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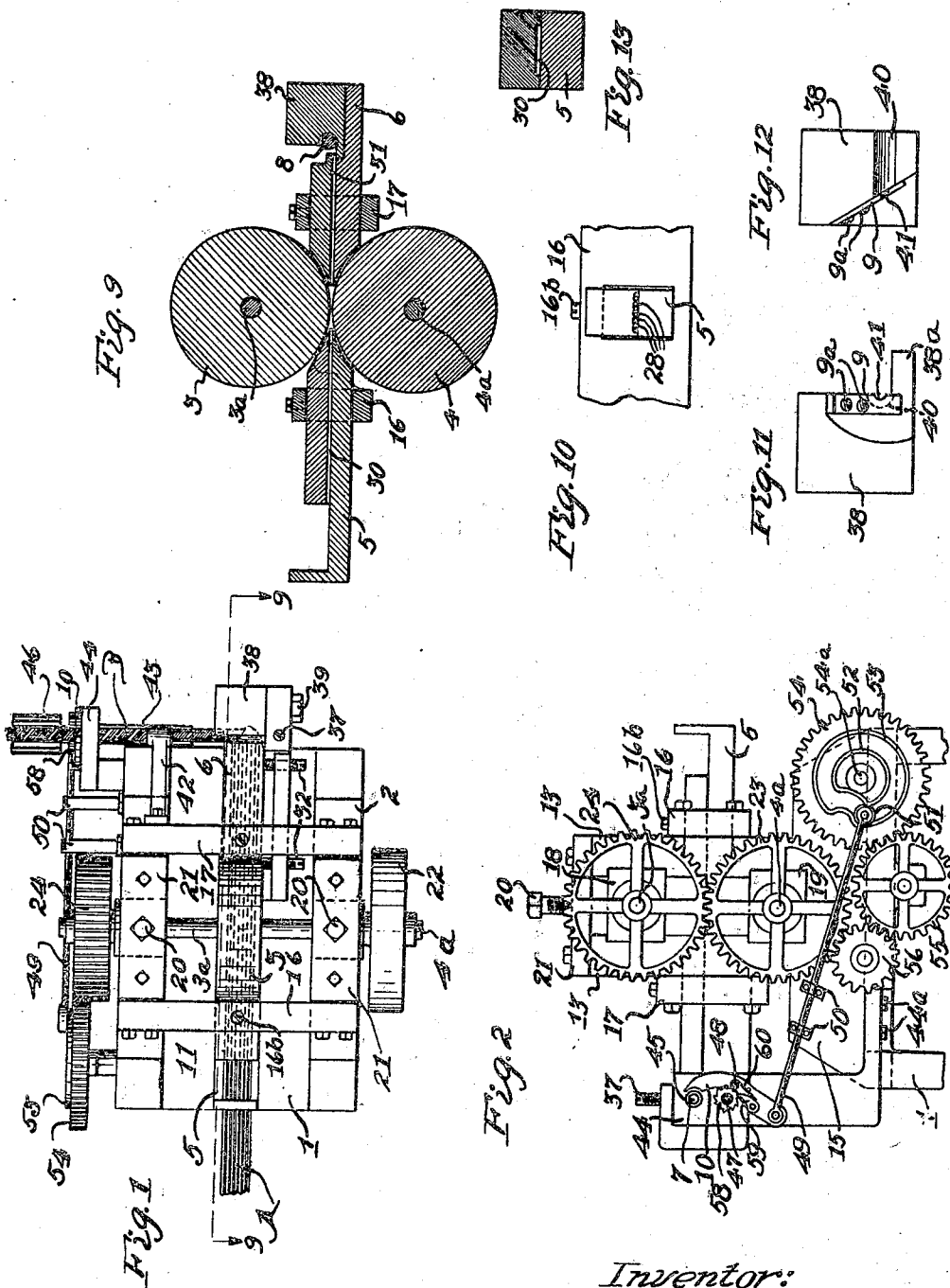
W. J. MAHONEY

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WIRE CABLE COILING MACHINERY

Filed July 10, 1920

2 Sheets-Sheet 1



Inventor:  
William J. Mahoney,  
by: John E. Shyler  
Attorney.

