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WIRE COILING APPARATUS

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6 Claims. (Cl. 242-82)

This invention relates to wire processing operations, such as the application of insulation coatings to bare wire, in which wire, withdrawn from a supply, is advanced through one or more processing steps and then suitably wound. The object of the invention is to obviate the need to stop the moving wire line upon depletion of the supply, by the provision of novel apparatus and methods for accumulating, from the supply, a wire reserve adequate to maintain delivery during replenishment of the supply.

The conventional practice, upon depletion of the bare wire supply in a coating operation, of stopping the wire line, substituting a fresh supply, splicing it into the line, and re-starting the line through the coater to a finished-wire spool involves faulty operation and breakage, high labor costs, and large scrap losses. Efforts to obviate this problem have not, so far as I am aware, afforded a commercially acceptable substitute for this practice.

I have discovered that during the withdrawal of bare wire as demanded by the coating and wind-up operation, a surplus of bare wire may also be withdrawn from the supply and temporarily stored in such a way as to afford a reserve supply which may be drawn on to accomplish a feed of the wire through the coater to the wind-up spool which is continuous and uninterrupted by exhaustion of the supply spool. By the present invention I have adapted that discovery to practical commercial use.

In the drawings:

FIG. 1 is a schematic plan view showing the bare wire supply and the coating, feeding, and coated wire wind-up elements of typical apparatus in which my invention may be incorporated;

FIG. 2 is an elevation view, partly in section, of a preferred embodiment of my invention;

FIG. 3 is an elevation view of a certain portion of my novel accumulator, illustrating one step in the operation;

FIG. 4 is a plan view of FIG. 2, with parts omitted;

FIG. 5 is a horizontal section on the line 5-5 of FIG. 2;

FIG. 6 is a horizontal section on the line 6-6 of FIG. 2; and

FIG. 7 is a horizontal section on the line 7-7 of FIG. 2.

In the diagram of FIG. 1 typifying one environment in which my invention may be employed, 2 is a spool supplying bare wire 4 which passes over the coating applicators 6 and thence through a drying oven 8. Conventionally the coating operation involves the successive application of a number of coatings, followed by return passes through the oven, as indicated by the further applicator 10 and the return rolls 12 and 14. On the last pass the coated wire, designated 16, is wound up at 18 which represents a shipping spool to be wound with a predetermined length or weight of finished coated wire. The elements of the apparatus designated so far may be conventional. At 20 I have indicated diagrammatically the accumulator provided by the present invention. In its preferred form, the details of its construction and mode of operation follow, together with a description of my novel method.

The several elements of the accumulator 20 (FIG. 2) are supported on a stand comprising the base 22 and supporting post 24 (FIG. 4) on which the parts are ad-

justably mounted by a number of clamping rings to be referred to.

The drive is by a motor 26 clamped by a strap 28 bolted at 30 to a bar 32 which is flanged at 34 and bolted at 36 to an angle iron 40. The angle iron 40 extends rearwardly to a clamping block 42 (FIG. 5) to which it is secured by bolts 44. The block 42 is formed with a circular hole 46 of a diameter slidably to receive the supporting post 24 to which it may be secured in vertically adjusted position by the thumb screw 48 passing through a screw-threaded hole in the block and bearing against the post. A complementary angle iron 50 is also bolted at 52 to the clamping block 42 and extends forwardly parallel with the angle iron 40.

The angle irons 40 and 50, at their forward extremities, afford support for a bearing block 54 (FIG. 6) bolted at 56 to the angle iron 40 and at 58 to the angle iron 50.

The bearing block 54 has a circular opening for reception of an annular bearing 60, preferably of nylon, secured to the bearing block by upper screws 62 (FIG. 6) and lower screws 64 (FIG. 2). Rotatably mounted in bearing 60 is the shaft 66, flanged at 68 at its lower end and protruding at its upper end above the bearing 60. A washer 61, friction fitted over the protruding end, is of a thickness equal to the length of the protrusion to afford flush surfaces for the support of a gear 70, secured to the shaft by screws 72. Gear 70 meshes with and is driven by pinion 73 formed on the end of shaft 74 of motor 26.

Mounted above and in vertical axial alignment with the gear 70 and shaft 66 is the drum 80. The side wall of the drum, flanged at 82, has a circular top cover plate 84, formed with an annular shoulder 86 which has a snug friction fit with the upper edge of the drum wall.

The drum is rotatably mounted on post 88 by means of upper and lower bearings 90 and 92, the inner races of which are mounted on the post and the outer races of which are mounted respectively in upper and lower bearing retainers 94 and 96 secured to the drum wall to rotate therewith. The outer race of the upper bearing 90 is received in recesses 100 and 102 formed respectively in the bearing retainer 94 and the closure plate 84. The inner race is engaged by washer 104 received over the extremity of the post 88 which is screw-threaded for reception of the locking nuts 106. The outer race of the lower bearing 92 is received in a recess 108 formed in the lower bearing retainer 96. The inner race is held in place by a head 110 formed on the post 88. The elements of the drum are secured together by screws 120 passing freely through the aligned apertures in the cover plate 84 and bearing retainer 94 and being received in screw-threaded orifices in the bottom bearing retainer 96. The inner surface of the drum wall is recessed to form a lower shoulder 122 against which the upper retainer bears, and an upper shoulder 124 against which the lower retainer 96 bears when the screws are tightened.

The post 88 on which the drum 20 is rotatably mounted, is in turn supported by a bracket 126 having at one end a flange 128, apertured for passage of a screw 112, threaded into the post 88. A washer 130 is interposed between the lower surface of the flange and the screw head 131. At its lower end the bracket 126 terminates in a base plate 132 (FIG. 5) resting on gear 70 and bolted to it at 134. As gear 70 rotates, bracket 126 and post 88 which it supports also rotate and yet the drum is not thereby driven because of bearings 90 and 92, by which the drum is freely rotatable with reference to the post. The bearing block 54 (FIG. 6), the bearing 60, and the shaft 66 are slotted vertically throughout their length as indicated at 140, 142, and 144, respectively. The gear 70 is also slotted from its periphery inwardly to a bore 141 as shown at 143 (FIG. 5). These slots may be aligned