

July 17, 1962

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3,044,699

CONDITION RESPONSIVE APPARATUS AND METHOD

Filed July 22, 1955

2 Sheets-Sheet 1

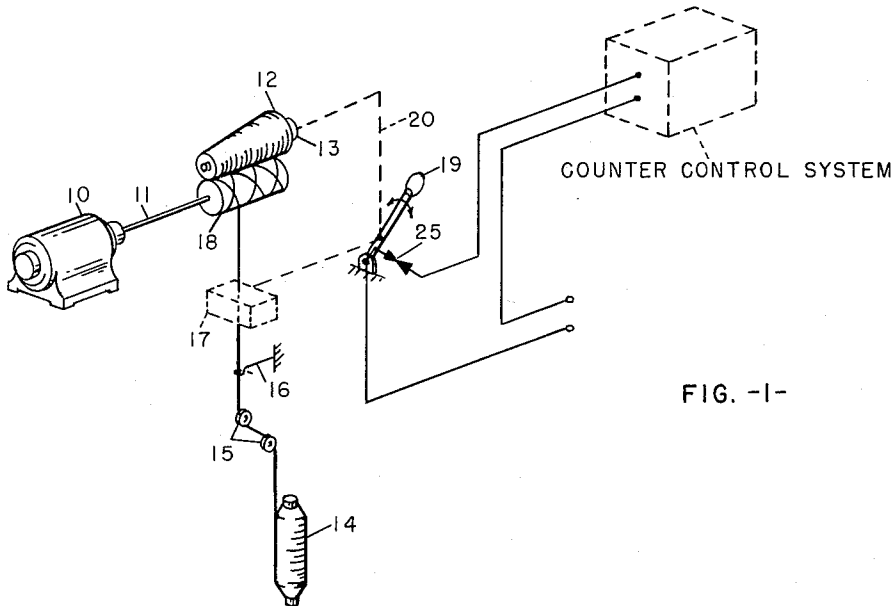


FIG. -1-

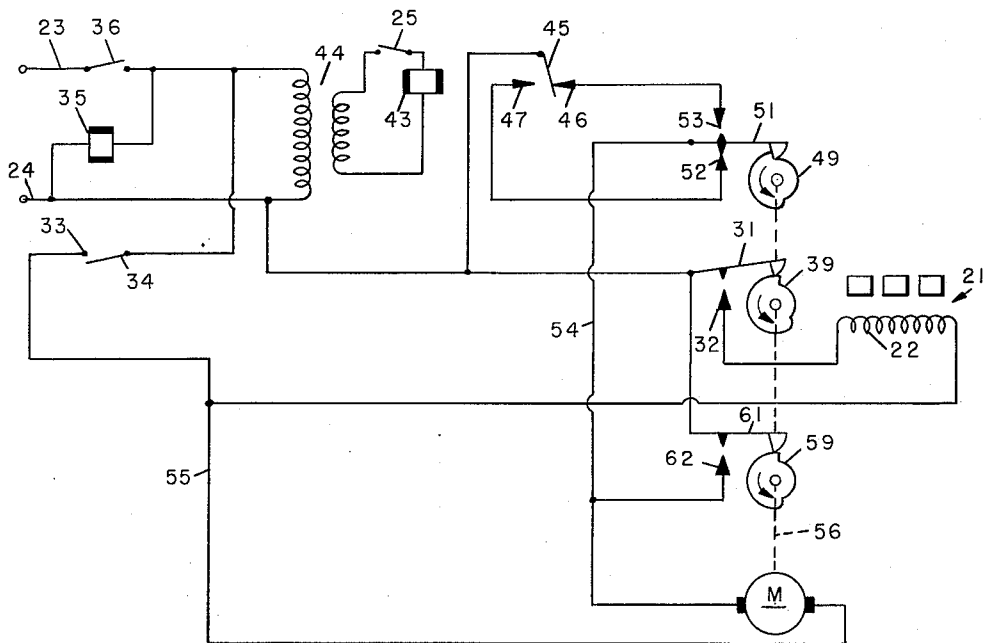


FIG. -2-

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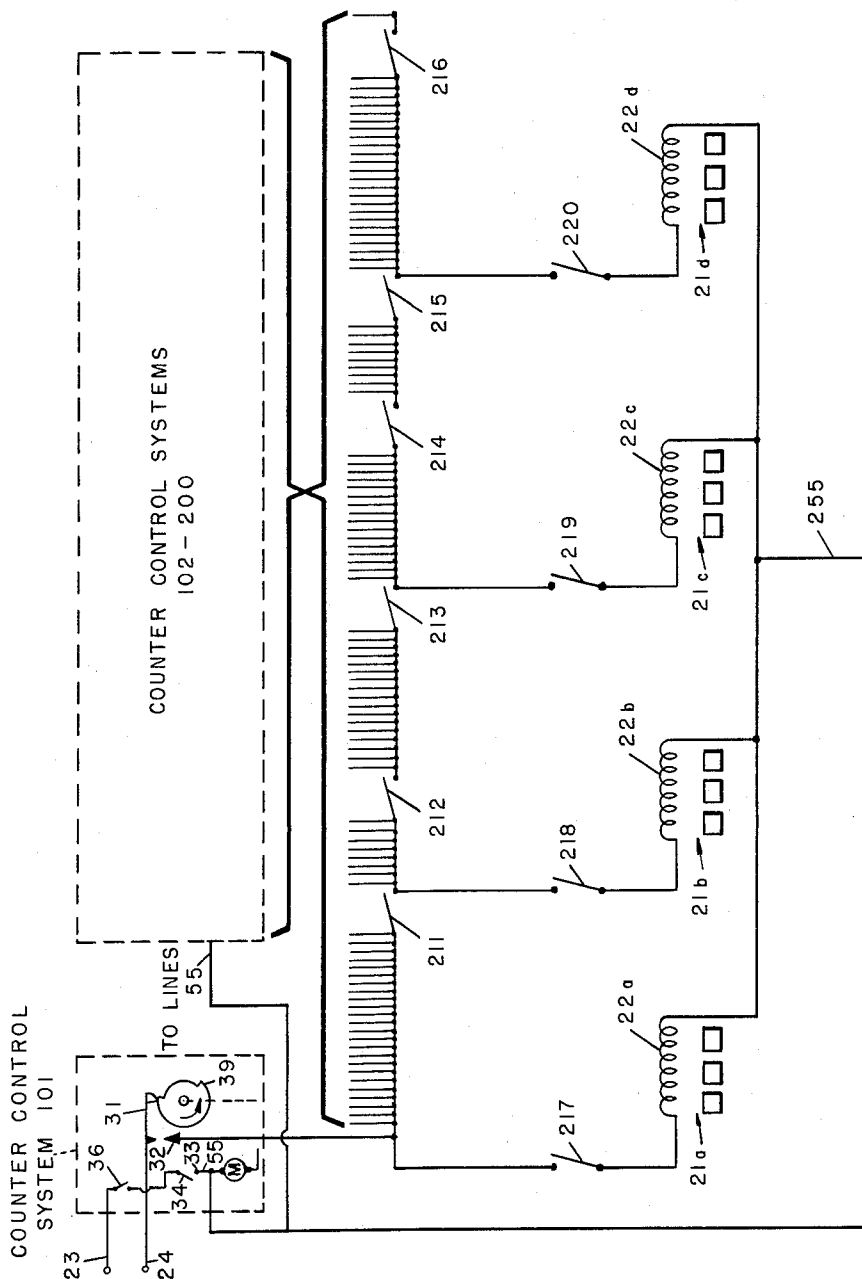
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CONDITION RESPONSIVE APPARATUS AND METHOD

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2 Sheets-Sheet 2



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CONDITION RESPONSIVE APPARATUS
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This invention relates generally to time controlling mechanisms, and more specifically to a novel method and apparatus for controlling the energization or actuation of an instrument, particularly such as a counter. Specifically, the present illustrative embodiments of the invention are directed to a winding machine counter control system for counting the number of knots tied in the yarn by an operator during the course of operation of the winding machine.

In certain types of operations, it is necessary or desirable to control the time of duration of energization or actuation of an instrument and to prevent its re-actuation or re-energization until after the elapse of a pre-determined time from the initial energization or actuation. Particularly, I have found this to be desirable in counter operations involving operator actions to be counted, where the operator might by various illegitimate actions otherwise record counts on the counter which are not of the type recognized as legitimate and permitted to be counted.