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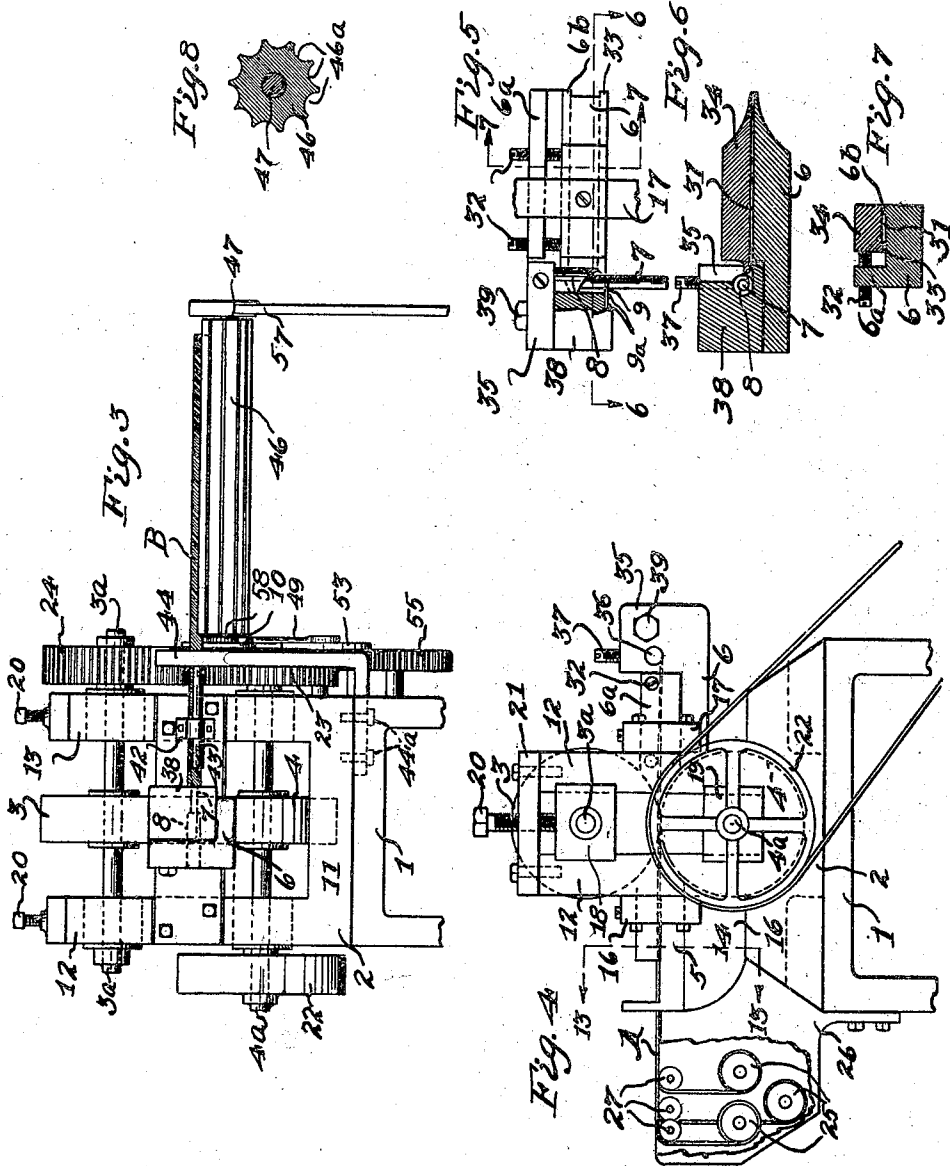
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Inventor:  
William J. Mahoney  
by: John E. Stephen  
Attorney.

## UNITED STATES PATENT OFFICE.

WILLIAM J. MAHONEY, OF ST. PAUL, MINNESOTA.

