

April 14, 1959

E. H. GRANBERRY  
SWITCH FOR CONTINUOUS OUTLET

2,882,374

Filed Aug. 23, 1956

4 Sheets-Sheet 1

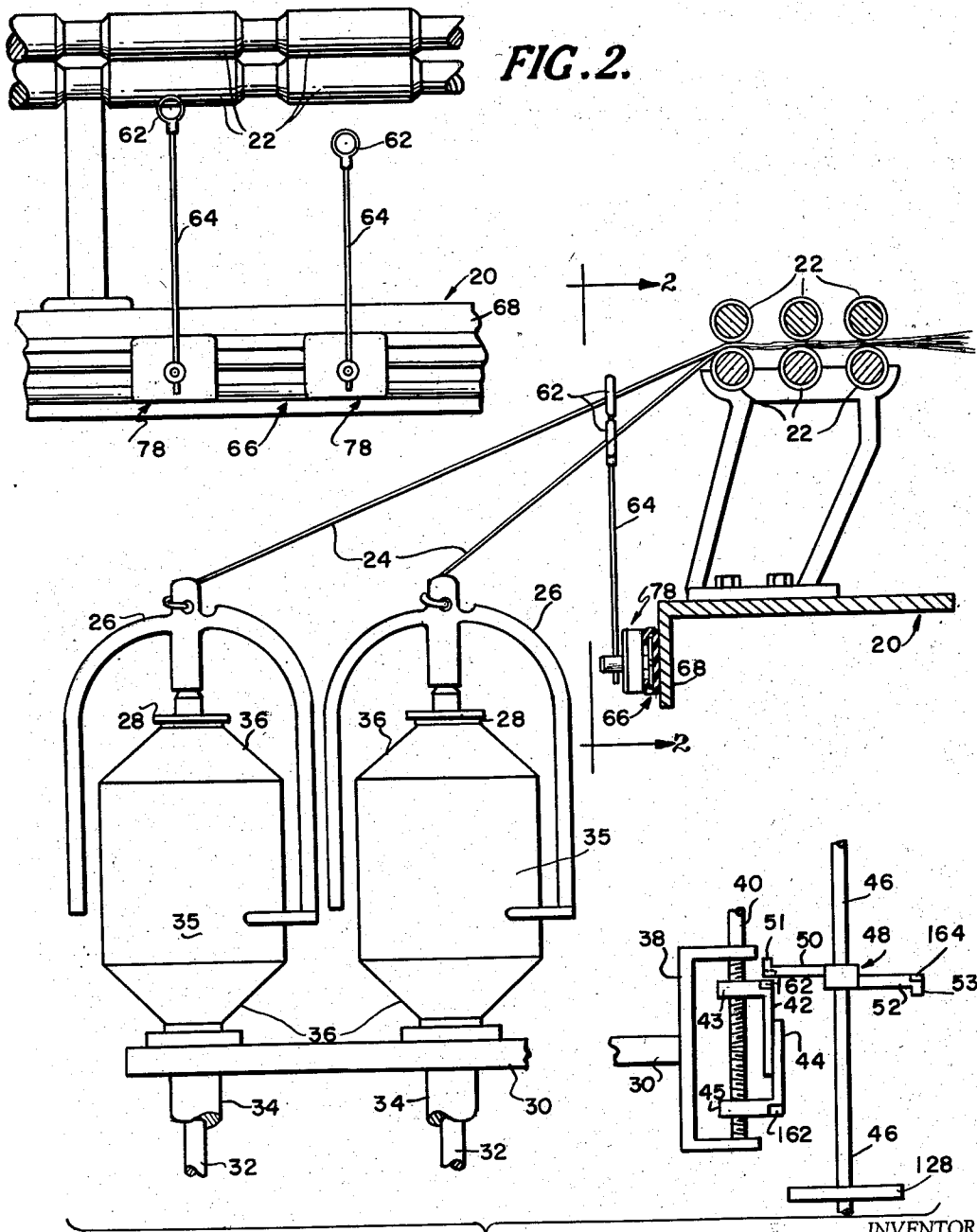


FIG. 1.

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FIG. 3.

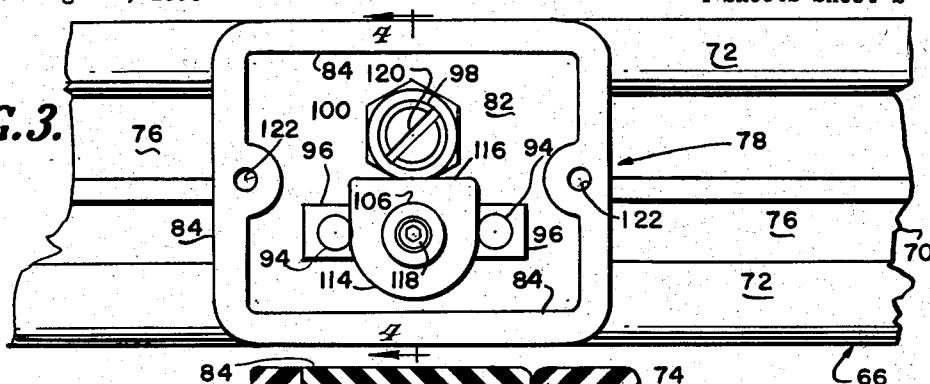


FIG. 4.

