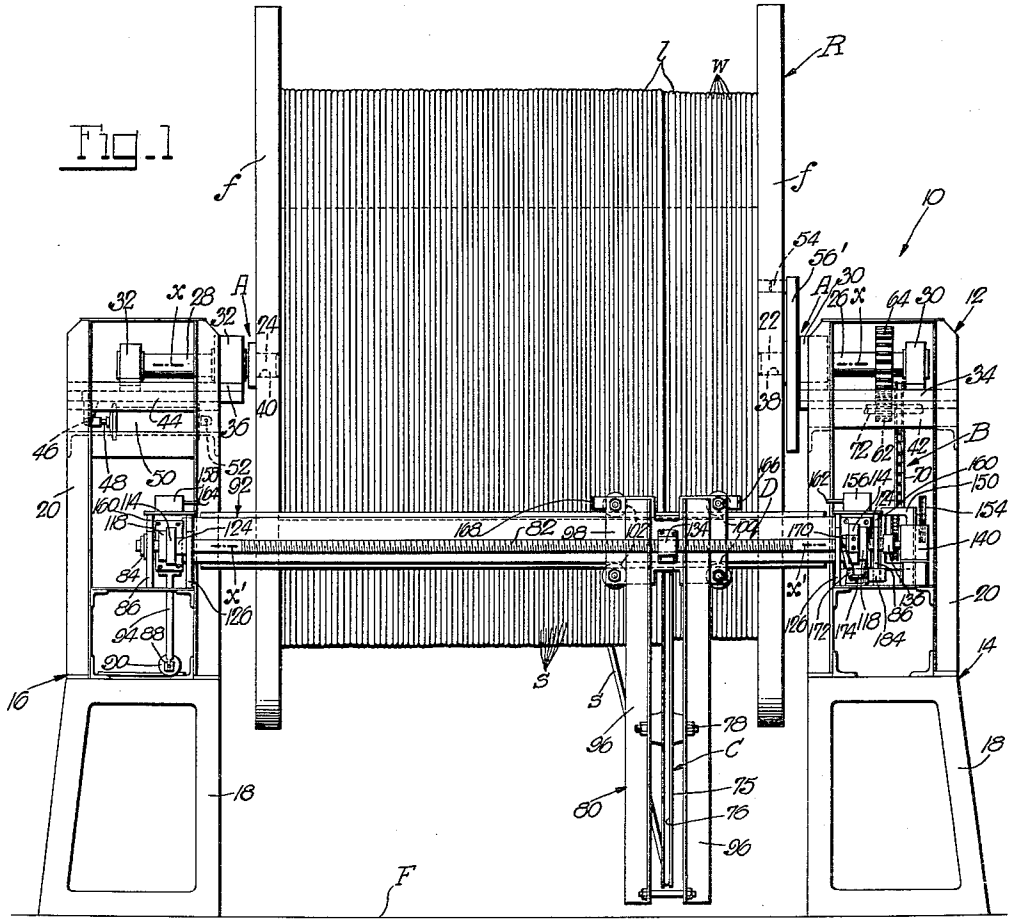
Jan. 21, 1964 A. W. NELSON ET AL 3,118,627

