

Aug. 26, 1924.

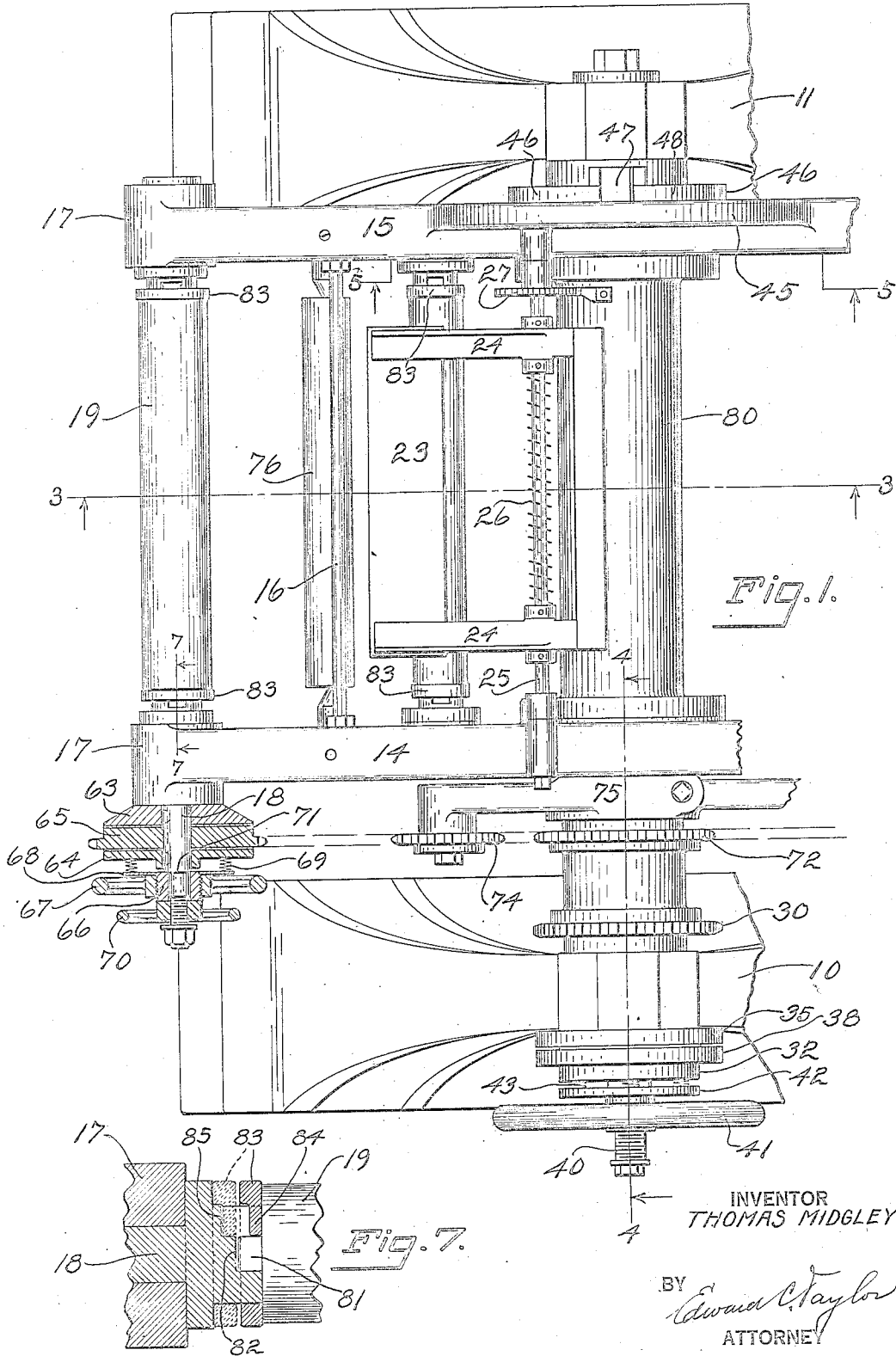
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T. MIDGLEY

WINDING DEVICE

Filed Aug. 12, 1921

3 Sheets-Sheet 1



Aug. 26, 1924.

