manner hereinbefore described. The several individually identified and sheathed groups of wires are simultaneously stranded before passing through the compacting sleeve 35, and in their passage therethrough are compacted into the single composite cable illustrated in Figs. 4 and 5.

It may be found desirable in some instances to omit the colored identifying thread 20 and substitute an entirely colored or partially colored metallic tape 28, which in addition to its serving as a retaining and identifying member would also serve as a sheath against the entrance of moisture and the inductive influence of the associated groups of conductors upon one another, as well as extraneous inductive influences.

What is claimed is:

1. In an apparatus for forming telephone cables, a rotary member, a plurality of sleeves mounted therein and adapted to carry cops of binding material in fixed relation thereto, means for supplying to the interior of each of said sleeves a group of conductors to be bound, said means including a rotary disk having groups of guiding apertures therein for the conductors and means for serving the material to the group of conductors.

2. In an apparatus for forming telephone cables, a rotary member, a plurality of sleeves mounted therein and adapted to carry cops of binding material in fixed relation thereto, rotary means for supply to the interior of each of said sleeves a group of conductors to be bound, means for serving the binding material to the group of conductors and means carried by the rotary member for supplying a covering to each of said groups.

3. In an apparatus for forming telephone cables, a rotary member, a plurality of sleeves mounted therein and adapted to carry cops of binding material in fixed relation thereto, means for supplying to the interior of each of said sleeves a group of conductors to be bound, means for serving the binding material to the group of conductors and means for supply a protective covering to each of said groups, said last mentioned means including members adapted to rotatably support rolls of tape and guiding members adapted to apply the tape in closed longitudinal relation to each group of conductors.

4. In an apparatus for forming telephone cables, a rotary member, a plurality of sleeves mounted therein and having their axes converging at a point forwardly of said rotary member, said sleeves being adapted to carry cops of binding material in fixed relation thereto, means for supplying to the interior of each of said sleeves a group of conductors to be bound, means for serving the binding material to the group of conductors and means carried by said rotary member for supplying a covering to each of said groups, said last mentioned means including studs projecting perpendicularly from said rotary member to rotatably support rolls of tape and guiding members adapted to apply the tape in closed longitudinal relation to each group of conductors.

In witness whereof, I hereunto subscribe my name this 7th day of July, A. D. 1926.

HENRY ROGERS MASSINGHAM.