REEL-WINDING APPARATUS

Filed Feb. 28, 1962 3 Sheets-Sheet 1

Fig. 1



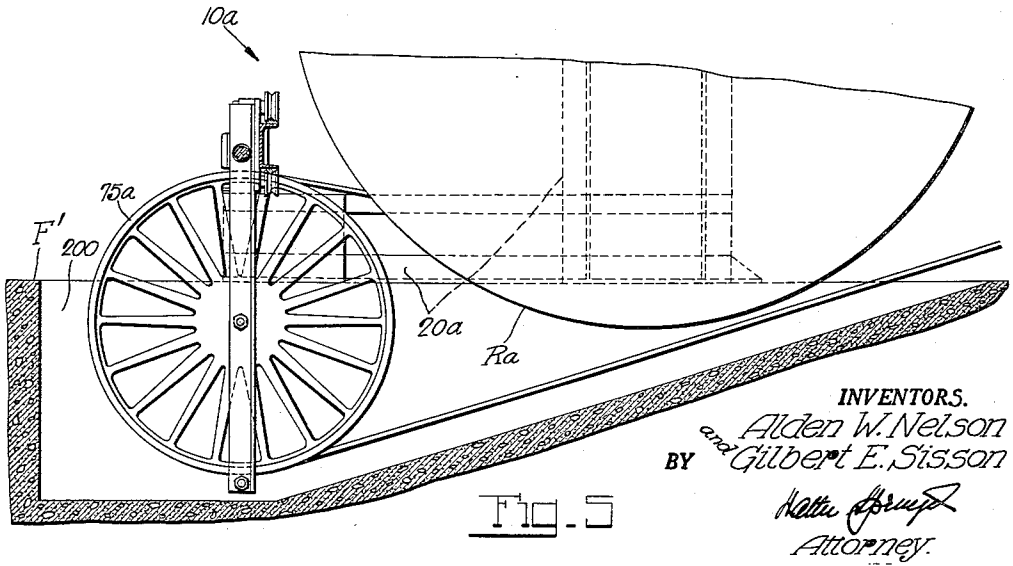


Fig. 5

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REEL-WINDING APPARATUS

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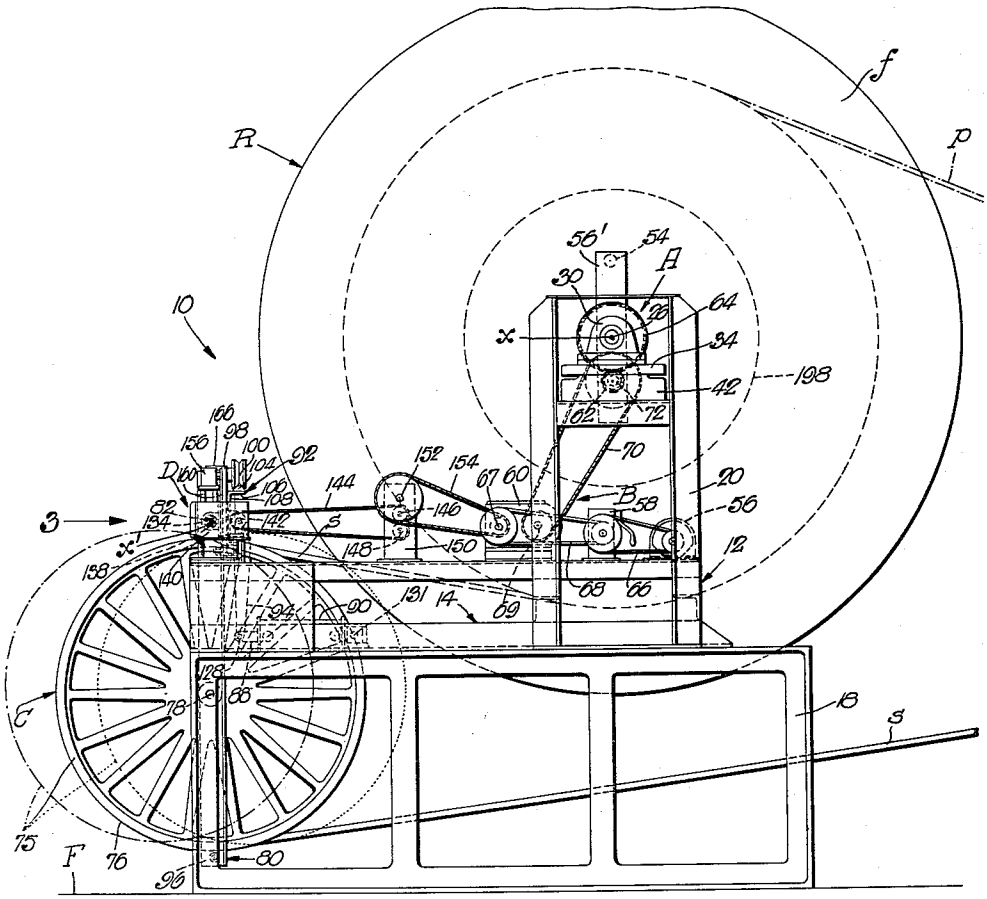


