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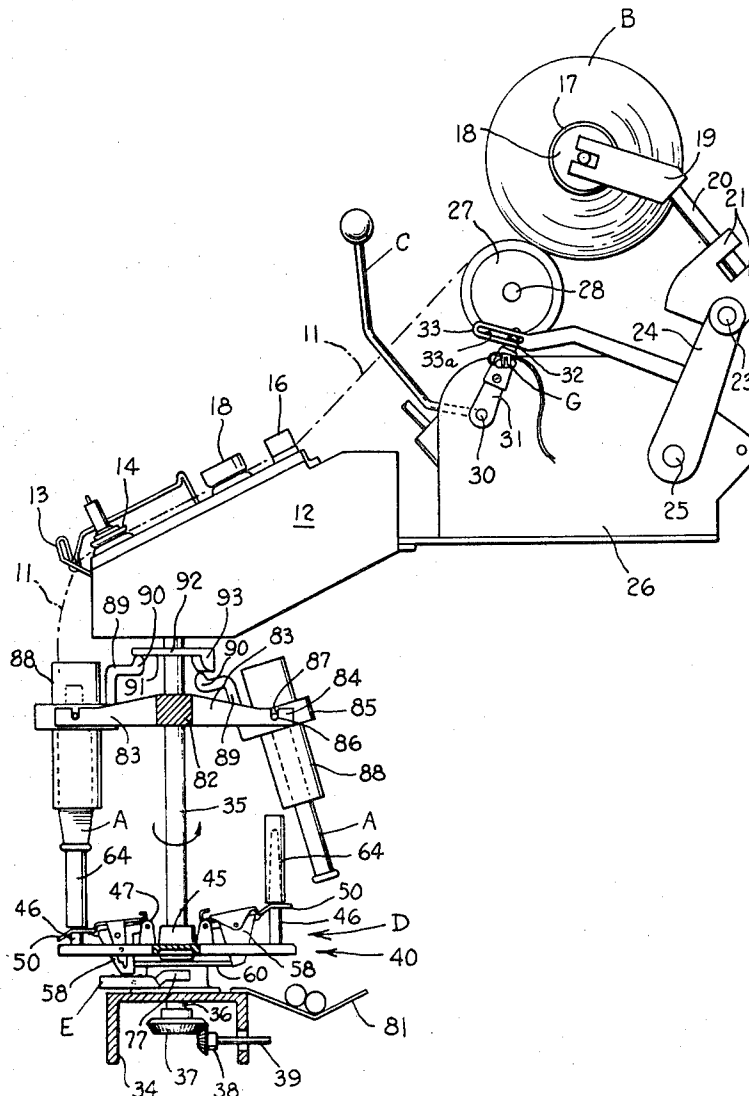
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 3,048,349 8/1962 Pitts et al. 242/130
 3,124,316 3/1964 O'Brien et al. 242/35.5
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[54] **MONITORING APPARATUS FOR A TEXTILE WINDING MACHINE**
4 Claims, 6 Drawing Figs.

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242/36, 242/130
 [51] Int. Cl. **B65h 54/22,**
B65h 63/00, B65h 49/12
 [50] Field of Search **242/35.6,**
35.5, 35.5 A, 130, 36

ABSTRACT: An apparatus for monitoring the operation of a textile winding machine upon which yarn is unwound successively from a plurality of yarn holders and wound onto a larger package. A signal-generating means is provided adjacent a yarn holder indexing mechanism for generating a signal each time a full yarn holder is rotated into the unwinding position. Another signal-generating means is carried by the winding machine for generating a signal responsive to manually restarting the machine, such as takes place after the larger package has been doffed or there has been a mistie.



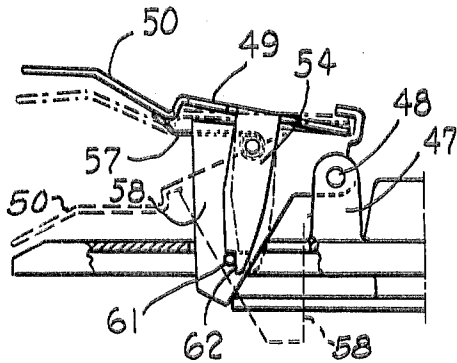


Fig. 2.