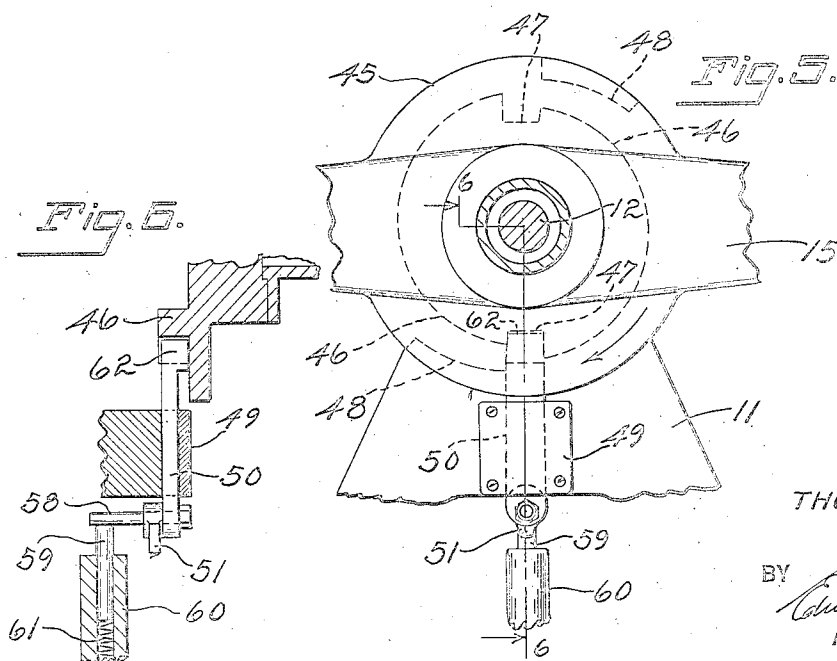
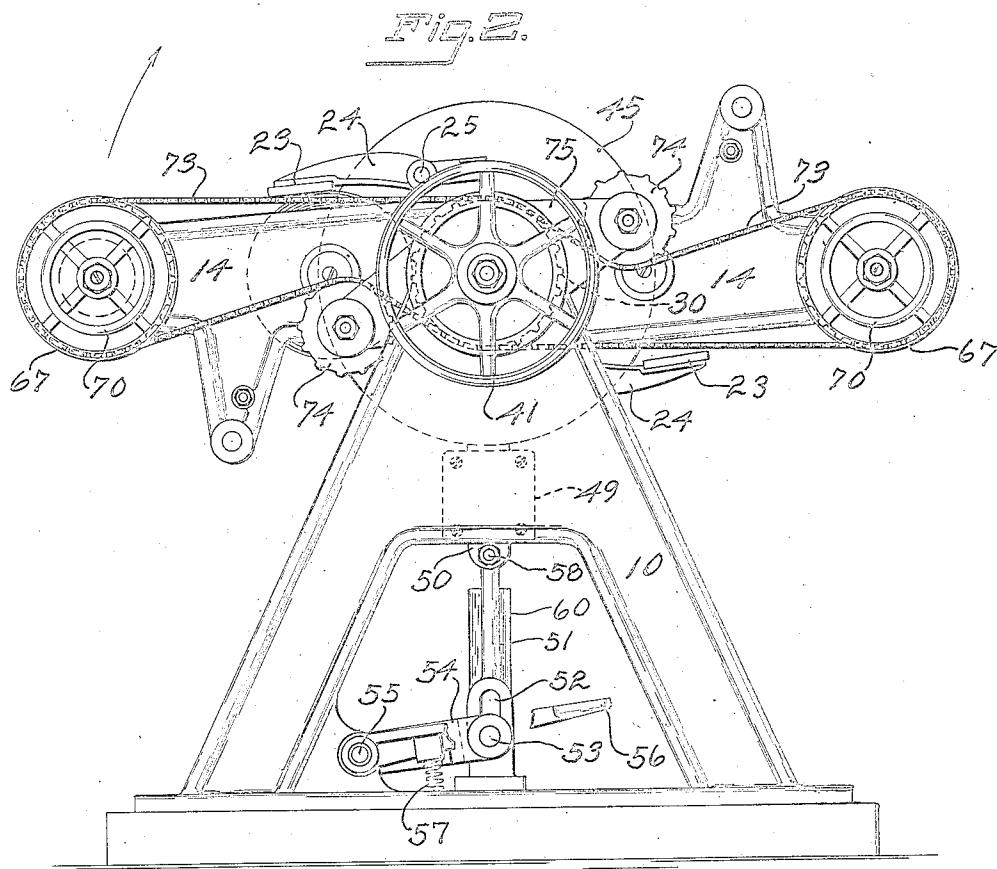
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3 Sheets-Sheet 2