Fig. 2

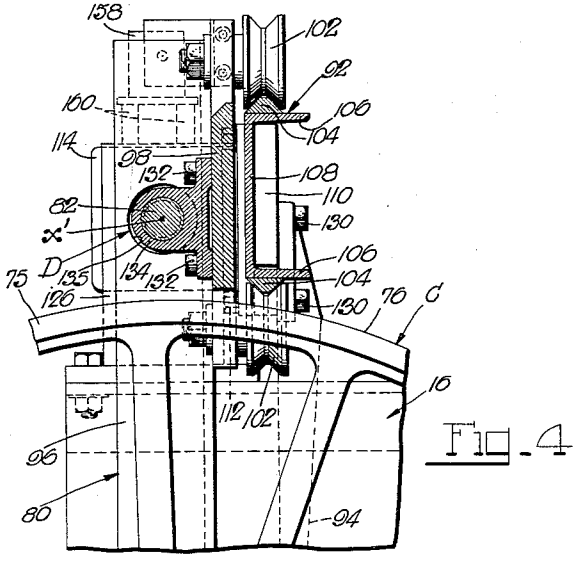


Fig. 4

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REEL-WINDING APPARATUS

Filed Feb. 28, 1962 3 Sheets-Sheet 3

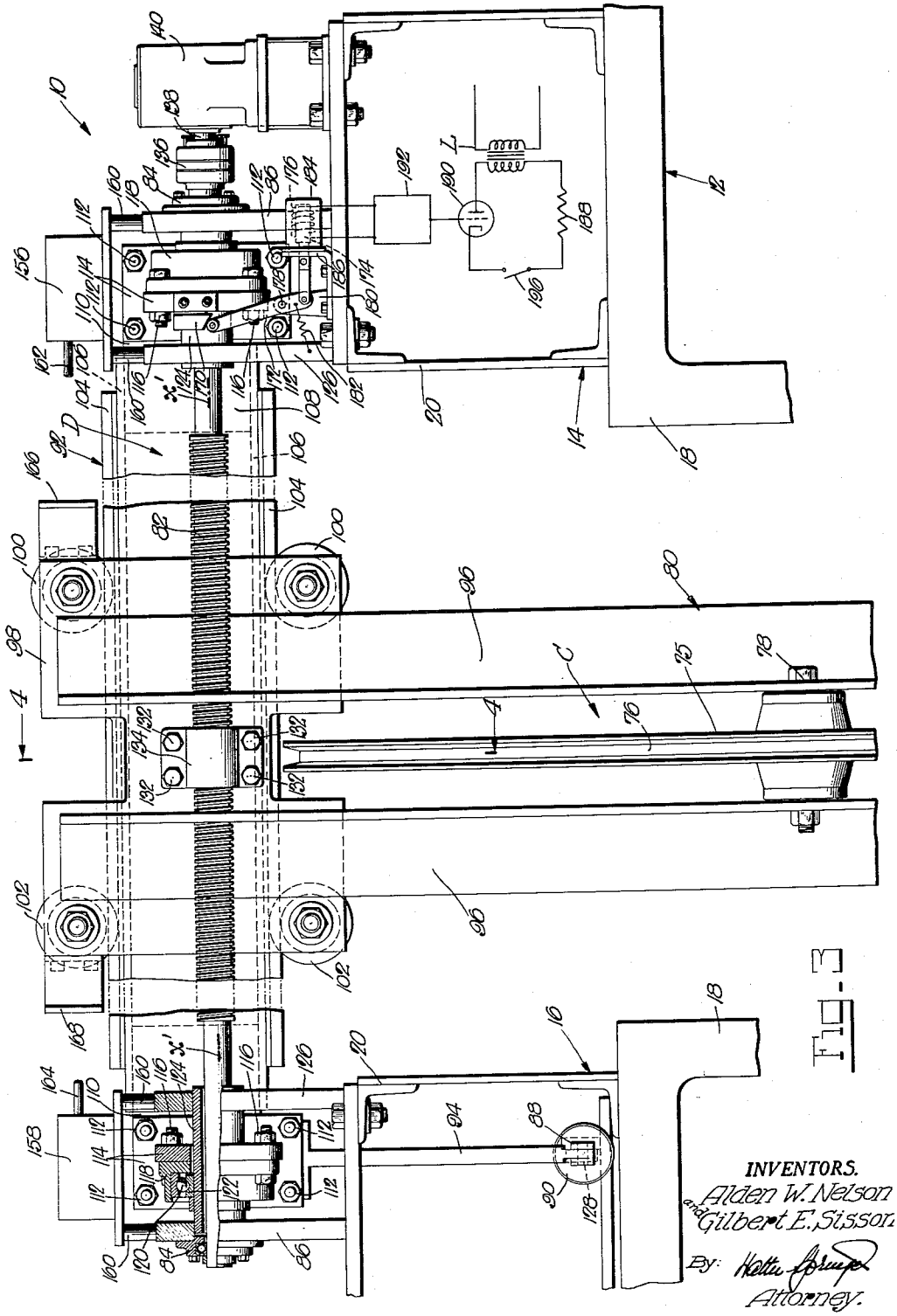


FIG. 3

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3,118,627
REEL-WINDING APPARATUS

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Filed Feb. 28, 1962, Ser. No. 176,252
5 Claims. (Cl. 242—25)

This invention relates to reel-winding apparatus in general, and to apparatus for winding cable stock on reels in particular.

The present invention is concerned with apparatus for winding cable stock as it is delivered from a power capstan following its pass through an extruder and vulcanizer in which its insulation coat is applied and cured, respectively. Cable stock in general, and cable stock of the heavier and less flexible sizes in particular, require not only reels of the larger sizes but also winding apparatus of rugged and more bulky construction. Also while fairly close control over the variable-speed drive of a reel is essential for winding cable stock of the smaller sizes under tension of the required uniformity as it is delivered to the winding apparatus at a controlled, and usually uniform, rate, particularly close control over the reel drive to the same end is indicated for cable stock of the larger sizes and for larger reels on which the cable windings are usually of more pronounced eccentricity relative to the winding axis. Uniform tension of the cable stock being wound is further important where the same is of a type having multi-conductors of different metals, such as submarine cable, for instance, which has to be electrically tested from time to time, wherefore cable stock of such type is, furthermore, wound customarily in an air-conditioned space.

It is an object of the present invention to provide reel-winding apparatus of this type which is efficient and reliable in its performance and meets the aforementioned requirements of rugged construction and close control over the variable-speed reel drive, yet is of simple and low-cost construction and of minimum bulk.

It is another object of the present invention to provide reel-winding apparatus of this type in which the cable stock is wound on a reel in orderly side-by-side windings and superposed winding layers by a traversing stock guide over which the stock is led to the reel and by which it is deflected from a straight path to the reel transverse to the reel axis, with the stock guide being further movable, transverse to its reel traversing direction, in opposite directions in which stock deflection from said straight path is increased and decreased, respectively, and being also urged in stock deflection increasing direction with a yielding force to impart to the stock its required wind-on tension. Thus, the additional stock-tensioning function of the stock guide enhances simple and low-cost construction of the apparatus in any event, and also makes the stock guide available for the control of the variable-speed reel drive.

