

June 4, 1968

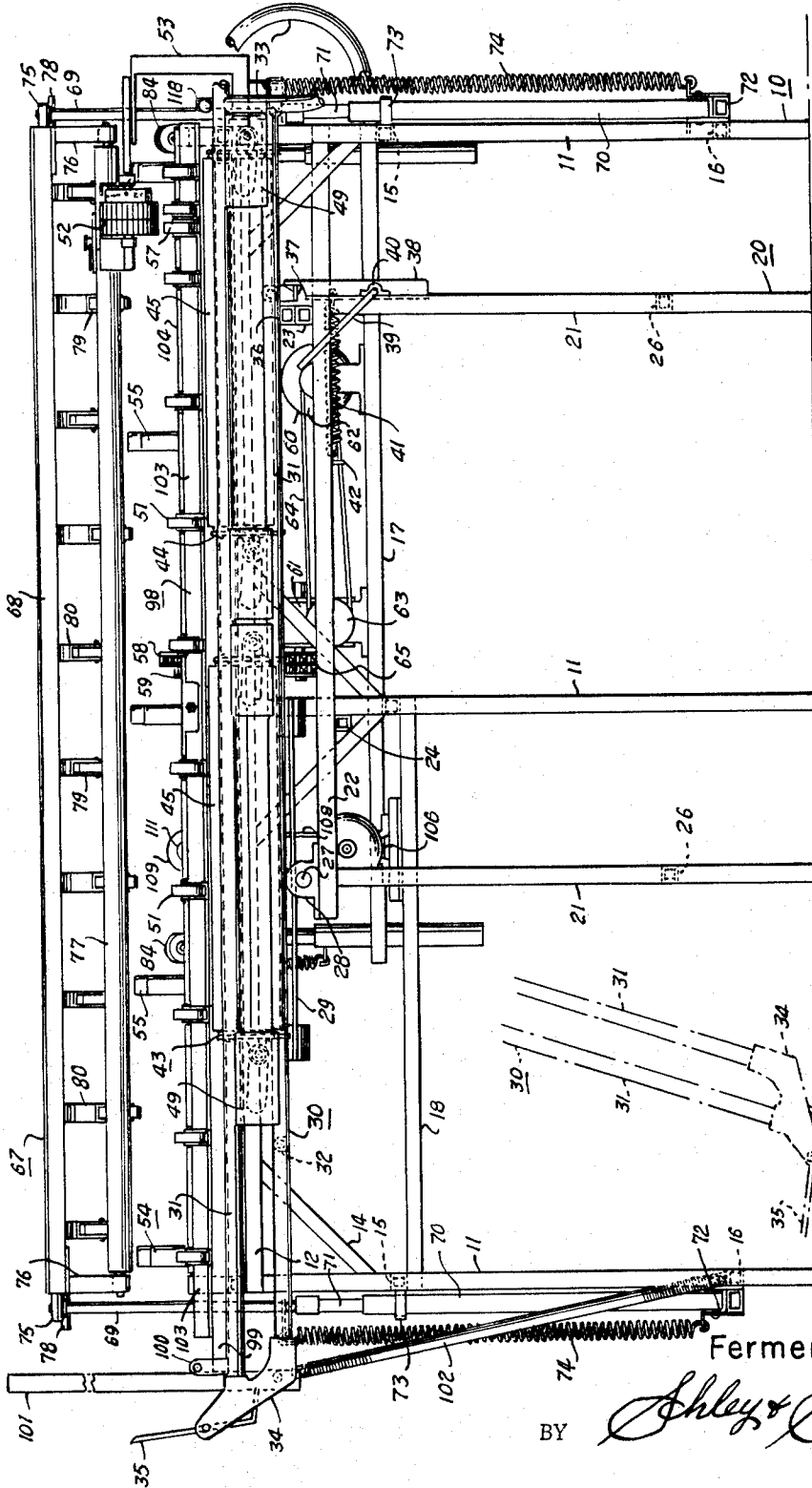
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3,386,678