INVENTOR
THOMAS MIDGLEY

BY *Edward Taylor*
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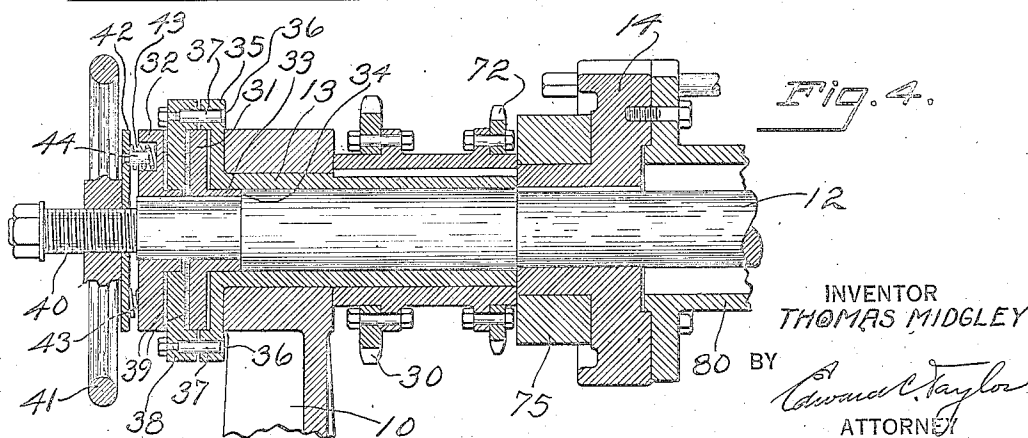
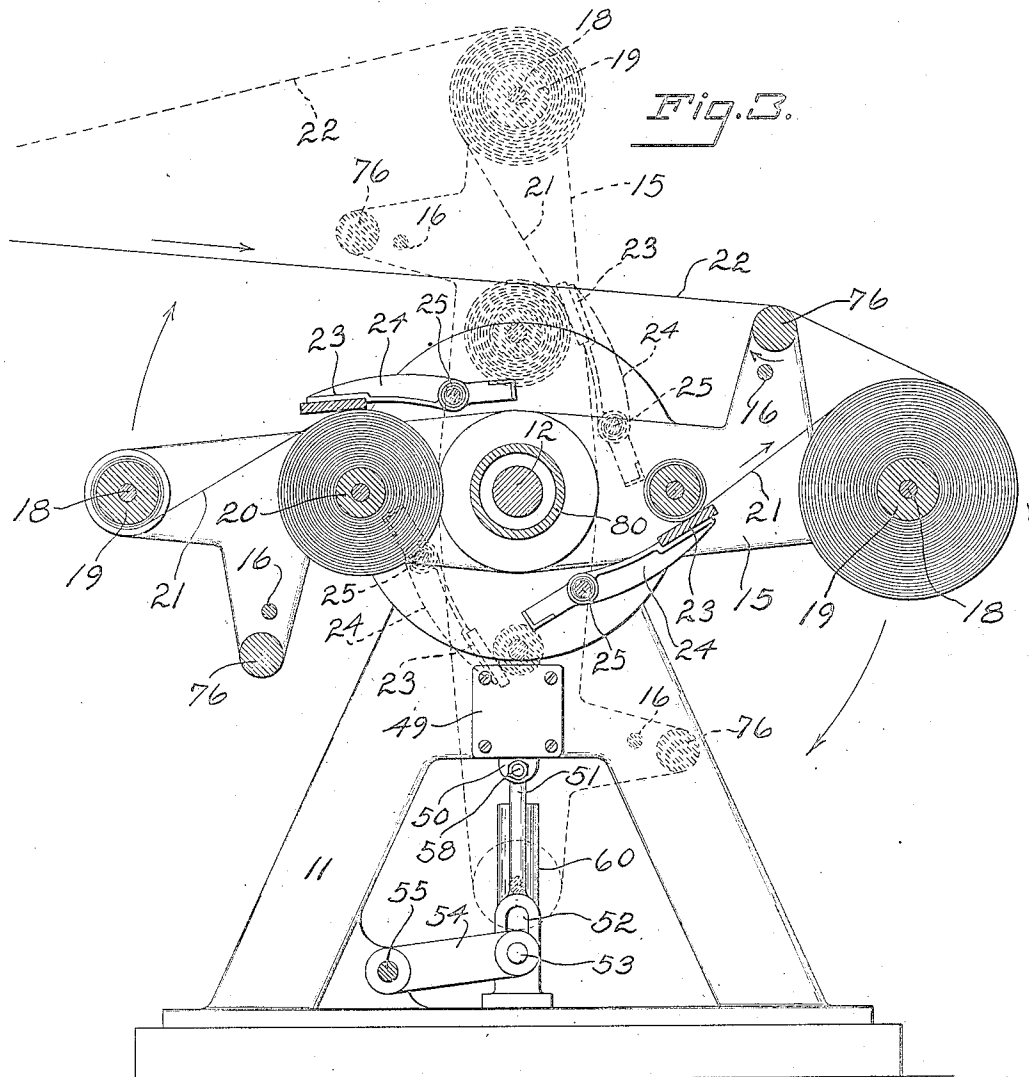
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WINDING DEVICE