For example, in the art of winding yarn it has been found convenient and desirable to count the number of knots tied by an operator in the course of operating the machine, as well as to measure the total amount of yarn wound. In order to count the number of knots tied, I have found that a substantially reliable count may be obtained by recording the number of certain starts of the winding machine. This, however, requires a system of control for the counter mechanism which will prevent recording or registering of illegitimate starts or other actions on the counter, yet which will not interfere in any way with the recording or registering of all legitimate starts which are possible after the tying of a knot by an operator.

It is, accordingly, an object of this invention to provide a system for the control of the actuation or energization of a counter mechanism which prevents the registering or recording of all actions except those of a selected type.

It is a further object of this invention to provide a counter system for a machine or instrument for recording the number of certain actions of the machine or instrument, yet which prevents the recording of other actions of the machine.

A still further object of the invention is to provide a counter control system which permits initial energization or actuation of a counter mechanism and which prevents re-energization or actuation of the counter mechanism until a predetermined time after the initial energization or actuation.

It is still another object to provide a time controlling system for controlling the actuation or energization of an instrument, wherein the instrument is prevented from being re-energized or re-actuated for a predetermined period after initial actuation or energization.

It is a still further object to provide a time controlling system for controlling the actuation or energization of an instrument, wherein the instrument is prevented from being re-energized or re-actuated for a predetermined period after each actuation or energization and for a second period after de-energization or de-actuation.