ROLL WINDING APPARATUS

Filed July 18, 1966

4 Sheets-Sheet 1



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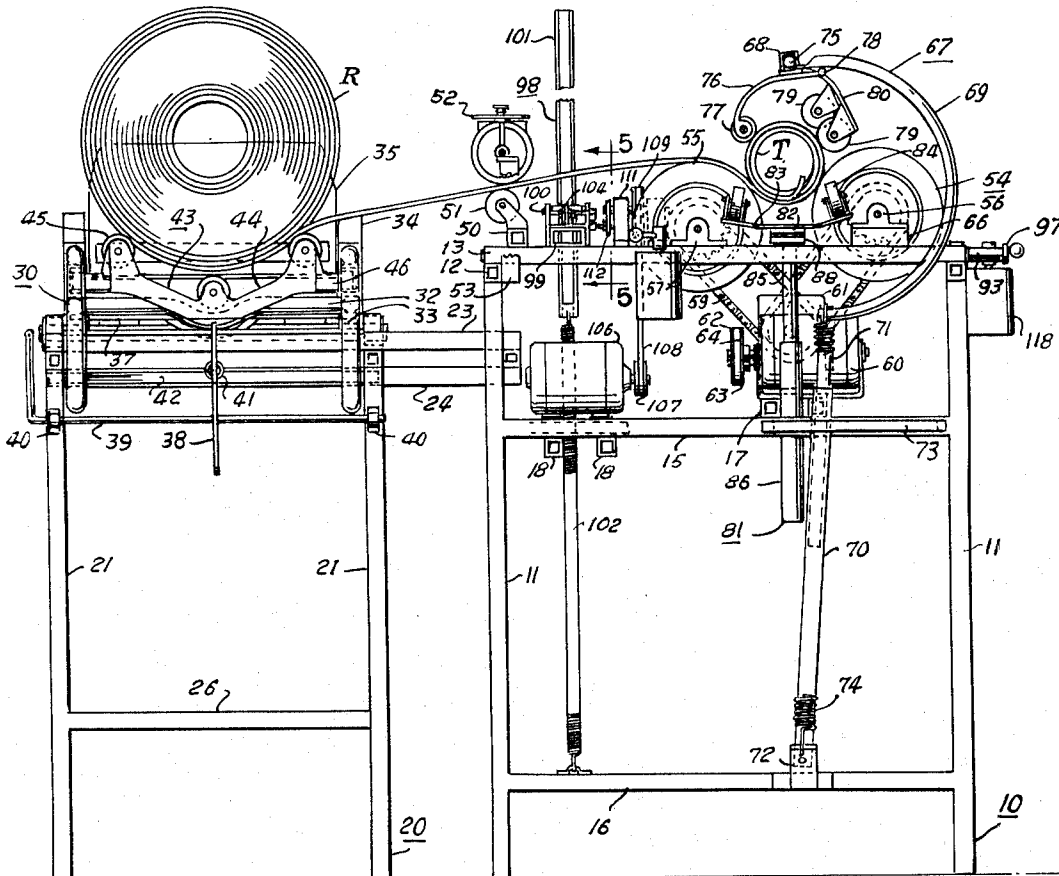