It is a further object of the present invention to provide reel-winding apparatus of this type with a control for the variable-speed reel drive which responds in simple manner to motion of the stock guide in the aforementioned stock-deflection increasing and decreasing directions by accelerating and decelerating the reel drive, respectively, with the stock guide being yieldingly urged in stock-deflection increasing direction with a substantially uniform force throughout a range within which the reel drive is controlled for fully winding a reel with stock under substantially uniform tension. With this arrangement, the reel drive is controlled by the stock tension which, being substantially uniform throughout a winding operation, compels the reel drive to respond in quick and exceedingly accurate corrective speed variation to

any and all causes which change the uniform stock tension at any time and even quite slightly, so that a reel will be driven at a speed which so decreases with increasing wound stock, and even fluctuates on each traverse of the stock guide and with eccentric stock wind-on, that the stock will be held under substantially uniform tension despite its delivery to the guide and reel at the aforementioned controlled, usually uniform, rate.

Another object of the present invention is to provide reel-winding apparatus of this type in which the stock guide is, at least for the larger sizes of cable stock, preferably and advantageously in the form of a rotary sheave in the grooved rim of which the stock is received and which is of sufficiently large diameter that the stock will in ready flexure conform to it on its passage thereover, whereby only a negligible part of the reel driving power is required for the stock passage over the guide and the stock is subjected to only negligible bending stresses and will not be marred in any way from friction causes.

A further object of the present invention is to provide reel-winding apparatus of this type in which the stock guide is, for its reel drive controlling motion in the aforementioned stock-deflection increasing and decreasing directions simply and conveniently pivotally mounted, with the stock guide being to this end carried by a pivoted arm such that its radius arm is sufficiently large to confine its displacement about the pivot axis, for the entire range of speed variations of the reel drive during a winding operation, to a relatively small angle within which the aforementioned yielding force on the stock guide may be kept substantially uniform by the simple expediency of operatively connecting the stock guide with the linearly displaceable plunger of a mounted cylinder which for its urgency of the plunger in all positions therein with the required uniform force is under the control of a well-known pressure-regulatable bleeder-type valve.

It is another object of the present invention to provide reel-winding apparatus of this type in which the aforementioned guide-carrying arm is received on a power-operated traverse spindle not only threadedly for the traverse motions of the guide, but also pivotally for the reel-drive controlling angular displacements of the guide, thereby further enhancing the structural simplicity of the apparatus.

It is another object of the present invention to provide reel-winding apparatus of this type in which the guide-carrying arm is not only threadedly received and pivoted on a power-operated traverse spindle, but is also movable on and turnable with a longitudinally immovable track which extends in spaced parallel relation with the traverse spindle and is pivoted about the spindle axis, and the aforementioned yielding force to which the guide is subjected is exerted on this track and transmitted by the same to the guide, thus permitting the aforementioned use of a mounted cylinder and plunger therein for producing this yielding force.

It is a further object of the present invention to provide reel-winding apparatus of this type in which the stock guide and reel support are arranged to permit cable stock to pass from an associated pay-out station or capstan directly to the guide underneath a reel being wound and over the stock guide to the reel, thereby not only achieving low construction of the apparatus for installation in a space of relatively low ceiling, with the reel support being the topmost structure of the apparatus, but also permitting installation of the apparatus in fairly close proximity to the associated pay-out station or capstan, limited only by the requirement that the stock leads from this station or capstan and onto the guide without undue flexure in all momentary traverse positions of the guide.

Another object of the present invention is to provide

reel-winding apparatus of this type which is adapted for pit installation by having a frame on which the operating parts and devices are carried such that a supported reel and the stock guide project beneath the frame base on the floor into a pit therein, thereby still further reducing the height of the apparatus above floor level.

Other objects and advantages will appear to those skilled in the art from the following, considered in conjunction with the accompanying drawings.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

FIGS. 1 and 2 are front and side views, respectively, of reel-winding apparatus embodying the present invention;

FIG. 3 is an enlarged, fragmentary view, partly in section, of part of the apparatus as seen in the direction of arrow 3 in FIG. 2;

FIG. 4 is a section taken on the line 4—4 of FIG. 3; and

FIG. 5 is a fragmentary view, partly in side elevation and partly in section, of installed reel-winding apparatus embodying the present invention in a modified manner.

Referring to the drawings, and more particularly to FIGS. 1 to 3 thereof, the reference numeral 10 designates reel-winding apparatus having a main frame 12 which carries a reel support A, a reel drive B, a stock guide C, and guide operating means D. The main frame 12 comprises, in the present instance, two opposite sections 14 and 16 each of which has a base 18 and a standard 20 thereon.