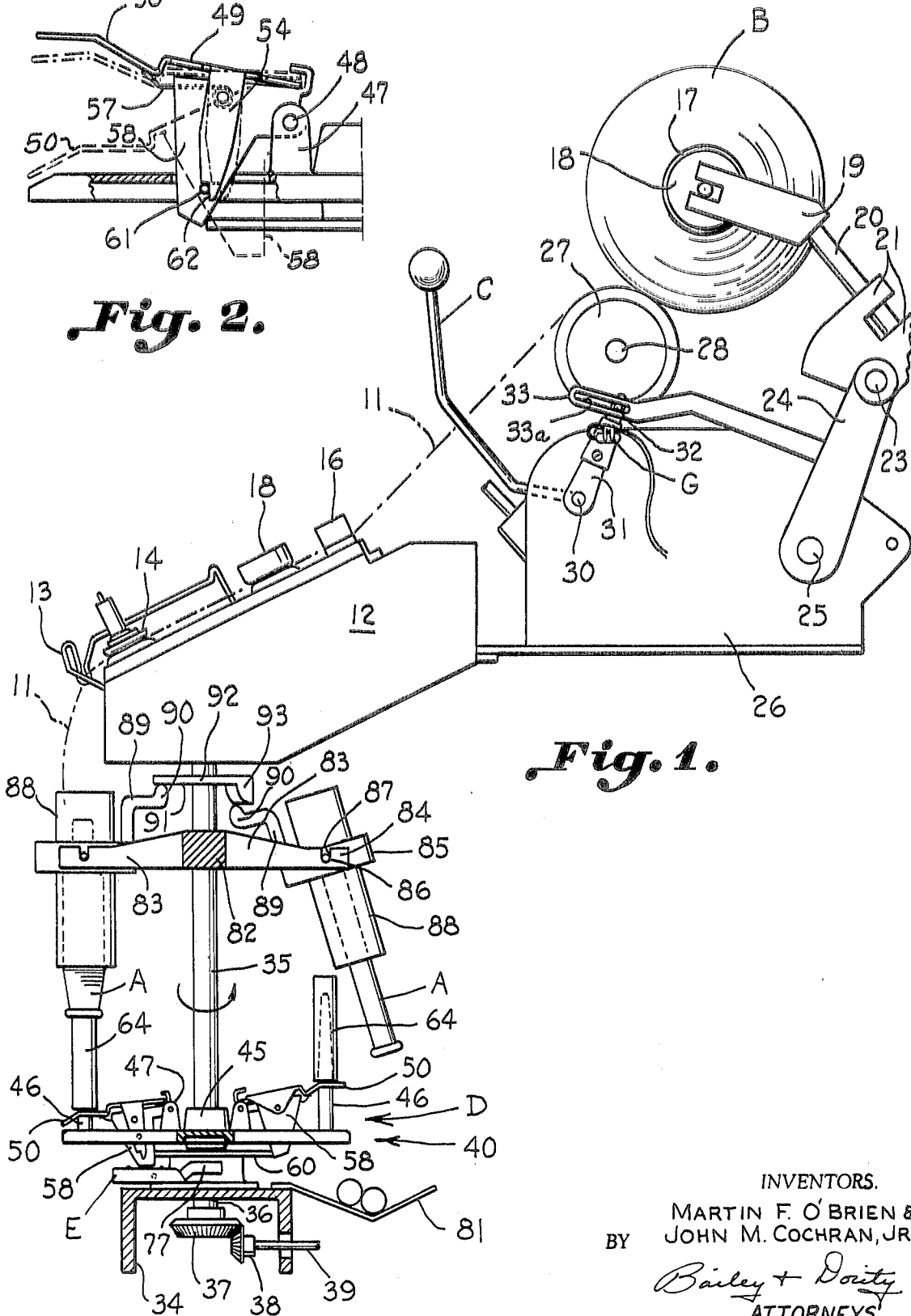


Fig. 1.

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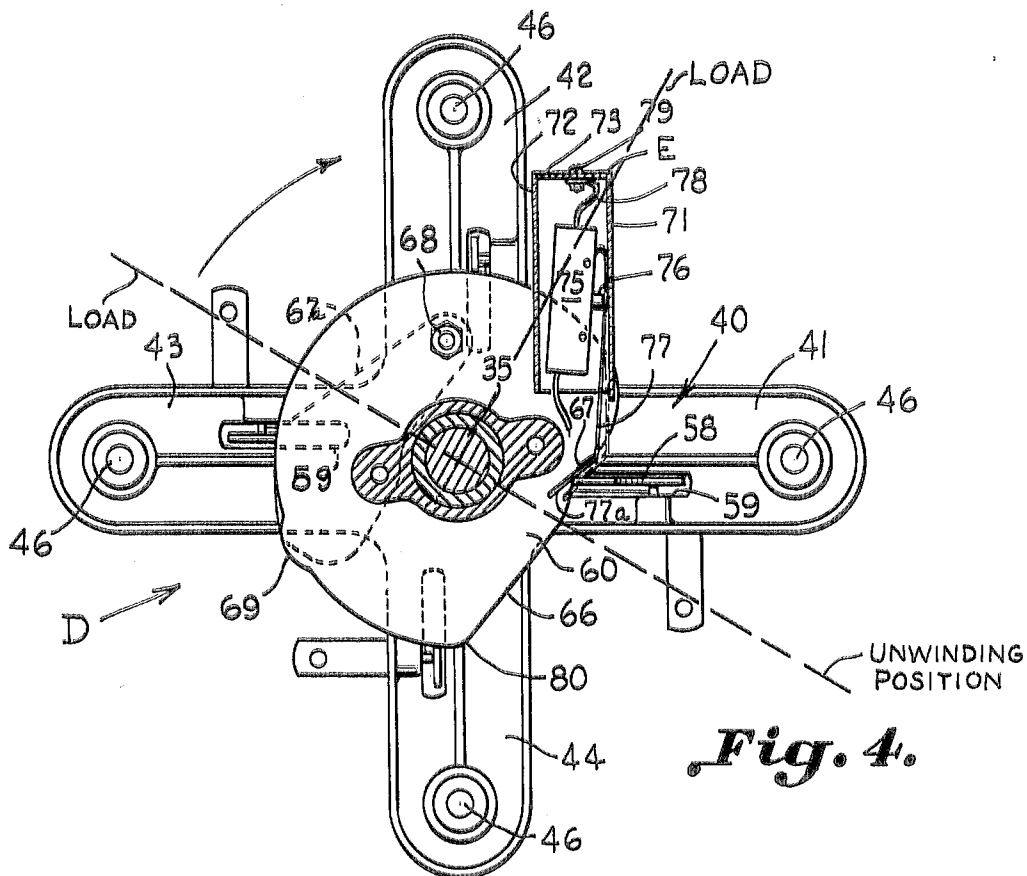


Fig. 4.