Fig. 2

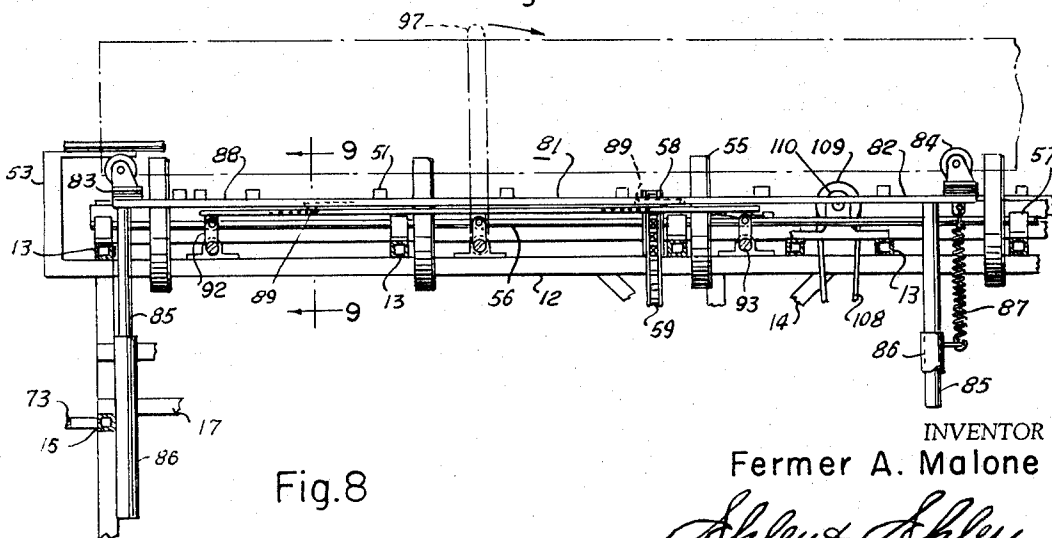


Fig. 8

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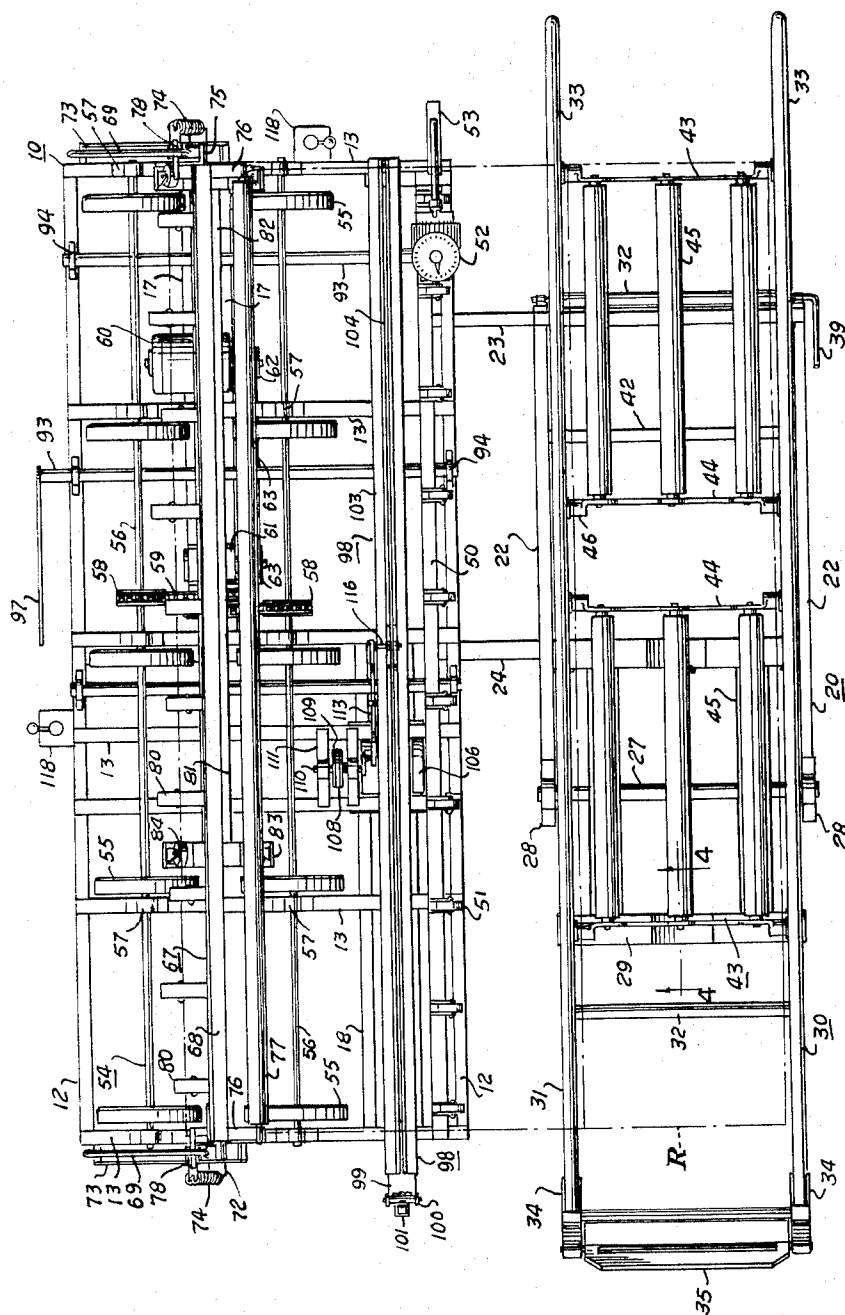
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ROLL WINDING APPARATUS

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15 Claims. (Cl. 242—56)

This invention relates to new and useful improvements in apparatus for unrolling and rewinding rolled material.

The novel apparatus includes means for rotatably supporting a roll of linoleum or other material to facilitate unrolling thereof and a pair of rotatable means arranged in spaced relation for receiving and supporting the unrolled material therebetween. The rotatable means is adapted to be driven in a direction to cause the unrolled material to wind upon itself or upon a suitable form into a roll while the length of said unrolled material is being measured, said material being held in engagement with said rotatable means during winding thereof by retractable means which is movable out of the way to permit feeding and removal of said material. Novel means are provided for cutting the unrolled material at the desired length as well as novel means for lifting the roll or rearound material from engagement with the rotatable means to facilitate removal of said roll from the apparatus. The means for rotatably supporting a roll of material during unrolling thereof has a rack mounted for pivotal movement about a horizontal axis so as to permit swinging of the rack to an upright position for facilitating loading and unloading of the roll onto and off of said rack.