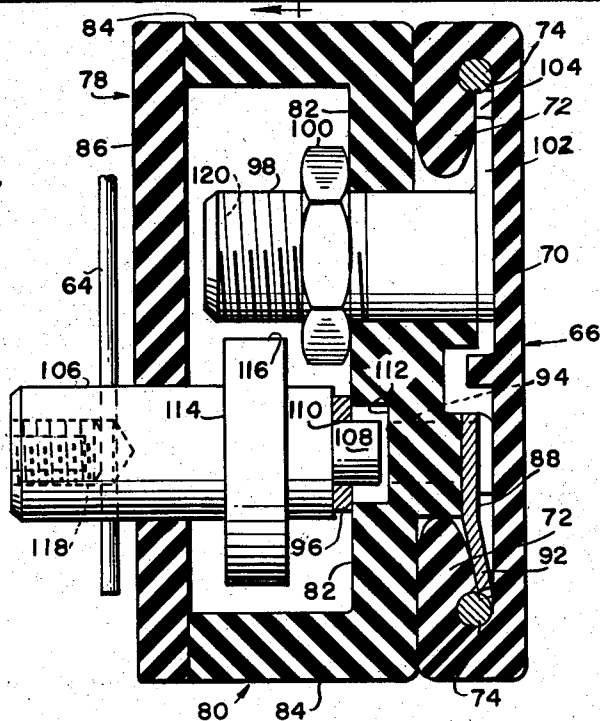
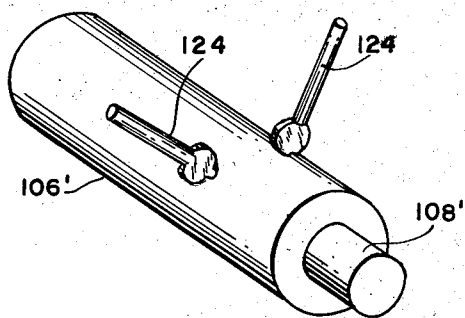


FIG. 9.



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FIG. 5.

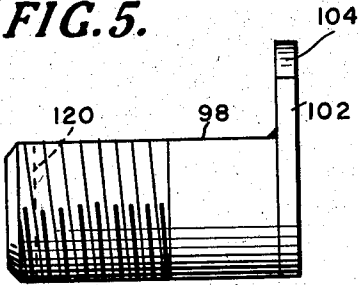


FIG. 6.

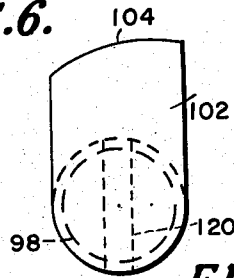


FIG. 7.

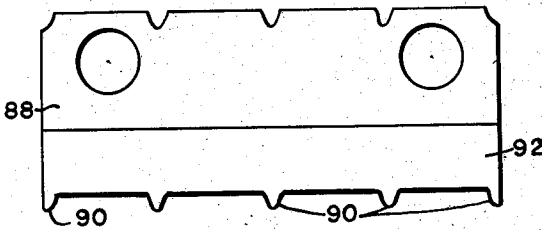


FIG. 8.

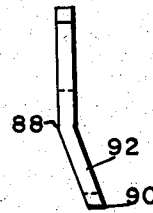


FIG. 11.

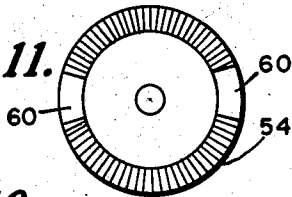


FIG. 13.

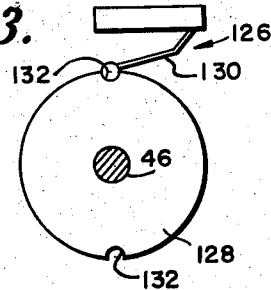


FIG. 10.