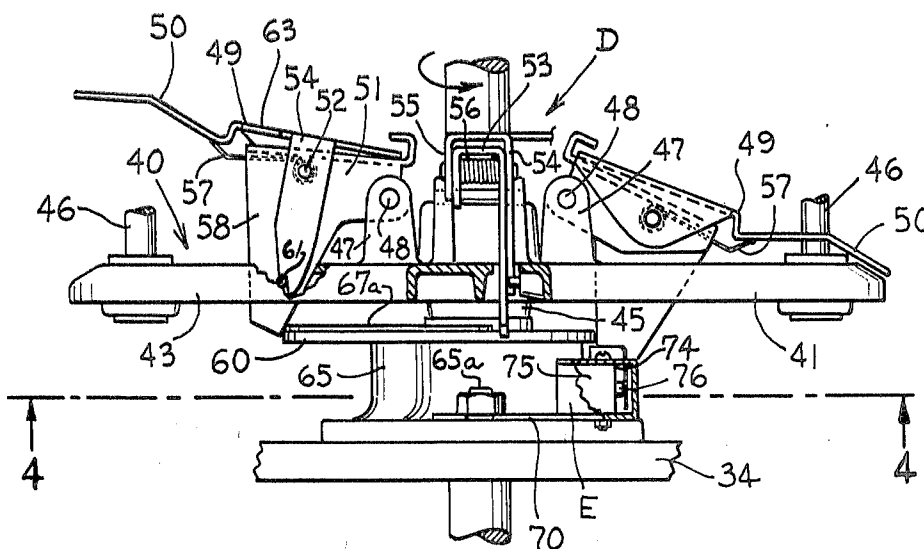


Fig. 3.

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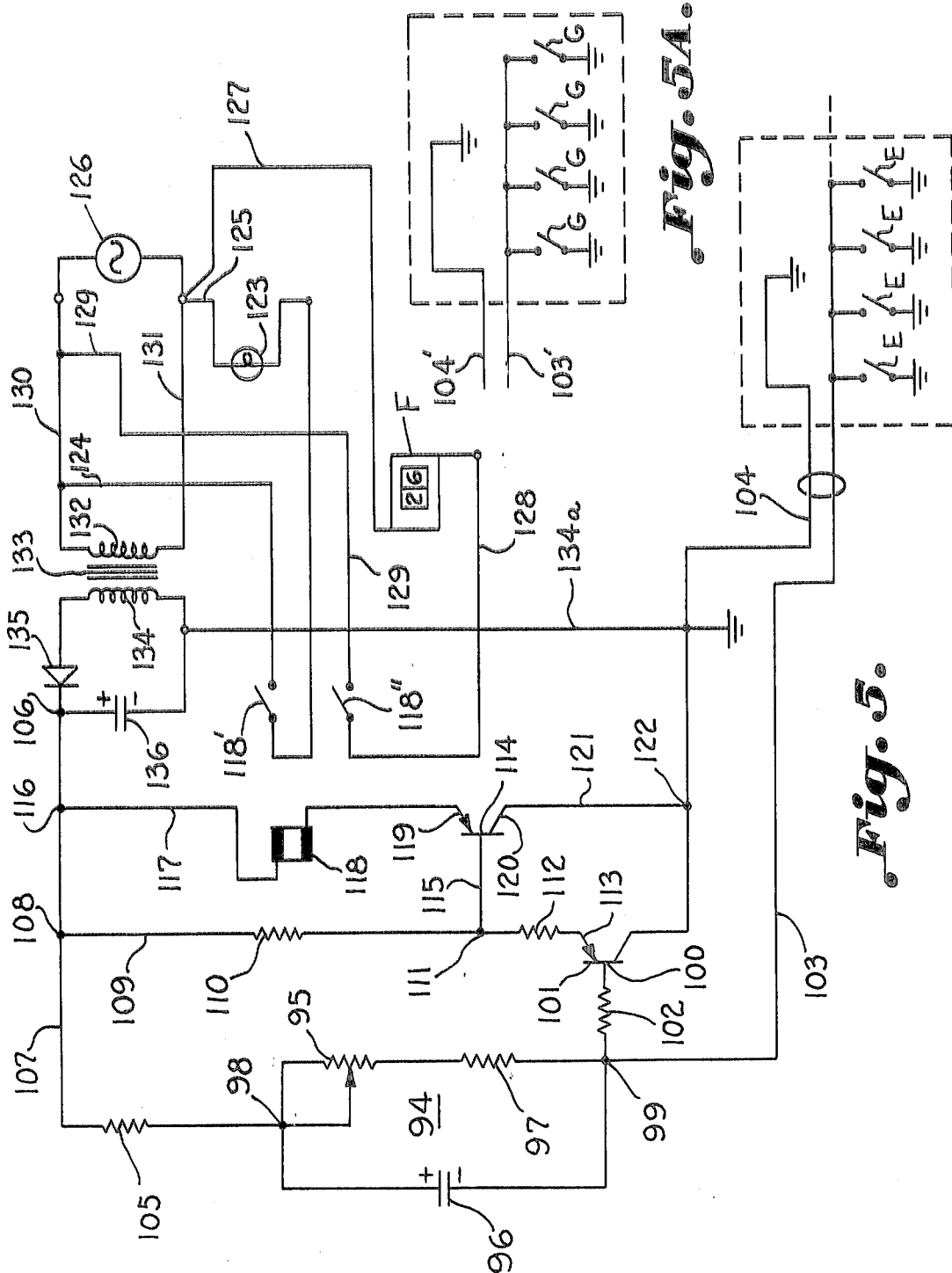


Fig. 5A.

