March 6, 1945. W. J. L. WILDBORE 2,370,899

APPARATUS FOR WINDING STRANDS PARTICULARLY FOR LAPPING OR BRAIDING MACHINES

Filed March 10, 1943

FIG. 1.

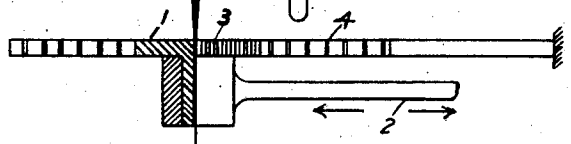
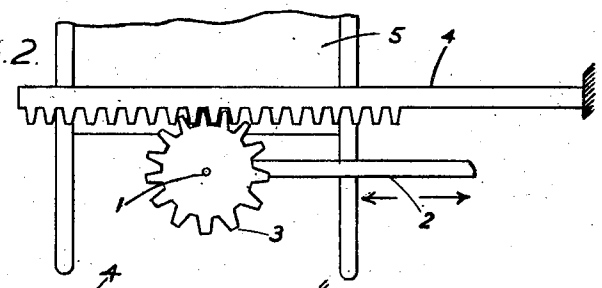


FIG. 2.



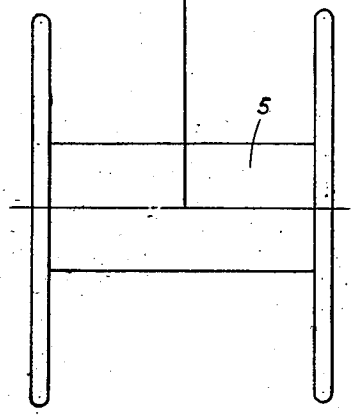


FIG. 3.

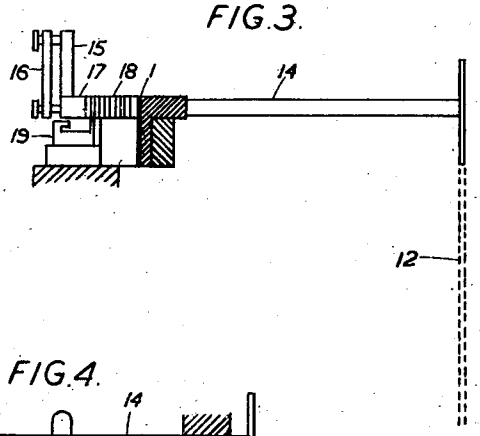
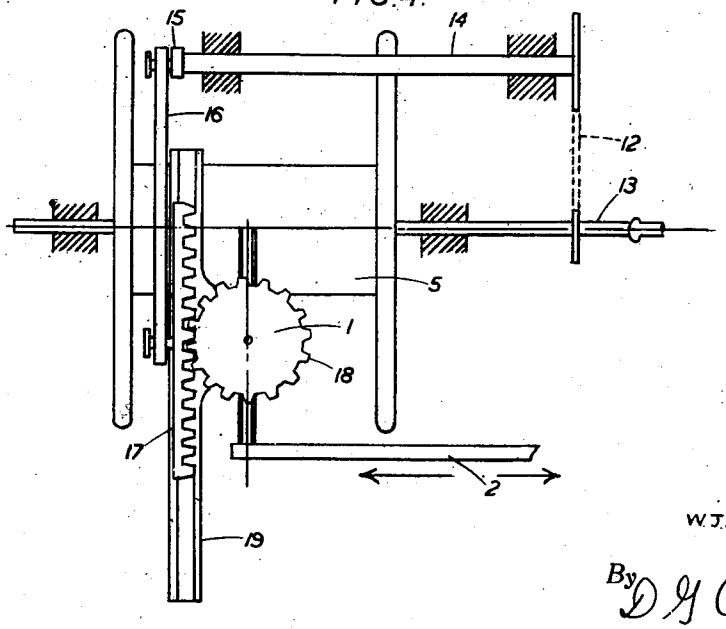


FIG. 4.



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2,370,899

APPARATUS FOR WINDING STRANDS, PARTICULARLY FOR LAPPING OR BRAIDING MACHINES

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4 Claims. (Cl. 57—1)

This invention relates to an improved process and apparatus for winding strands particularly for lapping or braiding machines.

The extensive use of high frequencies in telephonic transmission has led to large demands for wire having an electrostatic screen over the insulation. Such a screen is often provided by a lapping or braiding of copper wires and in such instances it is often necessary to wind several wires on to one bobbin for fitting on the lapping or braiding head. For these multiple wound bobbins to operate successfully one requirement is that each wire shall be of a similar length to its fellows as any slight amount of slack in a wire tends to accumulate at any guide or constricting device through which the several strands may be required jointly to pass and such accumulation of slack tends to form a loop which is liable to catch or entangle itself with other parts of the machine. A second requirement is that all the wires on any one bobbin should not be twisted around each other since they would then appear twisted in the finished lapping or braiding and the full available coverage of the wire would not be secured.