A further object is the provision of a counter system

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which counts certain starts, actuations, or other actions of a plurality of machines or other instruments on a single counter.

Another object is to provide a counter system which registers certain starts, actuations, or other actions of a plurality of machines or other instruments on a number of counters less than the number of associated machines or other instruments.

Still a further object is to provide a novel method for counting certain starts, actuations or other actions of a machine or other instrument.

It is another object to provide a novel method for counting certain starts, actuations, or other actions of a plurality of machines or other instruments, wherein the number of counting devices required is less than the number of machines or other instruments involved for counting action thereof.

It is a still further object to provide a novel method of counting certain starts, actuations or other actions of a plurality of machines or other instruments on a single counting device.

A further object is to provide a method and apparatus for counting the number of knots originally tied by a textile machine operator.

Still another object of the invention is to provide a counter system for a winding machine wherein each of the legitimate starts of the machine occurring after each original tying of a knot in the yarn are recorded by the counter mechanism.

Still other objects and many attendant advantages will become apparent to one skilled in the art from a reading of the following detailed description of several preferred physical embodiments of the invention, wherein,

FIGURE 1 is a diagrammatic illustration of a winding machine incorporating the present invention;

FIGURE 2 is a schematic diagram of the electro-mechanical control system of the embodiment of FIGURE 1;

FIGURE 3 is a schematic diagram illustrating a modification wherein a plurality of counter control systems are employed.

Referring to FIGURE 1, a winding machine of standard construction incorporating the present invention is diagrammatically illustrated. A suitable drive motor 10 is connected through a suitable driving connection, such as shaft 11, to a grooved yarn traversing roller 18, which drives a take-up package tube or cone 12 carried by spindle 13 through surface contact between the cone or package formed thereon and the roller 18 in a commonly known manner. Yarn feeds to cone 12 from a suitable supply, such as supply bobbin 14, upon the rotation of the cone 12 by traversing roller 18, in any desired manner, such as through tensioning discs 15, stationary yarn guide 16, yarn-break stop mechanism 17, and over traversing roller 18, to the cone 12. The yarn-break stop mechanism may be of any desired construction, or type, and since such mechanisms are commonly known and used in the art, such is only indicated in block diagram at 17 in this illustration.

Motor 10 may be energized by any suitable power source, such as an E.M.F. source of 110 v. A.C. (not shown). Yarn-break stop mechanism 17 is suitably mechanically or otherwise connected to starting lever 19 such that, as is common in the art, the starting lever is moved to stop position, and through suitable mechanical linkage 20 the spindle 13 and cone 12 is moved up out of contact with roller 18 upon the breakage or exhausting of the yarn or other filament being wound, thereby causing stopping of takeup spindle 13 and cone 12. A switch 25, opened and closed through stop and start movement of lever 19, actuates and deactuates a counter control system, next to be described, which causes the

registering on a counting device of each of certain starts of the winding machine.

As seen in FIGURE 2, a counter 21, which may be of any suitable type, in the present embodiment has an actuator winding 22 which is so arranged as to be energized during certain starts of the winding machine, and which is prevented from being reenergized by other starts of the machine. To this end, a counter control circuit is provided, having a normally open control switch 25 connected in series with the coil of a relay 43 and the secondary of a transformer 44, the primary of which is connected to any suitable source of power (not shown), such as 110 v. A.C., through a switch 36, lead 23 and lead 24. The relay 43 has a movable contact arm 45 and a pair of associated contacts 46, 47, the contact arm 45 being engaged with contact 46 while relay 43 is unenergized.

In series with switch 36 and the power leads 23, 24, and in parallel with the primary of transformer 44 is a time delay relay 35 (more particularly to be described hereinafter), having a normally open contact arm 34 and associated contact 33 which are in the power circuit for actuator winding 22 of the counter 21 and the power circuit for a cam drive motor M. The cam drive motor M, when energized, rotatably drives cams 39, 49, and 59 through a suitable mechanical connection, such as a rotatable shaft, 56, and the cams control opening and closing of various circuits. Cam 39 together with associated cam follower contact arm 31 controls energization and deenergization of the actuator winding 22 of counter 21, while cam 49 with its cam follower contact arm 51 controls energization and deenergization of motor M, and cam 59 with its cam follower contact arm 61 controls a holding circuit for motor M, all to be more specifically described hereinafter.

Three power circuits are provided for motor M, one of which may be termed as a holding circuit. The initial power circuit to the motor includes power lead 23, closed switch 36, relay contact arm 34, relay contact 33, line 55, motor M, line 54, cam follower contact arm 51, contact 52, relay contact 47, relay contact arm 45, and power lead 24. A reset power circuit is provided which includes power lead 23, closed contact 36, relay contact arm 34, relay contact 33, line 55, motor M, line 54, cam follower contact arm 51, contact 53, relay contact 46, relay contact arm 45, and power lead 24. The motor holding circuit includes power lead 23, closed switch 36, relay contact arm 34, relay contact 33, line 55, motor M, contact 62, cam follower contact arm 61, and power lead 24.