Fig. 5.

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MONITORING APPARATUS FOR A TEXTILE WINDING MACHINE

This invention relates to an apparatus for monitoring the operation of a textile winding machine, and more particularly to an apparatus which counts the number of full bobbins that are unwound and the number times the winding machine is restarted.

The invention is particularly applicable to winding machines of the type disclosed in U.S. Pat. No. 2,764,362 issued Sept. 25, 1956, to W. V. Goodhue et al. for "WINDING MACHINE" which automatically repairs broken ends in the winding strand and ties in new supplies when the supply is exhausted. Only those portions of the winding machine are shown which are necessary to enable a person to visualize a particular environment where the invention is applicable. A more detailed disclosure of the components illustrated in the drawings is found in the above-mentioned U.S. Pat. No. 2,764,362, U.S. Pat. No. 3,081,046 granted to Barnes, Jr. et al. on Mar. 12, 1963, and U.S. Pat. No. 3,048,349 granted to Pitts et al. on Aug. 7, 1962. The winder upon which the monitoring apparatus is mounted is generally known in the textile industry as the "UNICONER" automatic cone winder manufactured by Leesona Corporation, a corporation of Massachusetts.

Heretofore, one way of paying operators of winding machines on an incentive basis was based on weighing the packages. However, if the machine itself were not operating properly, then the operator would be penalized for the actions of the machine rather than his own performance. The apparatus constructed in accordance with the present invention provides an incentive method wherein an operator can be paid for the number of bobbins dropped or loaded by him on a winding machine. Therefore, if an operator works at a higher rate of speed, he will be paid more than a slower performing operator. Another method of basing the rate of pay is on the number of times the operator doffs the machine or reties misties. Each of these last two functions requires manually restarting machines thereafter. If it is desired in calculating the incentive pay to know how many misties took place, it is only necessary to count the number of packages doffed and subtract from the readings on the counters which totalize both the number of packages and the number of misties.

Accordingly, it is an important object of the present invention to provide a monitoring apparatus for winding machines and the like, wherein the number of bobbins or yarn holders unwound are totalized and the number of times the winder is manually restarted is recorded.

Another important object of the present invention is to provide a switching means for a winding machine for generating a signal responsive to an indexing mechanism rotating a full yarn holder into an unwinding position, but does not generate a signal when there is no yarn holder mounted on the carrier.

Another important object of the present invention is to provide information regarding the operation of a winding machine so that operators of the machines can be paid on an incentive basis relating to the attention and work performed by the operator.

Other objects and advantages of the invention will be apparent during the course of the following detailed description.

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

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

FIG. 1 is a side elevation of one segment of a winding machine with parts removed therefrom for the purpose of clarity,

FIG. 2 is an enlarged detailed view, partially in section, illustrating a lifting member provided for raising a yarn holder after it has been unwound,

FIG. 3 is an enlarged elevational view, partially in section, illustrating the indexing mechanism for the yarn holders and a switch means mounted thereon,

FIG. 4 is a plan view taken along line 4—4 of FIG. 3, illustrating a portion of the indexing mechanism looking from the bottom of the indexing mechanism upwardly,

FIG. 5 is a schematic diagram of the electrical circuit for the monitoring device, and

FIG. 5A is a schematic diagram of a portion of the electrical circuit provided for counting the number of restarts of the winding machine.

The drawings illustrate an apparatus for monitoring the operation of a textile winding machine in which the yarn is unwound successively from a plurality of yarn holders A and wound onto a larger package B. The winding machine is provided with a manually operated restart handle C which is manually depressed by the operator to restart the machine after such has been stopped to doff the larger package or when there is a mistie of the ends of the yarn. A yarn holder indexing means is provided for successively rotating the yarn holders A into an unwinding position from a reserve position. A signal generating means E is carried adjacent the yarn holder indexing means D for generating a signal each time a full yarn holder A is rotated into the unwinding position. A totalizing means F is coupled to the signal generating means E for totalizing the number of yarn holders unwound. A second signal-generating means G is carried by the textile winding machine for generating a signal responsive to the restarting handle C being depressed. Another totalizing means is coupled to the second signal generating means G for recording the number of times the winding machine has been restarted. An electronic circuit is interposed between a totalizing means F and a plurality of signal generating means which generate a signal each time a full-yarn holder is rotated to the unwinding position. A similar circuit is provided between the second signal generating means associated with the restart handle and a totalizing means F associated therewith.

In the following specification and claims the term "yarn" is employed in a general sense to apply to all kinds of strand material, either textile or otherwise, and the designation "package" is intended to mean the product of a winding or twisting machine, whatever its form.

Referring now to the drawings wherein a preferred embodiment of the present invention is shown in connection with the winding machine of the type disclosed in U.S. Pat. No. 2,764,362 which is better known as the "UNICONER" winder, the winding machine is provided with a plurality of identical units, as shown in FIG. 1, each of which is adapted to wind a package B. The yarn 11 is unwound from a yarn holder A, and fed over a flat upper plate of a housing 12 which includes conventional tensioning and waxing elements which form no part of the present invention, and are described in detail in U.S. Pat. No. 3,119,571 granted to Pitts on Jan. 29, 1964. Some of the elements of the box will be identified for the sole purpose of illustrating the path of the yarn 11.