Reel Support A

The reel support comprises opposite forward pintles 22 and 24 on rotary shafts 26 and 28 in bearings 30 and 32 on a plate 34 and slide 36, respectively, with the pintles 22 and 24 projecting into central apertures 38 and 40 in the end flanges *f* of a reel R for its rotary support about a winding axis *x*. Bearing plate 34 is suitably mounted on a platform 42 on the frame section 14, while the bearing slide 36 is guided for movement in the direction of the winding axis *x* in a way in a platform 44 on the other frame section 16. To support an empty reel in winding position, the bearing slide 36 is retracted to the left from the projected position in FIG. 1, the reel is next raised by a hoist chain, for instance, and its rim apertures 38 and 40 are aligned with the pintles 22 and 24, whereupon the bearing slide 36 is projected forwardly until the reel rests on both pintles. For moving the bearing slide 36 in this fashion, the same is connected at 46 with the plunger 48 of a double-acting cylinder 50 which at 52 is pivotally mounted on the frame section 16. The cylinder 50 is under the control of a suitable valve (not shown) which on different manipulation vents either end of the cylinder and admits fluid under pressure into the opposite end.

Reel Drive B

The drive into a supported reel is by way of a coupling pin 54 on an arm 56 on the driven shaft 26, with the pin 54 being received in an aperture in the adjacent reel flange *f*. As shown in FIG. 2, the shaft 26 is driven from a motor 56 through intermediation of a change-speed mechanism 58, speed reducer 60 and reduction gears 62 and 64. The motor 56, change-speed mechanism 58 and speed reducer 60 are suitably mounted on the frame section 14, with the motor being connected by a belt drive 66 with the input shaft of the change-speed mechanism 58 the output shaft of which is connected by a belt drive 68 with the input shaft 67 of the speed reducer 60. The output shaft 69 of the speed reducer 60 is by a chain drive 70 connected with a suitably journalled shaft 72 which carries the gear 62 that is in permanent mesh with the gear 64 on the pintle shaft 26. Thus, the reel drive from the motor 56 to the pintle shaft 26 has, in the present example, two reduction stages, one in the speed reducer 60 and the other in the gears 62 and 64, of which both reduction stages are of fixed ratios, while the overall drive beyond the motor 56 may be stepped up or down by the change-speed mechanism 58.

Stock Guide C

The stock guide 75 is adapted to lead supply stock *s* onto a driven reel in orderly side-by-side windings *w* and superposed winding layers *l*, and is to this end operated in opposite reel-traversing directions. The stock guide 75 is, in the present instance, preferably and advantageously a rotary sheave over the grooved rim 76 of which the stock is led to the reel. The guide sheave is at 78 rotatably carried by an arm 80 which is threadedly received by a traverse spindle 82 (FIGS. 1 and 3) that extends parallel to the winding axis *x* and is journalled in bearing brackets 84 on side plates 86 on the opposite frame sections 14 and 16. The spindle 82 is, for the reel traversing motions of the guide 75 with its arm 80, driven in opposite directions in a manner described hereinafter.

In accordance with an important aspect of the present invention, the guide 75 is also used to impart to the stock *s* tension of the required uniformity and magnitude for its winding on a driven reel. To this end, the guide 75 is so arranged that it not only deflects the supply stock from its straight path to a driven reel transverse to the winding axis *x*, but is in addition to its reel traversing movements in the direction of the axis *x* also movable transverse to this axis in opposite directions in which stock deflection from this straight path is increased and decreased, respectively, wtih the guide 75 being yieldingly urged with a predetermined force in stock-deflection increasing direction. In the present instance, the guide 75 is movable in opposite directions transverse to the winding axis *x* by being with its arm 80 free to pivot on the traverse spindle 82. Further, in order to apply to the guide 75 in any and all positions of its operational movements in the direction of and transverse to the axis *x* the aforementioned yielding force conveniently from a fixed source, in this instance from the fluid-pressure urged plunger 88 of a mounted cylinder 90 on the frame section 16 (FIGS. 1 to 3), this yielding force is transmitted to the guide through intermediation of a track 92 which extends in spaced parallel relation with the traverse spindle 82 and is swingable about the axis *x'* of the latter, with the guide 75 being with its arm 80 movable on and swingable with this track and the latter having an arm 94 for operational connection with the plunger 88. To the end of being movable on the track 92 as well as swingable therewith, the guide arm 80, which in this instance is formed by spaced angles 96 attached to and depending from a head plate 98, carries in back of this plate two spaced pairs of track rollers 100 and 102 of exemplary V-shaped peripheries of which the rollers of each pair straddle the track 92 (FIGS. 3 and 4). The track 92 is in this instance formed by V-shaped rails 104 on the side flanges 106 of a U-channel 108 to the opposite ends of which are suitably secured mounting plates 110 to which swing brackets 114 are bolted at 112. Secured at 116 to the swing brackets 114 are housings 118 for antifriction bearings 120 the inner races 122 of which are tight on sleeves 124 which are pressfitted in the spaced side plates 86 and 126 on the respective frame sections 14 and 16 (FIG. 3). The traverse spindle 82 passes with its ends through the sleeves 124 which are coaxial with the spindle. The track 92 is thus immovable in the direction of the spindle axis *x'* but is freely swingable about this axis, while the guide 75 is with its arm 80 movable on the track 92 in the direction of the spindle axis *x'* and, hence, also in the direction of the winding axis *x*, and is also swingable with the track 92 in opposite directions transverse, and in this instance normal, to the axes *x* and *x'*. The arm 94, which at 128 is pivotally connected with the plunger 88 of the cylinder 90 (FIGS. 2 and 3), is in

this instance bolted at 130 to one of the mounting plates 110 of the track (FIG. 4), while the cylinder 90 is pivoted at 131 to the frame section 16 (FIG. 2). For its aforementioned threaded connection with the traverse spindle 82, the guide arm 80 has bolted at 132 to its head plate 98 a bracket 134 which is threadedly received by the spindle 82 (FIGS. 3 and 4), with the spindle passing in this instance through clearance apertures 135 in the spaced angles 96 of the arm 80.