The actuator winding 22 of the counter 21 is connected through cam follower contact arm 31 and contact 32 to power lead 24 and through the contact 33 and contact arm 34 of time delay relay 35 to the other lead 23 from the source of power. In the normal ready position of the counter control system the cam 39 is in the position shown in FIGURE 2, at which position contact arm 31 is held out of engagement with contact 32, and thus counter 21 is not energized. Also, as will be seen from FIGURE 2, the cam 59 in ready position holds open its associated cam follower contact arm 61, while cam follower arm 51 is in engagement with contact 52, and thus motor M is unenergized.

Prior to operation of the system for counting actual starts, the switch 36 in the 110 v. A.C. power line is closed in order to energize time delay relay 35 and thereby close contact arm 34 and contact 33. After the closing of contact arm 34 with contact 33, the system is in complete readiness for counting a start of the machine to which it may be attached.

Referring to FIGURE 1, the starting lever 19 of the machine has attached thereto or actuated thereby through any suitable mechanical or other connection a normally open switch 25, which is closed upon the starting of the machine by the actuation of the machine's starting lever or other starting control device.

Referring again to FIGURE 2, the closing of switch 25 causes energization of relay 43 through the closed circuit including closed switch 25, the secondary of transformer 44 and coil of relay 43. Energization of relay 43 causes the breaking of contact between relay contact arm 45 and relay contact 46 and the making of contact between relay arm 45 and relay contact 47. As described supra, cam 49 is in such initial or ready position that its associated cam follower contact arm 51 is in contact with contact 52. Thus, the making of contact by the contact arm 45 and contact 47 completes a power circuit to motor M, the power circuit including one line 24 from the power source, relay arm 45, relay contact 47, contact 52, cam contact follower arm 51, line 54, motor M, line 55, relay contact 33, relay contact arm 34, closed switch 36, and return to the other line 23 from the power source.

The motor M being thus energized drives cams 39, 49 and 59 in synchronism, in a counterclockwise direction as seen in FIGURE 2, through a suitable mechanical connection 56. The motor M may be of the slow running type, or may be fast running and geared down to the desired speed, which in the instant example has been selected as 5 r.p.m. with one complete revolution of the cams 39, 49, 59 thus requiring a period of 12 seconds. Obviously, this is only by way of example and any desired speed or rotation for the motor M and cams 39, 49, and 59 might be utilized to achieve the desired results for any specific case.

Very shortly (approximately $\frac{1}{2}$ second) after the starting of motor M, cam 59 will have rotated to a position such that cam follower contact arm 61 makes contact with contact 62, thereby establishing a holding circuit to supply power to the motor M in parallel with the initial power circuit through relay contact arm 45 and relay contact 47. Thus, so long as this holding circuit remains completed, motor M will continue to run regardless of whether switch 25 associated with the starting lever of the machine is either closed or open.

Shortly (approximately $\frac{1}{2}$ second) after the closing of cam follower contact arm 61 with contact 62, cam 39 causes the closing of its associated cam follower contact arm 31 with contact 32. The making of contact arm 31 with contact 32 completes the energization circuit for the actuator winding 22 of the counter 21, the circuit running from line 24 through contact arm 31, contact 32, actuator winding 22, contact 33, relay arm 34, closed switch 36 to line 23. Energization of the actuator winding 22 causes one count to be recorded on the counter 21 and no other count may be registered by the counter 21 until after de-energization of the actuator winding 22. Thus, so long as actuator winding 22 is energized through the continued completion of its power circuit through cam follower contact arm 31 and contact 32, no further count can be registered on the counter 21 by actuation of either the starter arm associated with switch 25 or any other machine starter arm, associated switch, and counter control circuit which may also be operatively connected to energize the counter winding 22 similarly to the presently described control circuit.

In winding machines, it has been found that an operator requires approximately four seconds to tie a knot. Hence, cam 39 has its reduced diameter of such angular length (120° for a 12 second period of rotation) as to yield a four second period of energization of the counter winding 22. By keeping the counter 21 thus energized for four seconds after the machine is started, it becomes impossible to record a second count during that period, either through opening and closing of switch 25 or any other similar switch having its control circuit operatively connected to counter 21. Obviously, for other operations and other machines, it may be desirable to provide different energization control periods, and such may readily be accomplished either by using different speeds of rotation, different cam configurations, or both.

The counter 21 remains energized for the period of

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four seconds, and then is de-energized through the moving of cam follower contact arm 31 out of contact with contact 32, thereby breaking the energizing circuit to counter winding 22. Shortly thereafter, or simultaneously therewith, cam 59 disconnects the motor M lock-in or holding circuit through opening of cam follower contact arm 61 and contact 62.