The yarn 11 as previously mentioned, is unwound from the yarn holder A and extends through an eyelet 13 between the usual tension disc 14, a waxed disc 18, and through a yarn holddown and guide mechanism 22 onto the package B on core 17 which, in turn, is suitably mounted on mandrel 18. Mandrel 18 is rotatably supported on a pivot arm 19, connected to a rod 20, supported in a bearing 21 of a bracket 22. The bracket 22 is mounted for pivotal movement on a stub shaft 23 journaled in the upper portion of an upstanding arm 24, which is also capable of pivotal movement. A shaft 25 extending through housing 26 mounts arm 24 on the outer end thereof. The shaft 25 extends within housing 26, and is connected to a suitable mechanism fully described in U.S. Pat. No. 2,764,362 to rock said shaft to thereby pivot arm 24 to move the package B. Similar suitable mechanism is illustrated in U.S. Pat. No. 3,081,046 and U.S. Pat. No. 3,016,205.

A yarn traversing and package drive roll 27 having helical grooves (not shown) in the periphery thereof, is fixed to shaft

28 for rotation therewith. The shaft 28 extends longitudinally of the housing 26 and is connected to any suitable power means, such as an electric motor not herein illustrated. As shown in FIG. 1, drive roll 27 serves to receive the surface of package 10 on its periphery and to frictionally rotate the package to wind a running strand of yarn 11 thereon. It will be understood that the mandrel 18 will be maintained in full driving contact with the surface of the drive roll 27 as wraps of yarn are laid on the package B by the rotation of rod 20 and bearings 21 to tilt or cant said mandrel 18. Further, as package B increases in diameter the mandrel 18 will be progressively moved away from drive roll 27 due to the increasing yarn mass on core 17 causing arms 19 and rod 20 to swing clockwise about the shaft 23.

A restart handle C has a lower end integral with or otherwise connected to the shaft 30 which extends through the housing 26, and will be rocked in a counterclockwise direction (FIG. 1) when the starting handle C is pulled downwardly. On the other end of shaft 30 is a fixed crank 31 extending generally vertically and terminating at its upper end above the top of the housing 26. A pin 32 is affixed on the upper end of the crank 31 for engagement with an elongated slot 33a cut in the front end of a connecting link 33. The connecting link 33 is, in turn, operably connected to the upstanding arm 24 as disclosed in U.S. Pat. No. 3,081,046.

It will be seen that as starting lever C is rocked downwardly to restart the machine after a package B has been doffed, or there has been a mistie of the yarn 11, such causes a counterclockwise rotation of crank 31. After pin 32 has reached the forward limit of slot 33a such will cause the package extension arm 19 to be lowered into winding position with the package tube 17 in peripheral contact with the driving roll 27 to initiate winding of a new package.

As can be seen, the second signal-generating means G is attached to complementary shaped bracket mounted on the crank 31. The signal-generating means G is a mercury switch and when the starting arm 29 is pulled downwardly the mercury switch closes producing a signal indicating that the winding machine has been restarted. The manner in which these signals are totalized will be discussed more fully below with the electrical circuitry.

Since the package B is wound from the yarn carried on a plurality of yarn holders A, it can be seen that it is necessary that the ends of successive packages of yarn carried on the yarn holders A be joined. An indexing mechanism D is provided for rotating the yarn holders from a load or reserve position, such as illustrated by the dotted line in FIG. 4, 90° to an unwinding position appropriately labeled in FIG. 4. It should be kept in mind that the view of the portion of the indexing mechanism illustrated in FIG. 4 is taken from the bottom of the machine looking upwardly. Therefore, from that position the indexing machine rotates in a clockwise direction. However, when viewing the indexing mechanism from the side, such as in FIGS. 1 and 2, it rotates in a counterclockwise direction.

The indexing mechanism is mounted on a rail 34, preferably in the form of inverted U-shaped channel having its end edges resting upon other supporting portions of the machine (not shown). A shaft 35 extends upwardly through the rail 34 and is suitably journaled therein for rotation about a vertical axis. At its lower end shaft 35 projects below the top wall of rail 34 as at 36, and a beveled gear 37 is rigidly fixed to the end of the shaft. Meshing with beveled gear 37 is a beveled pinion 38 secured to the outer end of a horizontal shaft 39 extending through the wall of rail 34. In some models the shaft 39 extends longitudinally across the winding machine with pinion gears mounted thereon so that the shaft can be used to drive a plurality of indexing mechanisms. The end of the shaft 39 remote from rail 34 is connected to a suitable source of power (not shown) and it is contemplated that shaft 39 shall be rotated from time to time through a limited arc, either by periodic operation of shaft 39, or in some other manner as desired. The rotation of shaft 39 provides power for indexing

the bobbins or yarn holders A from a reserve position to the unwinding position.

There is affixed to shaft 35 at a point somewhat above the upper level of rail 34 a yarn carrier member generally designated at 40, constructed of four radially extending branches 41 through 44, respectively, having a central hub portion 45 press fitted or otherwise secured on shaft 35. Adjacent the respective outer ends of the branches 41 through 44 are vertically arranged posts 46 having their upper ends tapered to receive and support the yarn supply package holders A. As shown in the drawings, these packages are in the form of tubular bobbins provided with an axial bore into the lower end of which the tapered ends of the posts 46 fit to support the package with their axis parallel to axis of shaft 35. It will be understood, of course, that carrier 40 could be adapted to support other types of yarn holders as well.