In order that the stock guide 75 may deflect the stock from its shortest, i.e., straight, path to a supported reel, and in its movements in opposite directions transverse to the winding axis *x* increase and decrease the stock deflection from this straight path, as mentioned above, the stock *s* is delivered to the apparatus so that its straight path from a pay-out station to a supported reel is in any event transverse to the winding axis *x*. The this end, the supply stock *s* is delivered to the apparatus from a pay-out station, usually a power-operated capstan (not shown), in front or back, and in this instance in back, of a supported reel and midway between the end flanges *f* of the reel, so that the straight path of the delivered stock to the supported reel would be as indicated by the dot-and-dash line *p* in FIG. 2, considering that the exemplary drive direction of the reel for stock wind-on is anticlockwise (FIG. 2). The stock guide 75 is, as usual, located in front of a supported reel and is, in this instance, at such low elevation above the floor F that the stock, when led over the guide, is by the latter deflected from the straight path *p* into a path underneath the reel, with the stock passing from the guide in this instance to the bottom of the reel for its winding thereon on the exemplary reel drive in anticlockwise direction (FIG. 2). With the stock *s* thus deflected by the guide 75 from the straight path *p* in the exemplary manner shown in FIG. 2, the guide will increase and decrease the stock deflection from the path *p* on its swinging movements about the spindle axis *x'* in clockwise and anticlockwise directions, respectively, with the guide 75 being by the plunger 88 urged in clockwise or stock-deflection increasing direction to tension the stock as it is wound on the reel.

Guide Operating Means D

The guide operating means include the described cylinder 90 and plunger 88, and further comprise a drive for the traverse spindle 82. The traverse spindle 82 is for its drive coupled at 136 to the output shaft 138 of a speed reducer 140 (FIG. 3) the input shaft 142 of which is, by a chain drive 144 (FIG. 2), connected with alternately oppositely driven output shafts 146 and 148 of a drive unit 150 of which the input shaft 152 is by a chain drive 154 connected with the input shaft 67 of the previously described speed reducer 60. The speed reducer 140 and the drive unit 150 are suitably mounted on the frame section 14. The exemplary drive of the traverse spindle 82 thus originates at the motor 56 at which the reel drive also originates, with the drive unit 150 acting to reverse the drive of the spindle 82 everytime the stock guide reaches either end of its reel traversing region. To the end of reversing the spindle drive on these occasions, there are associated with the drive unit 150 two limit switches 156 and 158 which by pillars 160 are mounted on top of the side plates 86, 126 on the opposite frame sections 14 and 16, respectively, and have yieldingly depressible operating plungers 162 and 164 in the path of ears 166 and 168, respectively, on the guide arm 80. The drive unit 150, which may be similar to that fully disclosed in the patent to Nelson, No. 2,913,191, dated November 17, 1959, forms no part of the present invention and, hence, requires no detailed description herein. To understand the function of the drive unit 150, it need merely be explained that the output shafts 146 and 148 thereof are driven from the input shaft 152 in opposite directions on closure of associated magnetic clutches (not shown) which are controlled by the limit switches 156 and 158. Thus, when the stock guide 75 reaches the right end of its reel-traversing motion as viewed in FIG. 1, the ear 166 on its arm 80 depresses the plunger 162 of the switch 156 which causes reversal of the drive of the traverse spindle 82 for the succeeding motion of the guide in reel traversing direction to the left, at the end of which the ear 168 on the arm 80 depresses the plunger 164 of the other switch 158 and causes renewed reversal of the spindle drive for the next reel traversing motion of the guide to the right. The guide 75 is thus controlled in its reel traversing motions until a reel is fully wound with stock.