## WIRE-CABLE-COILING MACHINERY.

Application filed July 10, 1920. Serial No. 395,221.

*To all whom it may concern:*

Be it known that I, WILLIAM J. MAHONEY, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented new and useful Improvements in Wire-Cable-Coiling Machinery, of which the following is a specification.

My invention relates to a machine for automatically forming a cable from a plurality of wires.

My primary object is to provide efficient and novel means for forming the stands of wire into coils and to cause the coils to be discharged from the machine in a single cable. Each strand is bent into successive coils of a uniform pitch and these form a cable with a hollow center.

A further object of my invention is to provide adjustable means whereby the number of strands in the cable may be varied to produce cables of different strengths.

Another object of my invention is to provide means for automatically cutting the cable, as it is discharged from the machine, into predetermined, uniform lengths.

The strands of wire for forming the cable are drawn into and forced through my machine by two opposed feed rolls. Upon entering the machine the strands are brought into parallel relation by a suitable guide and after passing the feed rolls are prevented from buckling or creeping over each other by a similar guide passageway that leads to the coiling device proper. The coiling device consists of a stationary mandrel having a spiral guide adjacent thereto which directs the several strands of wire around the mandrel, thereby forming a cable. The cable is discharged from the machine with its axis at right angles to the entering strands and is cut into uniform lengths.

Referring to the accompanying drawings Figure 1 is a plan view of my improved machine with a portion of the cable receiving drum removed. Fig. 2 is an elevation of the discharge end of the same; Fig. 3 is a side elevation showing the cable receiving drum complete; Fig. 4 is an elevation of the end opposite the one shown in Figure 2; Fig. 5 is a detail plan view of the coiling mechanism proper with portions broken away; Fig. 6 is a section taken on the line 6—6 of Fig. 5; Fig. 7 is a section taken on the line 7—7 of Fig. 5; Fig. 8 is a transverse section of the cable receiving drum; Fig. 9 is a sec-

tion taken on the line 9—9 of Fig. 1; Fig. 10 is an elevation of the wire receiving end of the guide passageway together with a portion of the supporting bar; Fig. 11 is a detail end view of the spacing plate and guide block, Fig. 12 is a side elevation of the same; and Fig. 13 is a section taken on the line 13—13 of Fig. 4.

In the drawings I have used the numeral 1 to indicate a suitable support for my device, 2 the frame, 3 the upper feed roll, 4 the lower feed roll, 5 the primary guide, 6 the secondary guide, 7 the mandrel, 8 the spiral, 9 the spacing plate and 10 the knife lever. The letter A indicates the wires for making cable and B the finished product.

The frame 2, which is secured in a suitable manner to the upper surface of the support 1, consists of a base 11, two pairs of vertical arms 12 and 13, end walls 14 and 15 and guide supporting bars 16 and 17.

The feed rolls 3 and 4 are rigidly mounted on shafts 3<sup>a</sup> and 4<sup>a</sup> respectively, said shafts being revoluble in suitable journal boxes 18 and 19 between the pairs of vertical arms 12 and 13. To adapt the feed rolls to receive different sizes of strand wires that may be required in making cables, the upper roll 3 is made adjustable. To this end the journal box 18 is made slidable vertically between the arms 12 and 13, and suitable set screws 20 are threaded in plates 21 on the upper ends of said arms so as to cause the roll 3 to be raised or lowered when said set screw are turned. The ends of the shaft 4<sup>a</sup> project through the bearings 19 to receive a pulley 22 and gear 23, said pulley and gear being fast on said shaft. A suitable belt applied to the periphery of the pulley 22 is adapted to deliver power to said pulley. A gear 24 fastened on the projecting end of the shaft 3<sup>a</sup> meshes with the gear 23 and drives the periphery of the roll 3 at substantially the same speed as the periphery of the roll 4. The remaining parts of my machine will be described in their order with reference to the operation of making a cable.