Each of the branches 41 through 44 is provided at its inner end adjacent hub 45 with pairs of spaced apart upstanding ears 47 which are bridged at their upper end by a horizontal pin 48. Projecting outwardly from the pairs of ears 47 with their inner ends pivoted on pins 48 are lift arms 49. The lift arm includes an upper lifting member which terminates in a circular portion 50 adjacent its outer end and is secured to a lower portion 51 by a pin 52 which extends through a U-shaped top 53 of the lower portion. The upper member has a pair of opposed downwardly extending flanges 54 and 55 which form a U-shaped top and sides directly over the U-shaped top 53 of the lower position, and is secured thereto by the pin 52 extending therethrough. A spring 56 is also carried on the pin 52 and has an outwardly projecting end 57 which engages the bottom side of the circular portion 50 tending to force such in a clockwise direction. It will be noted that the U-shaped top 53 of the lower portion has a downwardly projecting tongue 58 which extends through an elongated slot 59 in a respective carrier arm to ride on the outer edge of a cam 60. A pin 61 projects outwardly from the tongue 58 for engaging a notch 62 carried in a lower edge of the flange 54 so as to lock the lifting arm 49 in the raised position, such as shown on the left in FIG. 2. The spring 56 maintains lifting arm in this raised position until an operator loads the respective post 46 with a yarn-carrying element depressing the lifting arm and releasing the notch off the pin 61. In other words, the lifting arm has two pivotal members. One pivots about the pin 48 while the circular portion 50 pivots about pin 52.

The enlarged circular portions 50 are preferably bent upwardly from the normal plane of a flat top portion 63 which is integral with the opposed downwardly extending flanges 54 and 55 so that, when the arms are in the fully depressed position, the outer edge of the circular portion 50 rests against the top face of the respective branch with the inner end of the lift arms supported above the surface in the ears 47 such as illustrated on the right in FIG. 3.

Fitting around the posts 46 between the tapered end portions and the enlarged circular portions 50 of the lift arms are tubular sleeves 64, which are just long enough to leave the tapered end portion of the post 46 exposed when the lift arms 49 are in the fully depressed position. The circular portions 50 have a cylindrical opening adjacent their end which encompass the post 46, but the outer edge of the circular member is closely adjacent the post 46 so that when the lifting arm is raised it will, in turn, raise the sleeve 64 forcing the yarn holder A off the top of the tapered post 46.

The manner in which the lift arms 49 are raised is accomplished through the medium of the elongated tongues 58 which ride on the cam 60 as the carrier arms are indexed. The cam 60 is fixed to an enlarged circular hub 65 which is, in turn, bolted by bolts 65a to the rail 34. The cam 60 is substantially circular with a portion removed so as to produce a substantially straight edge 66 with a smooth flowing notch 67 removed therefrom, such as illustrated in FIG. 4. It is, also, noted that an additional plate 67a is bolted the cam 60 by bolt 68 and extends slightly beyond the curved periphery providing a smooth projection 69 extending therefrom. The purpose of such is discussed more fully below.

Up to this point the structure described is a conventional winding machine and is disclosed for the purpose of setting forth the environment in which the monitoring device is used. The signal-generating means E which forms a part of the monitoring device is mounted on the base of the enlarged circular hub 65 and has a flat baseplate projecting outwardly, which has a hole therein, through which the bolt 65a passes to secure the switching means thereto. The switching means E is carried within a rectangular-shaped metallic housing formed of the sidewalls 71 and 72 and joined by an end wall 73, baseplate 70, and a top plate 74. The end of the housing opposite end wall 73 is open. A switch 75 is suitably carried within the housing and has a spring biased plunger 76 extending from a sidewall. An arm 77 has an inner end pivotally attached to the switch 75 and extends across in engagement with the plunger 76 outwardly through the open end of the housing and terminates in an inwardly slanting portion 77a which is located adjacent the notched out portion 67 of the cam. The switch is, in turn, grounded to the housing through lead 78 and bolt 79.

As the carrier arms are indexed the downwardly extending tongues 58 ride on the peripheral surface of the cam 60 raising and lowering the lifting arms 49 accordingly. If the yarn holder A has been loaded on post 46, as the post is rotated the unwinding position (see FIGS. 2 and 3) the tongue associated with the respective lifting arm rides along the peripheral edge of the cam 60 over the housing provided for the switch 75. After it passes over the housing the lifting arm drops downwardly to the position shown on the right in FIG. 3, since the tongue 58 is allowed to move radially inward as a result of the edge of the cam being radially closer to the center axis. As this takes place the tongue engages the outwardly extending arm 77 pivoting such inwardly causing the plunger 76 of the switch to be momentarily depressed. This, in turn, causes an electrical circuit to be closed generating a signal which is sent to the monitoring device, as more fully discussed with the electrical circuitry of FIG. 5. If, however, the operator has failed to load a bobbin on a post 46, the lifting arm remains in the upwardly latched position as the carrier arm is indexed to the winding position. Therefore, the tongue associated therewith would not engage the lever arm 77. As can be seen, a signal is produced only when a full yarn holder has been placed on a post by an operator and, if the operator fails to load a carrier arm before the particular carrier arm is rotated into the unwinding position, then a false count will not be produced.

It is to be understood that through the specification and claims any reference to a "full-yarn holder" will include yarn holders that are partially full and placed on the post 46 to be unwound.

After the yarn 11 has been unwound from a yarn holder A the empty bobbin can be removed from the carrier arm by any suitable apparatus, such as disclosed in U.S. Pat. No. 3,048,349 and partially disclosed in FIG. 1. When the carrier arm is indexed the tongue 58 continues to ride on the peripheral edge of the cam and as such reaches point 80 on the cam it is moved radially outwardly causing the lifting arm to be raised. It continues in this raised position until the lifting arm strikes the projection 69 at which time it is raised slightly more, causing the notched out portion 62 to ride up on the pin 61 latching the lifting arm in the raised position.