Assuming that the switch 25 remains closed and the winding machine continues to run, the motor M runs until cam 49 moves cam follower contact arm 51 out of contact with contact 52 and into contact with contact 53. Inasmuch as the lock-in or holding circuit to motor M has already been broken prior to this time, it will be apparent that the breaking of contact between cam follower contact arm 51 and contact 52 effectively breaks the power circuit to the motor M, whereupon the motor M and cams 39, 49 and 59 stop. In the illustrated embodiment this intermediate stop position of the motor M and cams 39, 49 and 59, occurs six seconds after initial starting of the machine or counter control system.

In order to reset the control system back to a state of readiness, the system is so arranged that it is necessary that a further predetermined period of time expire before it is possible to again count a start of the machine. While the period may be made as long or as short as desired, or may be eliminated for certain types of operations, machines or uses, I find it particularly advantageous as used in conjunction with textile winding machines as in the present embodiment, since it takes from five to twenty seconds for a yarn take-up package to come to rest after breakage of the yarn. Thus, a return or reset period, next to be described, of some six seconds duration is provided to prevent false counts during this package stopping period. To this end the enlarged diameter of cam 49 extends over a six second (180°) arc of the cam. After the motor M has stopped and cam 49 is in its intermediate stopped position, it will be seen that opening of the switch 25, as through stop movement of the machine starter lever or other stop actuating device on the machine, causes the cam drive motor M to again be energized. This is accomplished through the breaking of the power circuit to relay 43 by opening switch 25 and the consequent making of contact between relay contact arm 45 and relay contact 46. Closing relay contact arm 45 with contact 46 completes a power circuit to motor M from line 24, through relay contact arm 45, contact 46, contact 53, cam follower contact arm 51, line 54, motor M, line 55, contact 33, relay contact arm 34, closed switch 36, and line 23.

Motor M then continues to run, advancing cams 39, 49 and 59 until the cams reach the position shown in FIGURE 2, whereupon the motor power circuit is broken through the breaking of contact between cam follower contact arm 51 and contact 53, associated with cam 49. The motor is thus stopped with the cams in their original ready position, and any new start of the machine will now be recorded by the counter, provided it is not at the time of such starting already energized by another previous start less than four seconds before on another machine feeding its counts into the same counter 21, as previously pointed out, and as more fully described hereinafter.

Should the operator attempt to record a start on the counter by this machine during this reset or return period, such will be to no avail as closing of the switch 25 will only result in stopping of motor M, thus effectively making longer the reset period, and will not result in a new energization of the counter winding 22 since the winding energization circuit is held open during this period by the action of the raised portion of cam 39 on cam follower contact arm 31. Thus, it will be apparent that the reset or return period provided by cam 49 prevents false counts during the time when the take-up package is stopping its rotation, and yet does not interfere with recording of legitimate starts since the spindle can-

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not be stopped by hand without causing the yarn to slough off the package.

It is to be noted that further precaution is taken to prevent false or illegitimate counts of starts or knots in the provision of relays 35 and 43, described supra. With respect to relay 43, this relay may be of any desired type, and is provided together with its energizing circuit to prevent false counts which could otherwise be obtained if relay contact arm and contacts 46, 47 were only a manually operated single pole double throw switch. With such a construction it would be possible for an operator to short circuit contacts 46 and 47, which would make the motor M run continuously, regardless of the position of the starting lever of the machine, and thus continuously record a false count for each revolution of the motor M and cam 39. By providing the single pole single throw switch 25 together with relay 43, the relay 43 may be removed to a safe place away from the machine or otherwise housed in a locked or sealed housing where the contacts 46 and 47 cannot be tampered with. Also, a further advantage of the relay 43 and its associated circuitry lies in the fact that with this arrangement the exposed wiring between the machine starting lever and associated switch 25 and the relay 43 (or relays, if a plurality of machines are involved) may be of low voltage, for instance of the order of 6-45 volts, since only sufficient voltage to actuate the relay 43 need be used in this circuit as distinguished from the 110 v. which would normally be used for the motor M in the circuit including contacts 46 and 47.

The relay 35 is a time delay relay of any suitable construction, but is preferably a positive acting relay of the mechanical type wherein deactuation thereof prevents re-actuation within a predetermined period of time thereafter. While in some cases thermal and other types of time delay relays may be satisfactory, the above mentioned type is by far the most advantageous, as will become apparent since the mechanical type gives immediate reset upon deenergization, while the thermal type does not. Without relay 35 and its associated switch contact arm 34 and contact 33, it would be possible for an operator to manipulate a number of false counts through intermittent interruption of the main power from lines 23 and 24. This could in such case be accomplished through shutting off the main power to the motor M just after closing switch 25. This would stop motor M with cam 39 so positioned that the circuit through contact arm 31 and contact 32 to counter winding 22 would be closed, and thus each pulse of power produced thereafter would register a count on the counter 21 until the cam 39 advanced beyond its 120° of circuit holding travel. Thus the operator might, by jiggling or bumping the machine or its power circuitry, intermittently interrupt the power circuit a number of times during the intermittent 120° travel of cam 39 and produce a corresponding number of false counts on counter 21. This is obviated by the provision of time delay relay 35, in that after each interruption of power it will require a number of seconds (the exact time delay period depending upon the relay chosen or the relay setting), before the relay can again make a completed circuit to the counter winding 22. Therefore, since the operator can much more easily and quickly accomplish a legitimate start on an adjacent machine, such requiring only about four or five seconds, illegitimate counts accomplished in this manner will be highly unprofitable to him and he will be encouraged to do only legitimate operations, which will be recorded by the counter 21. As stated above, it will be apparent from the foregoing description of the desired operation of relay 35 that a "positive reset" type relay, such as the mechanical reset type, is much more advantageous than the thermal type for the instant embodiment, since a thermal relay would permit almost immediate re-actuation in many instances if only a short deenergization period of the relay 35 had just preceded reenergization.