In Figure 4 is shown a suitable support for spools of wire together with rollers for directing the strands into the guide 5 of my machine. The spools 25 are revoluble in the housing 26, said housing being bolted to the support 1. A plurality of rollers 27, one for each strand of wire, direct said strands in the same horizontal plane to the holes 28 (Fig. 10) in the upwardly projecting end

of the primary guide 5. The guide 5 (Figs. 9 and 13) is constructed in two parts with a narrow passage 30 between them. The bar 16 is bolted near its ends to the vertical arms 12 and 13 and has a rectangular opening through which the guide 5 passes and in which said guide is held by a set screw 16<sup>b</sup>. The inner end of the guide 5 is tapered and fits between the rolls 3 and 4 in a manner to deliver the incoming strands of wire as near as possible to the line of contact of said rolls (Fig. 9). The slot 30 is just wide enough to allow the required number of strand wires to enter side by side in parallel relation and just high enough for clearance. Thus there is no possibility for the entering wires to buckle or creep over each other. The strands of wire after passing the rolls 3 and 4 enter the secondary guide 6 which is supported in an opening in the bar 17. A passage-way 31 in the guide 6 is adjustable as to width by means of set screws 32. A flange 6<sup>a</sup> (Fig. 7) formed on the guide 6 contains the screws 32, and a rib 33 on an upper member 34 of said guide together with a similar rib 6<sup>b</sup> on the guide 6 form adjustable side walls for the passageway 31.

The coiling mechanism is mounted on the end of the guide 6 away from the rolls 3 and 4. A projection 35 at this end of the guide 6 is perforated at 36 (Fig. 4) to receive the end of the mandrel 7 and spiral 8, and a set screw 37 threaded in said projection is adapted to rigidly secure said mandrel and spiral in said perforation. A block 38 (Figures 5, 6, 11 and 12) is fastened in a recess in the guide 6 by a bolt 39, said bolt passing through the projection 35 and being threaded in said block. A semi-circular recess 40 in the block 38, is formed to partially surround the spiral 8 on its side away from the guide 6 and to direct the strands of wire around the mandrel 7. The block 38 has an extension 38<sup>a</sup> which projects under the upper member 34 of the guide 6 and a portion of said block is cut away to form a seat for the spacing plate 9 at an obtuse angle with the axis of the mandrel 7. The plate 9 is secured to the block 38 by screws 9<sup>a</sup>, and a semi-circular recess 41 in one edge of said plate makes contact with the periphery of the mandrel 7.

A bracket 42 (Figs. 1 and 3) supporting a trough 43 is bolted to the bar 17 and said trough directs the cable B from the mandrel 7 to the severing mechanism. The severing mechanism is provided to cut the cable B, after it leaves the mandrel 7, into uniform lengths and consists of a bracket 44 perforated at 45 (Fig. 2) in line with the axis of the mandrel 7, and a knife lever 10 together with the necessary operating mechanism hereinafter described.

As a support is necessary to prevent the cable B from bending before it is cut into

the desired lengths, I supply a revoluble receiving drum 46 (Figs. 1, 3 and 8), of a length at least equal to the lengths into which it is desired to cut the cable B, and positioned in line with the mandrel 7 and perforation 45. A plurality of longitudinal grooves 46<sup>a</sup>, adapted to receive sections of the cable B, are formed in the drum 46.

The bracket 44 is secured by bolts 44<sup>a</sup> to the under side of the base 11 and forms a support for the knife lever 10 and one end of the shaft 47 on which the drum 46 is mounted. The knife lever 10 (Fig. 2) is pivotally mounted on a pin 48 in the bracket 44 and its upper end is adapted to sever the projecting cable B against the edge of the perforation 45. The lower end of said lever 10 is actuated by a rod 49 said rod being slidable longitudinally in brackets 50 on the end wall 15 of the frame 2. A roller 51 is mounted on the end of the rod 49 opposite the lever 10 and is arranged to roll between two similar cam surfaces 52 and 53 formed on the face of a gear 54. This gear 54 is revoluble on a shaft 54<sup>a</sup> in the end wall 15 and is driven through two meshing change speed gears 55 and 56 from the gear 23 on the shaft 4<sup>a</sup>. Thus in operation the rod 49 is given a reciprocating motion and the knife lever 10 an oscillating tilting motion.