The mechanism for removing the empty bobbin from the post 46 and depositing it in a V-shaped trough 81 includes a hub 82 carried adjacent the top of shaft 35 at a point spaced vertically a substantial distance above the carrier arms 41 through 44, and has four equally spaced arms 83 extending outwardly therefrom. Each of the arms 83 have a bifurcated end portion 84. The axis of the arms 83 are in vertical alignment with the axis of a respective branch 41 through 44. Arranged within the bifurcated end portions 84 for pivotal movement about the horizontal axis are collars 85, one for each arm 83, each collar having a pair of opposed gudgeons 86 resting in upwardly facing U-shaped recesses 87 in the bifurcations. Collars 85 encircle and support elongated tubes 88, preferably

constructed of transparent plastic or the like, and have a sufficient internal diameter to surround the yarn holder A carrying a full supply of yarn in spaced concentric relationship. In vertical directions, tubes 88 project both below and above the level of the collars 85 extending over a major portion of the length of the yarn holders A for terminating at a level spaced above the upper limit of posts 46 far enough to clear the upper ends of sleeves 64 when elevated to package holder unseating positions by the lift arms 49.

On the inner side of collars 85 at points lying on the same axis as the bifurcated portions 84 are collar operating levers or crank arms 89, one for each collar, formed integral with or otherwise fixed to the collars. Levers 89 are of substantial dog-legged configuration, each having a lower portion projecting at more or less right angles the plane of the collars and an upper end portion 90 extending angularly from the free-end of the lower portion towards the upper end of shaft 35 and terminating at a point lying on a circle concentric with shaft 35. For the purpose of rocking collars 85 their inner ends 90 of levers 89 are engaged by the lower edge 91 of an annular crown cam 92 supported against rotation from the under surface of machine frame parts by means of a bracket or the like (not shown). The lower edge 91 of crown cam 92, which edge is the effective camming surface of that cam, lies in a common horizontal plane around all of the periphery of the cam except for a short arc in which it is extended downwardly to define a generally U-shaped lobe 93. A circumferential position of lobe 93, and its arcuate extent is necessarily such that it is not engaged by the end of levers 89 until the tongue 58 of the lift arm 49 situated beneath that lever has contacted at least radially extending portion 80 on the cam 60 to elevate a lift arm 49 and corresponding sleeve 64 to yarn holder unseating position. This allows the collar 85 to be pivoted as illustrated in FIG. 1, so that the yarn holder 88 can drop into the V-shaped trough 81. As previously mentioned, the operating structure of the winding machine so far discussed, other than the signal generating means E and G, form a part of well-known winding machines being presently used and better known as the "UNICONER" winder and discussed more fully in the above-mentioned patents.

Referring now to the electrical circuitry illustrated in FIGS. 5 and 5A, it can be seen that all of the signal generating means E for a particular winding machine are tied together in parallel and generate signals indicating the bobbins or yarn holders indexed in a particular operator's job. Only four such signal-generating means E generate illustrated as being connected in parallel, but normally at least all the signal-generating means on a single operator's job are connected in parallel. The totalizing means F, which is in the form of a counter, is provided for counting the number of times the switches or signal-generating means E are closed so as to maintain an accurate count of the total number of yarn holders A indexed.

A completely separate counter (not shown) in a circuit identical to that illustrated in FIG. 5 is provided for counting the number of times the signal-generating means G, such as illustrated in FIGS. 1 and 5A are closed. As previously mentioned, the signal-generating means G is closed each time the restart handle C is pulled down to restart the winding machine after a mistie or the package B has been doffed. All of the switches for the winding apparatus being grouped in a particular operator's job are coupled in parallel, such as illustrated in FIG. 5A.

The manner in which the signals generated by either the signal-generating means F or the signal generating means G are coupled to the counter E will no be described.

To count bobbins indexed a counter time-delay, generally designated by the reference character 94, is set to a minimum value by moving a wiper arm of a potentiometer or variable resistor 95 to the minimum value. This is because it is desirable that the signal generated by a particular bobbin or yarn holder A being indexed be recorded substantially instantaneously on the recorder E since there may be several bobbins running out at substantially the same time. One purpose for the small time

is to prevent the possibility of double count due to switch contact bounce.

The time-delay circuit includes the potentiometer 95 and a capacitor 96, and a series resistor 97 which are connected in parallel with the potentiometer 95 between junctions 98 and 99. Junction 99 is connected to the base electrode 100 of transistor 101 through a current limiting resistor 102. When junction 99 is coupled to ground through lead 103 and one of the switches E it is in essence tied to lead 104 through ground completing a circuit. This causes the capacitor 96 to charge to its full potential. The capacitor 96 is charged through a current limiting resistor 105 to the full DC voltage of the circuit which appears at junction 106 and is in the vicinity of 18 volts. The grounding of function 99 is completed through the signal-generating means E momentarily as a yarn holder A rotates into position to be unwound. The time-delay circuit 94 begins to function when the circuit between junction 99 and ground is again opened as by opening the closed signal-generating means E. Since the potentiometer 95 is set to the minimum value, the capacitor 96 will discharge almost instantaneously and will discharge through resistor 105, lead 107, junction 108, lead 109, resistor 110, junction 111, resistor 112, an emitter electrode 113 of PNP transistor 101, through the base electrode 100 back to junction 99. Current is also flowing through the pot 95 and resistor 97. The amount of current flowing through the emitter and base electrodes 113 and 100, respectively, is constant but the amount through the time-delay potentiometer 95 depends on the setting of the potentiometer. The capacitor 96 can be discharged in less than one-half a second when the potentiometer 95 is set at its lowest value or the discharge time of the capacitor 96 may be 7 or 8 seconds if the potentiometer is set on its maximum value. When this discharge current from capacitor 96 is flowing, the current flowing through the emitter electrode 113 and out the base electrode 100 of transistor 101 will turn the transistor on and allow the current to flow out of the base of a PNP transistor 114 through its base electrode lead 115, resistor 112 and through transistor 101. The base current out of transistor 114 in turn, turns transistor 114 on. When the transistor 114 is turned on current flows from junction 116, lead 117, relay 118, through emitter electrode 119, and out collector electrode 120, lead 121 to junction 122, interposed in lead 104. The energizing of relay 118 causes relay contacts 118' and 118'' to be closed. When relay contact 118' is closed lamp 123 is illuminated indicating that a bobbin has been indexed. The circuit, including lamp 123, is connected in parallel by leads 124 and 125 across a source of AC power 126 which is 115 volts. The totalizing means F, which in this particular example is a counter, is also connected across the AC source 126 by means of leads 127, 128 and 129.