With the stock *s* being delivered to a driven reel at a controlled, and in this instance uniform, rate, it stands to reason that with increasing diameter of wound stock on a driven reel the reel drive will have to undergo compensatory downward speed adjustment in order to maintain the stock being wound under the required uniform tension. In accordance with another important aspect of the present invention, the stock guide 75 assumes such control over the reel drive, and in this instance over the motor 56 which is of variable-speed type. To this end, the motor 56, and with it the reel drive and also the spindle drive, will be accelerated and decelerated on movement of the stock guide 75 in stock-deflection increasing and decreasing directions, respectively, which in the present instance is swinging movement of the guide about the spindle axis *x'* in clockwise and anticlockwise directions, respectively (FIG. 2). This is achieved, in the present example, by a cam 170 on one of the swing brackets 114 of the track 92 which through a follower arm 172 shifts a magnetic core 174 in a reactor coil 176 on swinging movements of the stock guide 75 in opposite directions. The follower arm 172 is at 178 pivoted on a bracket 180 on the frame section 14, and is by a spring 182 urged against the cam 170. The reactor coil 176 is enclosed in a housing 184 which is mounted on a bracket 186 on the frame section 14. The speed of the motor 56 is in this instance regulated by regulating the current supplied to its field 188 (FIG. 3). To this end, the field current from a line source L is regulated by a grid-controlled rectifier tube 190 the grid bias voltage of which is changed by a conventional phase-shift network 192 which is phase-sensitive to a change in the inductance output voltage of the reactor coil 176 as caused by linear displacement of the magnetic core 174 therein, with the grid bias voltage controlling the current input to the motor field 188. The arrangement is such that swinging movement of the stock guide 75 in clockwise and anticlockwise directions (FIG. 2) will cause acceleration and deceleration, respectively, of the motor 56 and, hence, of the reel drive and also spindle drive, as already mentioned, and the range of swinging movement of the stock guide and corresponding range of speed variations of the motor 56 and remainder of the reel drive are fully adequate to permit fully winding reels of sizes adapted for the apparatus at substantially uniform stock tension. There are preferably provided suitable limit stops for defining the range within which the stock guide 75 may swing, with the ends of this range determined in this instance by the opposite end positions of the plunger 88 in the cylinder 90.

Mode of Operation

Assuming that an empty reel has just been supported in the apparatus and stock *s* led over the guide 75 and suitably anchored to the reel near the end flange thereof adjacent to which the guide reposes, the circuit of the motor 56 will be closed at a switch 196, for example, to render the reel and spindle drives operative. With the stock guide 75 being then in its exemplary foremost dot-and-dash line position in FIG. 2 which corresponds to the maximum speed of the reel drive, the motor 56 will come up to speed as the load permits and initially wind stock on the reel periphery 198 (FIG. 2). In thus

coming up to speed, the reel drive will shortly overdrive the reel and wind stock thereon at a rate in excess of its uniform delivery rate to the guide 75, thereby immediately compelling the guide to yield rearwardly and cause deceleration of the reel drive until stock is wound on the reel at its uniform delivery rate to the guide. As the guide 75 finishes its first reel traverse and at the start of its next reel traverse winds stock on the increased wind-on diameter of the first stock layer on the reel, the reel drive again overdrives the reel but the stock guide will be enforced further rearward yielding cause quick compensatory deceleration of the reel drive until the reel is driven at the proper speed for wind-on of the stock at its uniform delivery rate to the guide. The stock guide thus yields backwards in incremental steps with the winding of additional stock layers on the reel, assuming the exemplary full-line positions in FIG. 2 on winding stock on the reel to the extent there shown, and when the reel is fully wound reaching a position intermediate its full-line and dotted-line positions in FIG. 2, with the dotted-line position of the stock guide corresponding in this instance to zero speed of the reel drive. When the reel is fully wound, the apparatus is stopped, the wound stock is severed from the supply stock, and the full reel is replaced by an empty reel, whereupon the same winding operation is repeated. In thus winding a reel, the guide 75 will even cause such incremental speed adjustments of the reel drive as are required by the varying stock length from the pay-out station to the guide during each reel traverse of the latter and by eccentricity of any stock layers on the drum, in order to wind the stock at its uniform delivery rate to the guide onto a reel until the same is fully wound. The guide 75 thus controls the reel drive with exceeding accuracy for winding reels with stock under uniform tension throughout. To this end, the radius arm about the spindle axis x' of the stock guide of the exemplary sheave or any other type is advantageously relatively long so that the angular range of operational displacement of the guide for a reel winding operation is kept as small as possible in order that the guide may throughout this range be urged in clockwise direction with a force which is substantially uniform on exertion on the track 92 by the linearly moving plunger 88 in the mounted cylinder 90 of its force which is quite uniform in all plunger positions. To the end of keeping the force of the plunger 88 uniform in all of its positions in the cylinder 90, the latter is under the control of a well-known pressure-regulatable bleeder-type valve (not shown).

The exemplary apparatus shown is suited particularly well for winding cable or other stock of the heavier and less flexible sizes on reels of accordingly large sizes. To this end, the exemplary rotary sheave form of the stock guide 75 is particularly advantageous, for the sheave may have any large diameter to which even the most unwieldy stock will readily flex with no more than harmless bending stresses, and it will readily turn with the stock on its passage thereover and, hence, subject the passing stock neither to friction nor to any possible abrasion. Further advantageous to the same end is the arrangement of the sheave-type stock guide at a relatively low elevation above the floor which permits stock delivery from a pay-out station in the rear of the supported reel beneath the latter to the guide in front thereof, thereby permitting installation of the apparatus in optimum space-saving proximity to the payout station at which the stock span therefrom to the guide is sufficiently long to avoid excessive flexing of the stock in all reel traverse positions of the guide, as well as permitting low construction of the apparatus in which only the size of a supported reel determines the minimum ceiling of a space in which the apparatus may be installed. Low construction of the apparatus is particularly advantageous for winding cable stock with multiconductors of dissimilar metals, and hence different coefficients of expansion, such as submarine cable, for instance, which requires electrical testing from time to time under uniform tension, wherefore it is customary to wind such stock in spaces which are kept efficiently air-conditioned under low ceilings. To enhance the use of apparatus of the present type for winding heavy cable stock in general, and submarine cable stock in an air-conditioned atmosphere in particular, in a space with a low ceiling, recourse may be had to the modified apparatus 10*a* of FIG. 5 which may in all respects be like the described apparatus 10 of FIGS. 1 to 4, except that the present apparatus is constructed for pit installation. To this end, the frame sections of the present apparatus lack the bases 18 of the apparatus 10 (FIGS. 1 and 2) and are mounted with their standards 20*a* directly on the floor F', with the stock guide 75*a* and a supported reel R*a* of adapted size projecting into a pit 200 in the floor.