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

THOMAS MIDGLEY, OF HAMPDEN, MASSACHUSETTS, ASSIGNOR TO THE FISK RUBBER COMPANY, OF CHICOPEE FALLS, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

WINDING DEVICE.

Application filed August 12, 1921. Serial No. 491,730.

To all whom it may concern:

Be it known that I, THOMAS MIDGLEY, a citizen of the United States of America, residing at Hampden, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in a Winding Device, of which the following is a specification.

My present invention is directed to improvements in devices for winding up a continuous web as the latter is fed from a web making machine as in paper manufacture or web treating machine as in rubber manufacture and has general utility in analogous situations. My invention will be described in connection with a preferred embodiment as arranged for winding up a raw rubber coated web as fed from a calender and this embodiment is illustrated in the accompanying drawings, in which:

Fig. 1 is a top plan view of the device, the right hand half being broken away;

Fig. 2 is an end view thereof;

Fig. 3 is a section on line 3—3 of Fig. 1;

Fig. 4 is a section on line 4—4 of Fig. 1;

Fig. 5 is a section on line 5—5 of Fig. 1;

Fig. 6 is a section on line 6—6 of Fig. 5;

and

Fig. 7 is a section on line 7—7 of Fig. 1.

Briefly summarized, the device comprises a plurality of take-up spools so arranged that they may successively be brought into operation and receive from the calender without interruption the sheet material delivered by it. These spools are preferably arranged so that they may be shifted by power to their active or inactive positions, and so that the speed with which they wind up the stock may be varied to accommodate the varying surface speeds of full or empty spools.