When the relay 118 is initially energized closing relay contact 118'' the counter F completes one-half of the count cycle. After the capacitor 96 discharges below such a level that transistor 114 ceases conduction, deenergizing the relay 118, opening contact 118'', then the counter F completes the other half of the count cycle. When the relay 118 is deenergized the lamp 123 is also deenergized by the opening of relay contact 118'.

The source of power 126, which as previously mentioned can be any suitable source, is connected between leads 130 and 131 to the primary winding 132 of a stepdown transformer 133. The transformer steps the voltage down to approximately 12 volts AC RMS. This 12 volts on the secondary winding 134 is fed through a rectifying diode 135, and a filter capacitor 136 to junction 106. The capacitor 136 and the diode 135 are connected in parallel between the secondary winding 134 and the junction 106. The secondary winding 134 is grounded through lead 134a to ground. The half-wave rectifying diode 135 in cooperation with the filter capacitor 136 provides a DC voltage of approximately 18 volts at junction 106. This DC voltage is provided for driving the time-delay circuit 94, transistors 101, 114, relay 118 and places a voltage on lead 103. Power to the signal generating means E is pro-

vided through lead 103 so that when the signal generating means E are closed the timing capacitor 96 is charged.

The circuit illustrated in FIG. 5A shows the signal generating means G which produces a signal responsive to the operator pulling down the restart handle C. This restart handle C is pulled down each time there is a mistie so as to restart the machine and each time the package B is doffed. It is coupled to a circuit identical to that illustrated in FIG. 5 with leads 103 and 104 corresponding to leads 103' and 104'. The only difference between the circuits for counting the number of times the restart handle C has been pulled down and the circuit in FIG. 5 provided for counting the number of bobbins indexed, is the setting on the potentiometer 95 of the time-delay circuit 94. The time-delay for the manual restarts is set to the normal working period of the operator going from one spindle to another which may be 3 to 5 seconds. This is to prevent the operator from moving the handle back and forth and ringing up several counts when actually he is only starting the machine one time. As previously mentioned, this is not a problem when counting the number of yarn holders A indexed, since such is a mechanical operation. The operation of the time-delay circuit is similar to that shown in U.S. Pat. No. 3,124,316 granted to O'Brien et al., and assigned to the same assignee as the subject application.

While a preferred embodiment of the invention has been described using specific terms, such description is for illustrative purposes only, and it is to be understood that changes and variations may be made without departing from the spirit or scope of the following claims.

We claim:

1. In a textile winding machine having a yarn carrier mounted for rotation about a vertical axis and adapted to support at least two yarn holders at circumferentially spaced points therearound, means operable from time to time for revolving said carrier through an arc equal to the circumferential spacing of said yarn holders on said carriers to successively bring said holders from and to a reserve position to and from an active unwinding position, a lifting member provided for raising an empty yarn holder after such has been unwound so that said empty yarn holder can be ejected from said carrier, said lifting member being mounted for movement between a raised position when a full-yarn holder is absent therefrom and a depressed position when a full-yarn holder is placed thereon, the improvement comprising: electrical switch means activated each time a full-yarn holder is rotated to the unwinding position for generating a signal indicative thereof, said electrical switch means being positioned adjacent the path travelled by said carrier as such is rotated so that when said lifting member is depressed with a full-yarn holder said switch means is activated by said lifting member as said full-yarn holder is rotated to the unwinding position, said lifting member bypassing said switch means when in a raised position as said carrier is rotated to the unwinding position without a full-yarn holder thereon, and totalizing means coupled to said switch means for computing the number of full-yarn holders unwound on said winding machine.

2. The winding machine as set forth in claim 1, further comprising a cam, a tongue extending downwardly from said lifting member, and riding on the edge of said cam as said carrier and lifting member are rotated, said electrical switch means being positioned below said cam preceeding said unwinding position so that said tongue engages said switch means to activate such as a yarn holder is rotated into said unwinding position.

3. The apparatus as set forth in claim 1 further comprising: a restart handle operably mounted on said winding machine for starting said machine, a second signal generating means carried by said textile winding machine for generating a signal responsive to said restart handle being depressed by an operator, and means coupled to said second signal generating means for recording the number of times said winding machine has been restarted by an operator.

4. The apparatus as set forth in claim 3, further comprising:
a timing circuit interposed between said second signal
generating means and said totalizing means which prevents

more than one signal indicating a restart of said winding
machine to be recorded in a given period of time.

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