Winding apparatus of the present type is, of course, by no means limited to the winding of stock of the heavier and less flexible sizes, for such apparatus may with the same advantages be used for winding lighter and quite flexible stock. Among these general advantages are the arrangement of the stock guide so that it performs the plural functions of distributing the stock onto a reel and also uniformly tensioning the stock as well as controlling the reel drive with the utmost accuracy, which additionally makes for exceeding structural simplicity and also low cost of the apparatus. Also, the range of speed variations of the reel drive under the control of the stock guide is quite adequate to meet the varying requirements for winding in the same apparatus stock of relatively widely varying sizes or delivery rates, or both. Further, the stock guide, whether of rotary sheave form or any other form, may for its reel-drive controlling motions be swingable or linearly movable, and may be arranged to deflect the supply stock from any convenient or desired straight path to a supported reel. Also, in case the stock guide is arranged to swing for its reel-drive controlling motions, its reel-traverse movement on and swinging motion with the pivoted track is quite advantageous, for this track may be made quite sturdy and will take up the entire load of the guide and stock thereon as well as all forces exerted by the stock on the guide, wherefore the traverse spindle is relieved of this burden and may be cross-sectionally dimensioned for the sole purpose of longitudinally moving the guide and stock load thereon on the track. Of course, the pivoted track for the guide is further advantageous in that it transmits to the guide the operational yielding force from a fixed source.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

What is claimed is:

1. In reel-winding apparatus with a winding axis, the combination with a rotary reel support about said axis, and a variable-speed reel drive for winding supply stock of controlled delivery rate onto a driven reel, of a stock guide over which supply stock is led onto a driven reel and by which it is deflected from a straight path to the reel transverse to said axis; a track extending parallel to said winding axis and pivoted about an axis parallel of said winding axis, said guide being movable on said track for reel traversing movement in the direction of said winding axis and being also swingable with said track for movement transverse to said winding axis in first and second opposite directions in which stock deflection from said straight path is increased and decreased, respectively; means for moving said guide for reel traverse; control means operative on movement of said guide in said first and second directions to accelerate and decelerate said reel drive, respectively; and means acting on said track

yieldingly to urge said guide in said first direction with a substantially uniform force throughout a range within which the reel drive is controlled for fully winding a reel with stock under substantially uniform tension.

2. The combination in reel-winding apparatus as set forth in claim 1, which further comprises a power-driven threaded spindle extending parallel to said winding axis over the traverse region of said guide, and said track being pivoted at its ends beyond said traverse region, with said guide being threadedly received on said spindle for its reel traversing movement.

3. The combination in reel-winding apparatus as set forth in claim 1, in which said control means include an instrumentality with an operating element shiftable in opposite directions, a cam on said track, and follower means connected with said element and actuated by said cam to shift said element in opposite directions on swinging movement of said guide in opposite directions, respectively.

4. In reel-winding apparatus with a winding axis, the combination with a rotary reel support about said axis, and a variable-speed drive for winding stock of controlled delivery rate onto a driven reel, of a rotary guide sheave over which stock is led onto a driven reel and by which it is deflected from a straight path to the reel transverse to said axis; a track extending parallel to said winding axis and pivoted about an axis parallel to said winding axis; an arm with one end movable on and swingable with said track, said sheave being carried at the other end

of said arm with its rotary axis extending parallel to said winding axis, and being movable and swingable with said arm for reel traversing movement in the direction of said winding axis and for movement transverse to said winding axis in first and second opposite directions in which stock deflection from said straight path is increased and decreased, respectively; means for moving said arm for sheave reel traverse; control means operative on movement of said sheave in said first and second directions to accelerate and decelerate said reel drive, respectively; and means acting on said track yieldingly to urge said sheave in said first direction with a substantially uniform force throughout a range within which the reel drive is controlled for fully winding a reel with a stock under substantially uniform tension.

5. The combination in reel-winding apparatus as set forth in claim 4, which further comprises a power-driven spindle extending parallel to said winding axis over the traverse region of said sheave, and said track being pivoted at its ends beyond said traverse region, with said arm being at said one end thereof also threadedly received on said spindle for the sheave reel traverse movement, and said sheave being carried at the other end of said arm.

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