For these and other purposes which will appear the device is preferably constructed as will now be described. A shaft 12 is journaled directly in standard 11 and at its other end journaled in a sleeve 13 freely rotatable in the standard 10. The sleeve 13 and shaft 12 are driven as will be described later. Keyed to shaft 12 are arms 14 and 15 spaced apart by the flanged tube 80 and extending both ways from the shaft and furnishing end bearings for a plurality of rolls which will be described. The outer ends of the two arms are preferably held in their

proper spaced relation by the rods 16 and at their ends provide bearings 17 for shafts 18 carrying by any suitable detachable connection wind-up rolls 19 such as illustrated in Fig. 7. In this figure the end of roll 19 is shown as having a squared end 81 fitting in a slot in the end of shaft 18. A collar 83, slidable from the locking position shown in full lines to the inoperative position shown in dotted lines, has a lug 84 sliding over the squared end 81 to constrain the roll for rotation with the shaft and to hold it in central position. When the collar is moved to inoperative position this lug is received within a recess 85 in the shaft 18. Cooperating with these wind-up rolls are liner supplying spools 20 detachably mounted in a like manner to rolls 19, and which carry sheet material 21 adapted to be wound upon rolls 19 between the layers of the sheet material 22. A friction brake 23 of any suitable construction presses against each liner spool to maintain the liner under tension. In the case shown each brake is carried by arms 24 pivoted on a shaft 25 supported between arms 14 and 15. A spring 26, secured at one end to shaft 25 and at the other to one of arms 24, and adjustable by means of a pawl and ratchet 27 arranged to hold the shaft in any desired position, serves to press the brake yieldingly against the liner roll.

In order to bring either of the two wind-up devices alternately into operative position the arms 14 and 15 are provided with mechanism for rotating them through 180°. To this end sleeve 13 has secured for rotation with it a sprocket 30 which may be constantly driven from any suitable source of power. Splined on shaft 12 are disks 31 and 32, disk 31 having a flange 33 abutting against a shoulder 34 on shaft 12, and disk 32 being freely reciprocable on the shaft through a short distance although constrained to rotate therewith by its splined connection. Sleeve 13 has a flange 35 formed on one end which is fitted with holes 36 adapted to loosely receive dowels 37 secured to a disk 38 interposed between disks 31 and 32. Friction lining 39, carried by disks 31 and 32 serves to cause these disks to grip the disk 38 for rotation therewith when the three disks are pressed together. To cause this pressure when desired the end of shaft 12 is threaded as at 40 to receive

a hand wheel 41 which serves to adjust the position of a plate 42 between which and disk 32 are springs 43 mounted as on pins 44 on the plate. When the hand wheel is 5 screwed up it increases the spring pressure with which the friction disks are held together, and thus provides an adjustment by which sleeve 13 and shaft 12 are frictionally 10 joined together for rotation. It will be apparent from the above description that by turning the hand wheel the arms 14 and 15 can be caused to rotate with shaft 12 under the influence of power supplied through sprocket 30.

15 It is desirable to provide means to stop the rotation of the arms after they have rotated through an arc of 180° so as to bring one or the other of the winding-up rolls into operative position. In order to accomplish 20 this I provide arm 15 with a circular boss 45, having on its outer face a double scroll cam 46 provided with diametrically opposite locking recesses 47. The boss also carries detent tripping cams 48. Reciprocable in 25 a guide 49 on frame 11 is a slide 50 to which is pivoted a pitman 51 (shown broken away in Fig. 5) having at its other end a slet 52 embracing a pin 53 on an arm 54 extending from a rock shaft 55. Also secured to this rock shaft is a treadle 56, 30 normally pressed upwardly by a spring 57, by means of which the slide 50 may be lowered. Slide 50 carries a pin 58, which may serve as the pivoted connection with 35 pitman 51, resting upon the top of a plunger 59 operating in a casing 60 and pressed yieldingly upwardly by a spring 61. On the upper end of the slide is a detent 62 cooperating with cams 46 and 48 as will 40 now be described.

As treadle 56 is depressed detent 62 is withdrawn from the locking recess 47 in which it was held by spring 61. The arms 14 and 15 are rotated by driving the 45 connection to sprocket 30 effected by turning hand wheel 41, as above described; and treadle 56 released. The depression of treadle 56 and the connection to sprocket 30 is preferably made at about the same 50 time. The detent will then drop into the succeeding recess 47 and will both stop further rotation of the arms and hold them in position until treadle 56 is again depressed. The hand wheel 41 is then turned to dis- 55 connect the driving connection between the sprocket 30 and the arms 14 and 15. If the operator neglects to release the treadle after starting the rotation of the arms the detent tripping cam 48 will raise the detent into 60 locking position. This will serve as a reminder to the operator to get his foot off the treadle because the latter rises with the detent. It will be seen that by this means the arms are kept against a rotation of more 65 than 180° or from one normal position to

another for a single depression of the treadle unless the operator continues to press his foot on the treadle after it is raised.