A construction designed to carry out the invention will be hereinafter described, together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, wherein an example of the invention is shown, and wherein:

FIG. 1 is a front elevational view, partly broken away, of a roll winding apparatus constructed in accordance with the invention,

FIG. 2 is an end elevational view of the apparatus with a roll of material unrolled and rearound,

FIG. 3 is a top plan view of the apparatus, the material being shown in broken lines,

FIG. 4 is an enlarged, fragmentary, vertical, sectional view taken on the line 4—4 of FIG. 3,

FIG. 5 is an enlarged, fragmentary, vertical, sectional view taken on the line 5—5 of FIG. 2 and showing a portion of the material cutting means,

FIG. 6 is a transverse, vertical, sectional view taken on the line 6—6 of FIG. 5,

FIG. 7 is an end elevational view of the rear portion of the apparatus with the retractable holddown means swung rearwardly and the rearound material elevated out of engagement with the rotatable means,

FIG. 8 is a fragmentary, vertical, sectional view, taken on the line 8—8 of FIG. 7, showing the rearound material in broken lines, and

FIG. 9 is an enlarged, transverse, vertical sectional view taken on the line 9—9 of FIG. 8.

In the drawings, the numeral 10 designates the elongate, rectangular, main frame of a roll winding apparatus having a plurality of upright, end and medial legs or standards 11 connected at their upper ends by a pair of horizontal, longitudinal, parallel bars or members 12 which have a plurality of transverse, parallel, overlying bars of members 13 secured thereto (FIG. 3). Diagonal braces 14 extend between the frame members 12 and the upper portions of the legs 11, while horizontal

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reinforcing bars 15 and 16 extend transversely between the upper and lower portions of said legs (FIGS. 2 and 7). The rear portions of the upper reinforcing bars 15 of the right end and medial legs support a pair of closely-spaced, longitudinal, overlying rails 17, and similar underlying rails 18 are supported by the front portions of the upper reinforcing bars of the left end and medial legs.

An elongate, rectangular, auxiliary frame or frame extension 20, of less length, height and width than the main frame 10, is disposed forwardly and toward the right end thereof in spaced, parallel relation and has similar legs or standards 21 with similar bars or members 22 connecting their upper ends. The right ends of the frame members 22 are connected by an overlying, transverse bar or member 23 which projects rearwardly to the main frame, while a similar bar or member 24 underlies and connects the left end portions of said members 22. As shown in FIG. 2, the rear ends of the members 23 and 24 are secured to each other by a longitudinally extending bar 25, and the lower portions of the legs 21 are reinforced by horizontal, transverse bars 26.

A horizontal shaft 27 extends across the left ends of the auxiliary frame members 22 and has its ends journaled in bearings 28 upstanding from said members for pivotally supporting a cradle 29 upon which an overlying rack 30 is suitably secured (FIGS. 1 and 3). The rack 30 is of greater length than the main frame 10, although centered relative thereto, and has its major portion to the right of the shaft 27 and cradle 29 so as to assist clockwise swinging of said rack into horizontal position. A pair of vertically-alined rails 31 extend longitudinally of each side of the rack and a pair of cross rods 32 connect the end portions of the lower rails. As shown by the numeral 33, the right ends of the upper side rails 31 are curved outwardly downward and inwardly upward for attachment to the ends of the lower side rails and to the undersides of said upper rails so as to provide handles for the rack 30. A bracket 34 is mounted on the left ends of each pair of side rails for pivotally supporting therebetween an angular foot plate 35 which is adapted to engage the floor, as shown in broken lines in FIG. 1, upon counterclockwise swinging of the rack.

The right end portions of the lower side rails 31 are adapted to rest on a suitable support 36 overlying the auxiliary frame member 23 when the rack 30 is swung to its horizontal position. A horizontal, transverse keeper bar 37 is suitably suspended from the right end portions of the lower side rails for engagement by a latch bar 38 which upstands from and is pivotally supported by an angular rod 39 extending transversely between the upper portions of the right legs 21 of the frame 20. The rod 39 is rotatably supported by bearings 40 mounted on the legs, and the latch bar 38 is urged into engagement with the keeper bar 37 by a helical spring 41 having one end fastened to said latch bar and its opposite end to an angle bar 42 extending transversely between the auxiliary frame member 22.