In FIGURE 3 there is shown an arrangement according to my invention in which a large number of winding machines and associated counter control systems may be selectively connected in various groupings of various numbers of machines to one or more of a small number of counters. The winding machines may, for example, comprise all or a part of the positions of one or more winding frames.

There are shown for purposes of illustration of this feature, four counters 21a, 21b, 21c, and 21d each with its respective energization winding 22a, 22b, 22c, and 22d, which are selectively connectible for registering counts from various groups of one hundred counter control systems 101-200 which may be connected to a corresponding one hundred winding machines, or other desired devices the actuations or other actions of which are desired to be registered on the counters 21.

In this arrangement all of the windings 22a, b, c, and d are connected at one end, through a common line 255, to each of the lines 55 of the counter control systems 101-200, and at their other end are connectible through a unique switch arrangement to the contacts 32 of each counter control system of various selected groups of the winders and associated counter control systems 101-200. This switch arrangement in the present illustration provides for connecting the one hundred winding machines in one group to one or all of the counters 21, in two groups of 50 each connected separately to two of the counters 21a or 21b and 21c or 21d; in three groups of 33 each (with or without the extra one added to one of the groups) connected to counters 21a, 21c, and 21d; and four groups of 25 each connected separately to counters 21a, 21b, 21c and 21d.

Thus, by closing switches 211, 212, 213, 214, 215, 216, and 217, all of the one hundred winding machines and their corresponding counter control systems 101-200 will register on counter 21a. It will be apparent that the counter control systems 101-200 are similar to that shown in FIGURE 2 and described supra.

Referring again briefly to the operation of the control system of FIGURE 2, it will be recalled that upon initial closing of the switch 25, relay 43 is energized, causing closing of the cam drive motor M power circuit, and the consequent slow rotation of cams 39, 49, and 59. Very shortly thereafter, the driven cam 39 causes registry of a count by counter 21 through making of contact between cam follower contact arm 31 with contact 32 and consequent energization of actuator winding 22. The actuator winding 22 remains energized for a predetermined period (four seconds in the illustrative example) until cam 39 has progressed to the point where it opens its associated cam follower contact arm 31 and contact 32, thereby breaking the energizing circuit to actuator winding 22 of the counter. Thus, counting registry on counter 21a by any of the 100 machines connected thereto will cause energization of the counter winding 22a for a predetermined period, in the instant example 4 seconds, during which period energization due to actuation of any of the other machines and counter control systems or reenergization due to reactuation of the same machine and counter control system will have no further counting effect on the counter 21a since its winding 22a is already and continuously energized as a result of the original counting actuation. At the end of the predetermined (four second) period, actuation of any one of all machines and counter control systems other than the one originally actuated will result in a further count being registered on counter 21a, with a further corresponding predetermined (four second) unresponsive period for the counter 21a. In order for reactivation or restarting of the originally actuated or any other previously actuated machine to cause registry of another count by counter 21a, such reactivation of this machine must occur after the expiration of a reset period (six seconds in the instant example) which commences only upon deactuation of the particular machine. After deactuation of the winding

machine which caused the count to be registered, and the expiration of the further predetermined reset period, the counter control system associated with the so deactuated machine will again be in readiness to cause a count to be registered on counter 21a upon actuation of the deactuated winding machine, provided that at the time of reactivation of this, or any other machine, there has not been an actuation by a machine less than four seconds before. In such case, as brought out above, no counts will be registered.

It will be apparent that should it be desired to actuate all of any number of the four counters 21a, 21b, 21c and 21d by the block of one hundred machines, instead of only one counter (21a) as described above, it will only be necessary to additionally close switches 218, 219, and 220 or the appropriate ones thereof, as may be the case when less than all counters are to be actuated. Other than this change the operation is identical to that described above, and thus need not be repeated.