To maintain a desired tension on each winding roll during the winding operation 70 a friction drive is provided. For this purpose each shaft 18 has splined thereto friction faced disks 63 and 64, between which runs a freely rotatable sprocket 65. Slid- 75 able on an extension of shaft 18 is a sleeve 66 upon which a hand wheel 67 is threaded. A plate 68, connected by springs 69 with disk 64, bears against the hand wheel. A second hand wheel 70 is threaded upon the 80 end of shaft 18 and serves to press sleeve 66 against a shoulder 71 on shaft 18 when it is desired to operate the friction drive. Hand wheel 67 acts to determine the adjustment 85 of the force with which the friction disks will be pressed against the sprocket when hand wheel 70 is turned up, the latter hand wheel being an operating control for the drive rather than an adjustment. The ad- 90 justment is made at any time by hand wheel 67 so as to hold the desired tension in winding up the web. In order to operate sprock- 95 ets 65 a sprocket 72 is secured to sleeve 13 for rotation therewith, and is connected with sprockets 65 by a chain 73 passing over the sprockets 72 and 65 and over idlers 74 95 carried by an adjustable bracket 75 mounted on arm 14.

The operation of the device will perhaps best be understood from Fig. 3. In this 100 figure the parts are shown in dotted lines at an intermediate position during the reversal of the positions of the winding spools, and in full lines after this reversal is com- 105 plete but before the web to be wound up is started around the empty spool. Starting with the full line positions of the elements 110 the web 22 to be wound up is shown as running over a guide roll 76 rotatably mounted between arms 14 and 15 and being wound up on the right hand one of spools 115 19. Assuming this spool to be wound to capacity the web 22 is severed between roll 76 and the supply, and the leading end 120 formed by the cut is started around the spool 19 at the left of the figure, this spool being rotated by coupling the friction drive 125 by means of hand wheel 70. The liner 21 may be started on spool 19 (at the left) and the severed end of web 22 placed between the liner and the roll which grip it and 130 feed it thereafter to the spool automatically. The winding of the web on this spool is continued while substituting an empty spool for the full one at the right. When this substitution has been made the arms may 135 be rotated as described above to reverse the position of the spools and without stopping the winding operation on the spool as it is taking its new position. This reverse is preferably deferred until the spool at the 140

left is nearly filled. The use of alternate wind-up spools, with intervening reversals of their positions, may be continued as long as desired without interruption to the feed of the web. The only human handling of the continuously fed web 22 is in the act of cutting it and immediately placing the severed end between liner 21 and new spool 19. This is of particular importance in cases where the web is composed of fabric or cords coated with or laid in rubber by calenders from which the present winding device receives it, as every stoppage of a calender interferes both with the output and with the quality of the product. Where, as in paper manufacture, the liner is not desirable between the coils of paper on the spool a short liner only may be used to get the end started on the fresh spool after which the paper may be wound up without a liner.

Having described one embodiment of my invention, I desire to claim it as broadly as the law will permit as well as to claim certain specific features found in the illustrated embodiment.

Having thus described my invention, I claim:

A winding mechanism comprising a frame with a rotatable shaft therein, spaced pairs of arms mounted on said shaft, a receiving spool and a liner-carrying spool positioned between each pair of arms, means to rotate the shaft to bring the spools successively into transfer position, means for holding the arms in the desired positions, means to rotate the winding spools individually while stationary or when changing positions, a guide roll on each arm holding the web out of contact with the mechanism when the active winding spool is in transfer position and acting as a guide until the web is severed, said mechanism being adapted to wind upon successive spools a continuous web of material passing above a fresh spool in its passage to a spool in transfer position, whereby when the web is severed the winding upon the fresh spool can be started immediately and without stopping the travel of the web.

THOMAS MIDGLEY.