The receiving drum 46 is fast on the shaft 47, said shaft having a journal bearing at one end in a separate support 57 (Fig. 3) and at its other end in the bracket 44. A small ratchet 58 is rigidly mounted on the shaft 47 adjacent to the bracket 44 and a pawl 59, pivotally mounted on the lever 10 and resiliently held in contact with the periphery of said ratchet by a spring 60, is arranged to intermittently rotate the drum 46 when my machine is in operation.

In operation the strand wires A are drawn through the guide 5 and pushed through the guide 6 by the co-acting rolls 3 and 4 (the pressure between said rolls having been adjusted by the screws 20). When the ends of the strands arrive in the recess 40 of the block 38 they are bent upward and at the same time the spiral 8 directs them laterally around the mandrel 7. The spacing plate 9 confines the several wires within the recess 40 until they are properly bent and prevents the first or adjacent wire from taking a wrong direction. Thus the strands are simultaneously coiled side by side in parallel relation and come out in a hollow cable which rotates about its axis. The cable passes through the recess 45 in the bracket 44 to the receiving drum 46. While this is taking place the gear 54 has been rotated by means of the change speed gears 55 and 56 from the power gear 23, the speed ratios of these gears being so fixed that the knife lever 10 will be tilted (by the cam surfaces 52 and 53, roller 51 and rod 49) to

sever the cable B when the desired amount of said cable has arrived on the drum 46. As the cable is severed the oscillation of the lever 10 will cause the pawl 59 to engage  
5 and rotate the sprocket 58; this will rotate the drum 46 and cause the severed portion of cable to be carried to one side in one of the grooves 46<sup>a</sup> while another of said grooves will be brought in line with the aperture 45  
10 to receive the next section of cable. The above operation will now be repeated, the severed portions of cable being dropped by the drum 46 into a convenient receptacle or being carried away by a power conveyor  
15 of suitable design. The cable coiled by my machine contains a spiral space between adjacent groups of contacting strands which is equal in width to the thickness of the spacing plate 9.

20 When a strand breaks for any reason or if all of the wire has been removed from one of the spools 25, it may be replaced by merely inserting a new strand through the same perforation 28 in the guide 5 and forcing  
25 the end of said strand between the peripheries of the rolls 3 and 4.

Having described my invention what I claim as new and desire to protect by Letters Patent is:

30 1. In a cable machine, a frame, feed rolls journaled in said frame, guides to and from said rolls for a plurality of strands of wire and means for simultaneously coiling said strands in parallel spirals, comprising a  
35 mandrel constituting a temporary core for said strands, a spiral guide around said

mandrel and a block having a recess adapted to confine the strands of wire adjacent to said mandrel and spiral guide for a part  
40 only of a turn around said mandrel.

2. In a cable machine, a frame, feed rolls  
45 journaled in said frame, guides for a plurality of wires leading to and from said feed rolls and adapted to confine said strands adjacent to each other in the same  
45 plane, a stationary mandrel mounted in said frame and a spiral guide around said mandrel, whereby the strands of wire will be simultaneously coiled in parallel spirals  
50 and extended at an angle to the direction of travel of said feed rolls.

3. In a cable coiling machine, a frame, feed rolls journaled in said frame, guides  
55 for a plurality of strands of wire mounted in said frame and arranged to confine said strands adjacent to each other in the same plane, means for simultaneously coiling said  
60 strands in parallel spirals to form a cable with its axis extending at right angles to the direction of travel between said feed rolls, said means comprising a stationary  
65 mandrel mounted in said frame and a spiral guide around said mandrel, a stationary die mounted on said frame, a knife pivotally mounted adjacent said die arranged to cut  
said cable into uniform lengths and a revoluble drum support for sections of said cable.

In testimony whereof, I have hereunto subscribed my name to this specification.

WILLIAM J. MAHONEY.