One cause of trouble in meeting the first requirement is that in winding several wires together on to the same bobbin one wire may ride over the top of the others and, being wound on a slightly larger diameter, the length on one turn round the bobbin is longer than that of its fellows. In normal winding practice there is nothing to prevent one wire overriding the others for some while and a considerable amount of slack may accumulate in that wire during the subsequent braiding or lapping operation.

This trouble may be eliminated by twisting the strands together but this means that the second requirement, stated above, is not met.

According to the present invention I arrange that a partial twist, which may be anything from a part of a revolution to several revolutions, is applied in one direction to a short length of the wires and an exactly equal twist is applied in the opposite direction to the next short length of the same wires. The result of this operation is that each wire in turn is in the position where it is most likely to over-ride the others and that differential treatment of the wires is eliminated. Under such conditions it is evident that a disparity in the lengths of the wires is less likely to occur. Since the wires are twisted equally in opposite directions the aggregate twist over a long length of the wound wire is zero and the length and duration of the twisting can be so arranged that when the wire passes through a guide on the lapping or braiding machine the twist is substantially eliminated.

One method of carrying out the winding operation is to arrange that the individual wires, comprising the multiple winding required on the bobbin, are passed through separate holes in a lay plate before being wound on to the bobbin and that this lay plate has imparted to it an oscillatory rotation. Provided there is a fairly long run of wire between this lay plate and the previous pulley round which the wire passes, the twist which is put into this section of the wire will disappear when the lay plate rotates in the opposite direction, whereas if there is a short run of wire between the lay plate and the receiving bobbin, the twists will appear in the wires on the bobbin.

In many cases a lay plate with separate holes for each wire is unnecessary and satisfactory results are secured by passing all wires through a die with one central hole which has imparted to it an oscillatory rotation. In this instance a suitable size of hole can be selected which produces the oscillatory twisting of the wires by the friction between the wires and the rotating die.

The invention will be better understood by reference to the accompanying diagrammatic drawing in which

Figs. 1 and 2 show in elevation and plan respectively one simple form of winding apparatus for receiving the desired result; and

Figs. 3 and 4 show in elevation and plan respectively a modified arrangement.

Referring first to Fig. 1. Here the wires are passed through a rotatable die **1**, carried on the traverse arm **2**, of the winding machine. The die has gear teeth **3** cut in the outer surface which engage with those on a stationary rack **4**. Thus while the traverse arm is moving from left to right, the die is rotating counter-clockwise when seen from above. When the traverse arm returns from right to left the direction of rotation of the die is reversed. The twist is thus imparted to the wires as they are wound on the bobbin **5**.

The arrows adjacent to traverse arm **2** indicate that this arm has a reciprocating motion. Any suitable mechanism (not shown) as well known in the art may be employed for imparting such motion to this arm and as I am not limited to any specific device for this purpose, it is omitted from the drawing for the sake of greater clarity. Any suitable mechanical coupling to the winding apparatus may furnish motive power therefor.

An alternative method is shown in Figs. 3 and 4. Here the rotatable die 1 is located at a fixed point and positively driven from the winding bobbin 5 with the oscillatory motion desired. A chain drive 12 is driven from the bobbin spindle 13 to rotate the shaft 14. This shaft 14 is fitted with a crank 15 driving through a link 16, a toothed rack 17 engaging with teeth 18 on the outside of the rotatable die 1. The rack 17 is a sliding fit in its support 19 and oscillates backwards and forwards to impart the required motion to the die 1. In this case the strands passing through the die 1 are engaged by the fork on the traversing arm 2 for distribution on the bobbin 5.

What is claimed is:

1. Apparatus for winding multiple strands on a bobbin with an equal and opposite twist for use in a lapping or braiding machine for the purpose described, including a traverse member, reciprocatingly traversing along said bobbin, a lay plate through which the individual strands are passed, rotatably mounted at the free end of said traverse member, and means whereby the direction of rotation of said lay plate is reversed upon the reversal of direction of longitudinal displacement of said traverse member, whereby said strands are twisted in alternately opposite directions while passing through said lay plate, according to the direction of rotation of said lay plate.

2. Apparatus according to claim 1, wherein said die has a single hole and strands are twisted by being passed collectively through said single hole in said die, the relative dimensions of said hole and of the strands passing therethrough being made such that the friction between said strands and said die produces the twisting of said strands.

3. An apparatus according to claim 1, wherein said last-mentioned means include the traverse arm of the bobbin winding device, a fixed rack engaging said lay plate, and means for mounting said lay plate rotatably on said traverse arm whereby it is rotated in opposite directions during the to and fro movements of said traverse arm by reason of said engagement between said fixed rack and said lay plate.

4. Apparatus according to claim 1, wherein said last-mentioned means also includes a crank-like member rotated by the operation of said winding apparatus, a rack driven reciprocatingly by said crank-like member, means for engaging said lay plate and said rack, and means for mounting said lay plate rotatably in fixed relation to said bobbin, whereby said lay plate is rotated in opposite directions by reason of engagement with said reciprocatingly driven rack.

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