A pair of spaced carriages 43 is slidably mounted on the rack 30 for supporting a roll R of linoleum or other sheet material, one of the carriages being at the right end portion of said rack and the other carriage adjacent its middle. Each carriage 43 includes a pair of horizontal end bars 44 extending transversely of the rack and rotatably supporting a trio of elongate, horizontal, parallel rollers 45 which extend longitudinally of said rack. An offset bracket 46 is provided at each end of each end bar 44 (FIG. 4) and carries a small roller or wheel 47 for engagement in a groove 48 formed in the inner surface of

an upright plate 49 mounted on each pair of side rails 31. The grooves 48 are inclined downwardly toward the right so that the roll R resting on the rollers 45 slides out of engagement with the foot plate 35, which is adapted to be engaged beneath and lift said roll, upon clockwise swinging of the rack. Although the side rollers may project above the upper side rails of the rack 30, the medial portions of the end bars are offset downwardly to dispose the center rollers below said upper rails and provide a cradle for the roll R (FIG. 2). The latter may be readily unloaded from the rack by clockwise rotation of the angular rod 30 to disengage the latch bar 38 from the keeper bar 37 and permit counterclockwise swinging of said rack by its handles 33. Due to the slidable mounting of the carriages 43, the roll R slides to the left and engages the foot plate when the rack 30 is tilted counterclockwise.

A longitudinal bar 50 overlies the front ends of the transverse frame members 13 adjacent and parallel to the front longitudinal frame member 12 to support a plurality of upstanding, stirrup-mounted, guide rollers or wheels 51 for rotation about a horizontal axis parallel to the bar and frame member (FIGS. 1-3). The guide rollers 50 are adapted to receive the material of the roll R from the carriages 45 of the rack 30 and two of said rollers are closely spaced for coacting with an overlying meter 52, of conventional construction and mounted on the right frame member 13 by a suitable U-shaped bracket 53 for measuring said material as it is unrolled. From the guide rollers, the roll material is adapted to be fed manually to a rewinding assembly 54 which includes two spaced sets of equally-spaced, large rollers or wheels 55 fixed on a pair of horizontal shafts 56 extending parallel to the longitudinal frame members 12. Each shaft 56 is journaled in bearings 57 upstanding from the frame members 13 and has a sprocket 58 fixed thereon for driving engagement by an endless chain 59. An electric motor 60 and speed reducer 61, having their pulleys 62 and 63 connected by an endless belt 64, are supported by the longitudinal rails 17 for rotating the shafts and their wheels 55 in a clockwise direction so as to rewind the unrolled material between the sets of wheels in counterclockwise direction (FIG. 2). As shown at 65 in FIG. 1, the speed reducer has a pair of sprockets in driving engagement with the endless chains 59 which are trained over the shaft sprockets 58. Spacers 66 are interposed between the frame members 13 and the bearings 57 of the rear shaft 55 to elevate the rear set of wheels slightly relative to the front set of wheels (FIGS. 2 and 7) so as to assist rewinding of the unrolled material between said wheel sets.

This rewinding is aided also by a holddown assembly 67 having an elongate horizontal bar or member 68 extending longitudinally of the frame 10 and supported at its ends by the upper ends of a pair of arcuate or semi-circular arms 69 which are curved rearwardly (FIGS. 1-3 and 7). A pair of upright, telescoping tubes 70 and 71 is mounted at each end of the frame for supporting the lower end of each arm 69, and the lower end of the lower tube 70 of each pair is pivotally attached at 72 to one of the lower reinforcing bars 16. The pivotal movement of each pair of telescoping tubes is limited by an elongate bracket 73 mounted on and extending longitudinally of one of the upper reinforcing bars 15 so as to overlie and movably confine the lower tube. A helical spring 74 extends between each pivot point 72 and the upper end of each upper tube 70, which is secured to the lower end of one of the arms 69, for constantly urging said arm and tube downwardly.

The ends of the horizontal bar 68 are journaled on pivot pins 75 extending transversely inward from the upper ends of the arms and have arcuate straps 76 projecting forwardly therefrom to pivotally and rotatably support an elongate roller 77 in parallel, spaced relation to said bar (FIGS. 1-3 and 7). A short portion of each strap 76 extends rearwardly of the bar and has a lug 78 extending transversely outward therefrom for engaging

the adjacent arm 69 to limit counterclockwise rotation of said bar. For coacting with the elongate roller 77 in confining the rewound material, the bar 68 has a plurality of equally-spaced, stirrup-mounted rollers or wheels 79 suspended therefrom by rearwardly depending straps 80 for rotation about horizontal axes parallel to the axes of rotation of the wheels 55 and roller. Alternate straps 80 are slightly elongated to offset alternate wheels 79 downwardly whereby at least one of adjacent wheels engages rewound material of different diameters.