To obtain counts on two counters 21, each for equal groups of machines and counter control systems, switches 211, 212, 214, 215 and 216 are closed with switch 213 being open. Additionally, either switches 217 or 218, and 219 or 220, are closed, operatively connecting correspondingly either counter 21a or 21b to the first group of fifty machines and counter control systems 101-150, and either counter 21c or 21d to the second group of fifty machines and counter control systems 151-200. The operation is identical to that described above with respect to the entire group of one hundred, except that obviously no actuation, energization or counting with respect to one of the two groups will have any effect on the counting, etc. of the other group.

To record three equal groups on three separate counters, it is only necessary to close switches 211, 213, 217, 219, and 220, with switches 212, 214, 216, and 218 open. This will result in registry of counts by machines and counter control systems 101-133 on counter 21a, 134-166 on counter 21c, and 167-199 on counter 21d. If it is desired, switch 216 may be closed and thereby additionally register counts from counter control system 200 on counter 21d, this making a total of 34 in this group.

For registry of counts by four separate groups of twenty-five each on a separate counter, switches 212, 214, 216, 217, 218, 219 and 220 are closed, and 211, 213 and 215 are open. Thus 101-125 will register on counter 21a, 126-150 register on counter 21b, 151-175 on counter 21c, and 176-200 on counter 21d.

Obviously, the above illustration is by way of example only, as this aspect of my invention is also capable of being expressed in many varying modifications, such that for example other numbers of groups such as 5, 6, 7, 8, etc. of various numbers of machines and counter control systems may be arranged to selectively actuate various numbers of counters.

Many modifications within the scope of the invention will be apparent to those skilled in the art from a reading of the foregoing description. Therefore I do not intend to be bound by the illustrative examples given but only by the scope of the appended claims.

I claim:

1. Apparatus for preventing certain actions from being registered on a counter and to permit other actions to be registered, comprising an accumulative counter having an energizing circuit and being of a type wherein deenergization thereof must occur between any two effective count registrations, an actuator for said counter operatively connected to said counter through said energizing circuit, and a time controlling device independent of said counter and operatively connected in controlling relation with said energizing circuit, said time controlling device being operatively connected to said actuator and being initially actuatable in response to actuation of said actuator, said time controlling device including a switch having a pair of contacts in said energizing circuit and means for closing and opening said contacts, said time control-

ling device and energizing circuit being independent of said actuator during a substantially predetermined period of time after initial actuation by said actuator.

2. Apparatus for preventing certain actions from being registered on a counter and to permit other actions to be registered, comprising an accumulative counter having an energizing circuit and being of a type wherein deenergization thereof must occur between any two effective count registrations, an actuator for said counter operatively connected to said counter through said energizing circuit, and a time controlling device independent of said counter and operatively connected in controlling relation with said energizing circuit, said time controlling device being operatively connected to said actuator and being initially actuable in response to actuation of said actuator, said time controlling device comprising a cam, a cam follower switch, and means for moving said cam, said cam follower switch being in said counter energizing circuit.

3. Apparatus according to claim 2 further comprising an energization holding circuit operatively connected to said cam moving means, said holding circuit being actuated in response to initial actuation of said actuator, and operable to prevent deactuation of said cam moving means and deenergization of said counting register during a substantially predetermined minimum period of time after and commencing substantially with initial actuation of said actuator.

4. Apparatus for preventing certain actions from being registered on a counter and to permit other actions to be registered, comprising an accumulative counter having an energizing circuit and being of a type wherein deenergization thereof must occur between any two effective count registrations, an actuator for said counter operatively connected to said counter through said energizing circuit, and a time controlling device independent of said counter and operatively connected in controlling relation with said energizing circuit, said time controlling device being operatively connected to said actuator and being initially actuable in response to actuation of said actuator, an initial energizing circuit and a reset circuit operatively connected to said time controlling device; said reset circuit comprising a double-throw switch having two contacts and a common contact arm, and means operatively connected to said contact arm to move said arm from one to the other of said contacts, one of said two contacts being in said initial energizing circuit for said time controlling device and the other of said two contacts being in said reset circuit, said common contact arm being common to both of said last mentioned circuits, and additional switch means in said reset circuit and independent of said double-throw switch.

5. Apparatus according to claim 4 wherein said initial energizing circuit for said time controlling device includes additional switch means independent of said double-throw switch.

6. Apparatus for preventing certain actions from being registered on a counter and to permit other actions to be registered, comprising an accumulative counter having an energizing circuit and being of a type wherein deenergization thereof must occur between any two effective count registrations, an actuator for said counter operatively connected to said counter through said energizing circuit, and a time controlling device independent of said counter and operatively connected in controlling relation with said energizing circuit, said time controlling device being operatively connected to said actuator and being initially actuable in response to actuation of said actuator, said counter energizing circuit including a time-delay relay including a pair of contacts open when said relay is deenergized, whereby after said relay is deenergized through cut-off of power to said energizing circuit a time delay will elapse before energy may again be applied to said counting register.