If desired, the material may be rewound on a tube T as shown in FIG. 2 or said material may be rewound upon itself. Due to the rotatable mounting of the horizontal bar of the holddown assembly 67, the roller 77 and wheels 79 may pivot clockwise to remain in engagement with the rewound material as it increases in size. Also, upward movement of the roller and wheels is permitted by the telescoping tubes 70 and 71 while engagement is maintained by the force of the springs 74. The pivotal mounting of the telescoping tubes allows the holddown assembly to be swung clockwise or rearwardly out of the way when the rewinding of the material is completed (FIG. 7) and, after cutting to the desired length, said rewound material may be wrapped while resting on and being revolved by the wheels 55. In addition, the rearward swinging of the assembly 67 facilitates the initial rewinding of the material.

An elevator or lifting assembly 81 is provided to simplify the removal of the rewound material and includes an elongate, narrow horizontal plate 82 extending longitudinally of the frame 10 between the sets of wheels 55 of the rewinding assembly 54 (FIGS. 2 and 7-9). Each end of the plate 82 carries an angular, transversely-extending bracket or element 83 having stirrup-mounted rollers or wheels 84 upstanding from its upwardly inclined ends for rotation about axes parallel to the inclination of the bracket ends. A rod 85 depends from each end of the plate and telescopes an upright tube 86, which extends and is suitably secured between the horizontal, longitudinal rails 17, to permit vertical reciprocal movement of said plate. Upward movement of the plate is resisted by a helical spring 87 which is suitably connected between one end of said plate and the upper end of the underlying tube 86 (FIG. 8). A similar plate 88, of less length, underlies the plate 82 in parallel alignment between the rods 85 and is slidably connected thereto by two pairs of ball bearings 89 which are confined in two groups of longitudinal grooves 90 and 91 formed in the underside of said plate 82 and the topside of said plate 88, respectively, as shown in FIG. 9. The grooves 90 and 91 are disposed at the end portions of the plates and are of short length to limit relative longitudinal movement between said plates (FIG. 8).

For imparting pivotal movement to the lower plate 88 so as to reciprocate the upper plate 82, a trio of link assemblies 92 pivotally connects said lower plate to a trio of underlying shafts 93 which extend transversely between the longitudinal frame members 12 and have their ends journaled in bearings 94 overlying and mounted on said members (FIG. 3). Each link assembly 92 includes a pair of links 95 pivotally attached at 96 to the underside of the lower plate and rigidly fastened to each shaft 93 (FIG. 9) whereby rotation of any of the shafts pivots the link assemblies and said lower plate to reciprocate the upper plate. A handle 97 is secured to the rear end of the center shaft for imparting rotation to all of the shafts, the handle being shown in phantom in FIG. 8. When the handle 97 is in the position shown in FIGS. 1-3, the elevator 81 is lowered to dispose its rollers 84 below the adjacent peripheral portions of the wheels 55 of the rewinding assembly 54 to permit the unrolled material to rest on said wheels. Upon counterclockwise or upward swinging of the handle to the position shown in FIGS. 7 and 9, the elevator assembly is raised to dispose its rollers above the adjacent peripheral

portions of the wheels for engaging and lifting the rewound material from said wheels. Manifestly, the rollers 84 facilitate the endwise removal of the rewound material from the apparatus.

Although the material removed from the roll R may be cut at the desired length in any suitable manner, a novel cutting assembly 98 is provided and includes an elongate, horizontal bar or member 99 overlying the front end portions of the transverse frame members 13 in parallel, rearwardly-spaced relation to the horizontal bar 50 (FIGS. 1-3, 5 and 6). The member 99 is of greater length than the frame 10 and has upstanding lugs 100 at its projecting left end for pivotally supporting a holddown bar 101 which is of inverted U-shape in cross-section (FIG. 6) and of greater length than said member so as to extend beyond said left end. A helical spring 102 connects the projecting end of the holddown bar 101 to one of the reinforcing bars 16 for constantly urging said bar counterclockwise and maintaining it in upright position. As most clearly shown in FIG. 6, the member supports a pair of substantially coextensive angle bars 103 with one of the flanges of each angle bar resting on said member and the other flanges upstanding in closely-spaced, parallel relation. An elongate saw blade 104, having upstanding teeth 105 and of slightly less length than the angle bars 103, is slidably confined between said angle bars for longitudinal reciprocation to cut the unrolled material when the holddown bar is swung downwardly to force said material into engagement with the saw blade.

For reciprocating the saw blade 104, an electric motor 106 is mounted on the right end portions of the horizontal rails 18 and has its pulley 107 connected by an endless belt 108 to an overlying pulley 109 which is supported on a horizontal, transverse shaft 110 between a pair of bearings 111 mounted on a pair of the transverse frame members 13 (FIGS. 1-3). The belt 108, pulley 109 and one of the bearings 111 are shown in phantom in FIG. 5 for orientation of the shaft 110 which has a crank arm 112 fixed on its front end. A rod 113 extends from the outer end of the arm 112 between the saw blade 104 in substantially parallel relation thereto and has a knuckle joint 114 at each end for connection with said arm and blade. The upright flanges of the angle bars 103 are recessed as shown at 115 in FIGS. 5 and 6 to accommodate a knuckle pin 116 (FIG. 1) which fastens one of the knuckle joints 114 of the rod 113 to the saw blade. A similar knuckle pin 117 connects the other knuckle joint to the saw blade 104 (FIG. 6). Manifestly, rotation of the arm by the shaft 110 causes the rod to impart reciprocation to the saw blade for cutting unrolled material. Switches 118 are adapted to be mounted at the rear side and right end of the frame 10 for controlling the operation of the motor 106 as well as the motor 60.

It is noted that substantially all of the bars, members, legs and rails of the apparatus may be of hollow or tubular construction as shown. Also, it is pointed out that the use of the apparatus is not dependent upon the specific means (rack 30 and carriages 43) for supporting the roll R of material during unwinding thereof, nor the meter 52, nor the specific cutting assembly 98. Obviously, the roll may be supported in any suitable manner, the unrolled material may be measured by a rule or other means and various types of cutters may be employed.

The foregoing description of the invention is explanatory thereof and various changes in the size, shape and materials, as well as in the details of the illustrated construction may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. A roll winding apparatus including means (30) for supporting a roll (R) of material to permit unwinding thereof, a pair of roller means (55) mounted for rotation about substantially horizontal parallel spaced axes

and coacting to provide a rotatable support (54) for receiving and permitting rewinding of the unwound material in a roll, means (58-64) for driving the pair of roller means (55) in the same direction to cause rewinding of the material, a holddown assembly (67) mounted for movement transversely of the rotatable support (54) and into and out of engagement with the rewound roll of material, an elevator assembly (81) extending longitudinally between said pair of roller means (55) and mounted for upright reciprocation relative thereto into and out of engagement with the rewound roll to lift and support the latter above said rotatable support (54) to facilitate removal of said rewound roll, and means (88-97) for reciprocating the elevator assembly (81).

2. A roll winding apparatus as set forth in claim 1 including means between the roll supporting means and the rotatable support provided by the pair of roller means for measuring the unwound material.

3. A roll winding apparatus as set forth in claim 1 including means between the roll supporting means and the rotatable support provided by the pair of roller means for cutting the unwound material at the desired length.

4. A roll winding apparatus as set forth in claim 3 wherein the cutting means includes a substantially horizontal saw blade mounted for longitudinal reciprocation below and transversely of the unwound material and having upstanding teeth, means for reciprocating the saw blade, and a holddown member pivotally mounted at one end of the saw blade for swinging movement about a substantially horizontal axis into and out of substantially overlying alignment with said saw blade to force the unwound material into engagement with the teeth of said blade.

5. A roll winding apparatus as set forth in claim 1 wherein each of the pair of roller means includes a plurality of endless surfaces spaced longitudinally thereof and having a common axis, the elevator assembly having transverse portions projecting between the spaced endless surfaces of said pair of roller means for movement above and below the adjacent peripheral portions of said endless surfaces upon reciprocation of said elevator assembly to lift the rewound roll of material from the rotatable support provided by said pair of roller means.

6. A roll winding apparatus as set forth in claim 5 including rollers upstanding from the transverse projecting portions of the elevator assembly for engagement with the rewound roll of material to facilitate endwise removal of the latter.

7. A roll winding apparatus as set forth in claim 5 wherein the holddown assembly includes a longitudinal member extending substantially parallel to the axes of rotation of the pair of roller means, a plurality of rollers suspended from the member in transversely spaced relation thereto and to one another for engagement with the front and rear peripheral portions of the rewound roll of material, a supporting arm extending transversely rearward and downward from each end of said member and relative to the rear roller means, means at the lower end of each arm mounting the arm for longitudinal reciprocation and for pivotal movement about an axis below said pair of roller means and substantially parallel to said axes of rotation thereof whereby the plurality of rollers may be swung forwardly into and rearwardly out of overlying relation to the rotatable support provided by said pair of roller means, the reciprocal mounting of each supporting arm permitting movement of said plurality of rollers in accordance with the diameter of the rewound roll, and means for constantly urging at least one of the supporting arms downwardly to maintain said plurality of rollers in engagement with the rewound roll.