7. Apparatus for preventing certain actions from being registered on a counter and to permit other actions to be

registered, comprising an accumulative counter having an energizing circuit and being of a type wherein deenergization thereof must occur between any two effective count registrations, an actuator for said counter operatively connected to said counter through said energizing circuit, and a time controlling device independent of said counter and operatively connected in controlling relation with said energizing circuit, said time controlling device being operatively connected to said actuator and being initially actuable in response to actuation of said actuator, said time controlling device comprising a cam, a cam follower switch in said energizing circuit and a motor operatively connected in driving relation to said cam and having an initial energizing circuit, a second cam operatively connected in driven relation to said motor, a second cam follower switch operatively engaging said second cam, said second cam follower switch being operatively connected in said initial motor energizing circuit.

8. Apparatus according to claim 7 further comprising a holding circuit for said motor, a third cam operatively connected in driven relation to said motor, and a cam follower switch contact operatively connected in said holding circuit and in engagement with said third cam.

9. Apparatus for preventing certain actions from being registered on a counter and to permit other actions to be registered comprising an accumulative counter having an energizing circuit and being of a type wherein deenergization thereof must occur between any two effective count registrations, an actuator for said counter operatively connected to said counter through said energizing circuit, and a time controlling device independent of said counter and operatively connected in controlling relation with said energizing circuit, said time controlling device being operatively connected to said actuator and being initially actuable in response to actuation of said actuator, a plurality of said counter energizing circuits and associated counter actuators and time controlling devices, and a common counter operatively connected to each of said counter energizing circuits.

10. A counting registry arrangement comprising a counter having an energizing circuit including a switch, said switch including a first cam follower switch contact, a first cam engaging said cam follower contact, a drive motor, an energizing circuit for said motor and including said motor and a second cam follower switch contact, a second cam engaging said second cam follower switch contact, each of said cams having portions adapted to effect movement of its respective said switch contact into open position and into closed position, a third cam and associated cam follower switch contact, a holding circuit operatively connected in circuit relation with said motor and including said third cam having portions thereon adapted to open and close its said associated switch contact, said motor being operatively connected in driving relation to each of said cams.

11. An arrangement according to claim 10 wherein the switch contact open and closed positions of said cams are sequentially interrelated, the switch closed positions of said cams being in the order of second cam first and said first and third cams subsequent to said second cam.

12. An arrangement according to claim 11 wherein the switch open positions of said cams are sequentially interrelated, the first switch open position of said second cam being after the second switch open position of said first cam, the second switch open position of said third cam being at least as early sequentially as the first switch open position of said second cam, and the second switch open position of said first cam being at least as early as the second switch open position of said third cam.

13. An arrangement according to claim 10 further comprising a reset circuit operatively connected to said motor, said reset circuit including a switch contact movable substantially synchronously with said first cam follower switch contact.

14. An arrangement according to claim 10 wherein said

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motor energizing circuit further includes a further switch, said further switch including a relay having an energizing coil, a contact and a contact arm, said relay having an energizing circuit including said relay coil.

15. An arrangement according to claim 14 further comprising a second motor energizing circuit including the back contact of said contact arm of said relay and a second contact of said relay, said second motor energizing circuit including a switch contact movable substantially synchronously with said first cam follower switch contact.

16. Apparatus for preventing certain actions from being registered on a counter and to permit other actions to be registered, comprising a plurality of accumulative counters each having an energizing circuit and being of a type wherein deenergization thereof must occur between any two effective count registrations, actuators for said counters operatively connected to said counters through said energizing circuits, time controlling devices independent of said counters and operatively connected in controlling relation with said energizing circuits, said time controlling devices being operatively connected to said actuators and being initially actuable in response to actuation of said actuators, characterized in the provision of a larger plurality of said counter energizing circuits and associated counter actuators and time controlling devices than said plurality of counters, and switches for interconnecting selected groups of said counter energizing circuits each with a selected one of said counters.

17. Apparatus for preventing certain actions from being registered on a counter and to permit other actions to be registered, comprising an accumulative counter having an energizing circuit and being of a type wherein deenergization thereof must occur between any two effective counter registrations, an actuator for said counter operatively connected to said counter through said energizing circuit, and a time controlling device independent of said counter and operatively connected in controlling relation with said energizing circuit, said time controlling device being operatively connected to said actuator and being initially ac-

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tuatable in response to actuation of said actuator, said time controlling device and energizing circuit being independent of said actuator during a substantially predetermined period of time after initial actuation by said actuator.

18. Apparatus for preventing certain actions from being registered on a counter and to permit other actions to be registered, comprising an accumulative counter having an energizing circuit and being of a type wherein deenergization thereof must occur between any two effective count registrations, an actuator for said counter operatively connected to said counter through said energizing circuit, and a time controlling device independent of said counter and operatively connected in controlling relation with said energizing circuit, said time controlling device being operatively connected to said actuator and being initially actuable in response to actuation of said actuator, said counter energizing circuit including a time delay relay having a switch which is open when said relay is deenergized, whereby after said relay is deenergized through cut-off of power through said energizing circuit a time delay will elapse before energy may again be applied to said counting register.

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