8. A roll winding apparatus as set forth in claim 7 wherein the longitudinal member of the holddown assembly is pivotally connected to the supporting arms to

permit swinging of the plurality of rollers transversely of the rewound roll of material in conformity with the diameter thereof.

9. A roll winding apparatus as set forth in claim 1 wherein the holddown assembly includes a longitudinal member extending substantially parallel to the axes of rotation of the pair of roller means, a plurality of rollers suspended from the member in transversely spaced relation thereto and to one another for engagement with the front and rear peripheral portions of the rewound roll of material, a supporting arm extending transversely rearward and downward from each end of said member and relative to the rear roller means, means at the lower end of each arm mounting the arm for longitudinal reciprocation and for pivotal movement about an axis below said pair of roller means and substantially parallel to said axes of rotation thereof whereby the plurality of rollers may be swung forwardly into and rearwardly out of overlying relation to the rotatable support provided by said pair of roller means, the reciprocal mounting of each supporting arm permitting movement of said plurality of rollers in accordance with the diameter of the rewound roll, and means for constantly urging at least one of the supporting arms downwardly to maintain said plurality of rollers in engagement with the rewound roll.

10. A roll winding apparatus as set forth in claim 9 wherein the longitudinal member of the holddown assembly is pivotally connected to the supporting arms to permit swinging of the plurality of rollers transversely of the rewound roll of material in conformity with the diameter thereof.

11. A roll winding apparatus as set forth in claim 1 wherein the holddown assembly (67) includes an arm (69) extending transversely rearward and downward relative to the rotatable support (54) provided by the pair of roller means (55), second roller means (77, 79) supported by the front upper portion of the arm (69) for rotation about an axis substantially parallel to the axes of rotation of said pair of roller means (55) for overlying engagement with the rewound roll of material, means (72) at its lower rear portion for mounting said arm (69) for pivotal movement about an axis substantially parallel to said axes of rotation of said roller means (55) whereby the second roller means (77, 79) may be swung forwardly into and rearwardly out of overlying relation to said rotatable support (54), and means (74) for constantly urging said arm (69) toward said support (54) to maintain said second roller means (77, 79) in engagement with the rewound roll.

12. A roll winding apparatus as set forth in claim 11 wherein the second roller means includes a plurality of rollers (77, 79) in transversely spaced relation to each other for engagement with the front and rear peripheral portions of the rewound roll of material, and means (68,

75, 76) for pivotally connecting the plurality of rollers (77, 79) to the arm (69) to permit swinging of said rollers (77, 79) transversely of the rewound roll in conformity with the diameter thereof.

13. A roll winding apparatus as set forth in claim 1 wherein the holddown assembly (67) includes an arm (69) overlying and extending transversely of the rotatable support (54) provided by the pair of roller means (55), second roller means (77, 79) rotatably supported by the arm (69) for rotation about an axis substantially parallel to the axes of rotation of said pair of roller means (55) and for overlying engagement with the rewound roll of material, means (70-72) for mounting said arm (69) for longitudinal reciprocation and for pivotal movement about an axis substantially parallel to said axes of rotation whereby the second roller means (77, 79) may be swung into and out of overlying relation to said rotatable support (54), the reciprocal mounting (70, 71) of said arm permitting movement of said second roller means (77, 79) in accordance with the diameter of the rewound roll, and means (74) for constantly urging said arm (69) downwardly to maintain said second roller means (77, 79) in engagement with the rewound roll.

14. A roll winding apparatus as set forth in claim 13 wherein the second roller means includes a plurality of rollers (77, 79) in transversely spaced relation to each other for engagement with the front and rear peripheral portions of the rewound roll of material, and means (68, 75, 76) for pivotally connecting the plurality of rollers (77, 79) to the arm (69) to permit swinging of said rollers (77, 79) transversely of the rewound roll in conformity with the diameter thereof.

15. A roll winding apparatus as set forth in claim 1 wherein the elevator assembly (81) includes roller means (84) rotatable about an axis transverse to the axis of rotation of the pair of roller means (55) which provides the rotatable support (54) for engagement with the rewound roll or material to facilitate endwise removal of the latter.

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