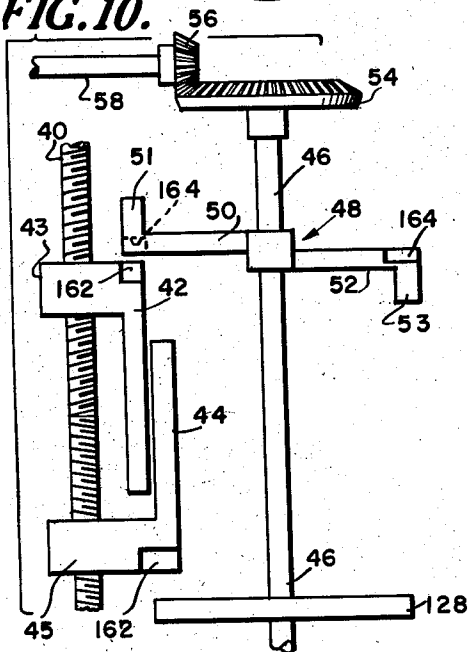
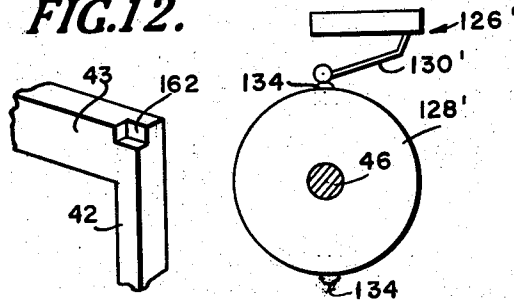


FIG. 14.

FIG. 12.



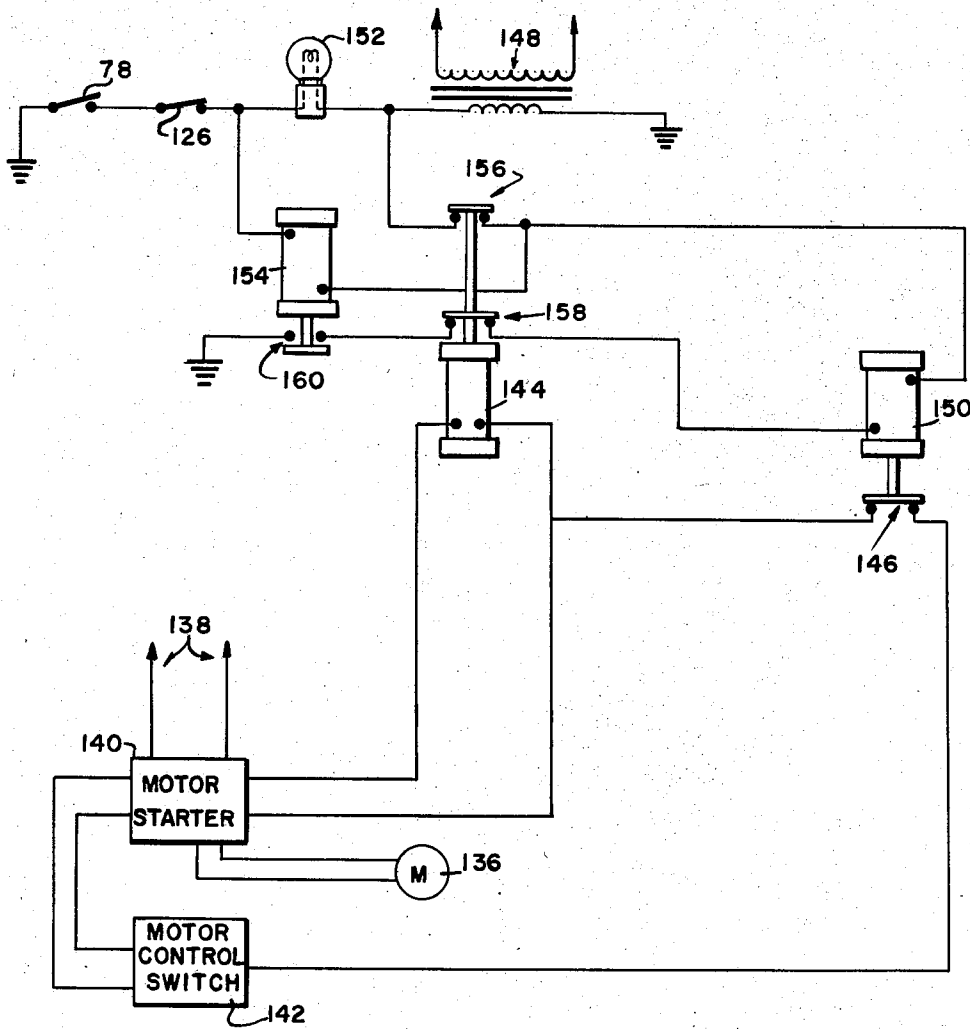
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SWITCH FOR CONTINUOUS OUTLET

4 Sheets-Sheet 4



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2,882,374

## SWITCH FOR CONTINUOUS OUTLET

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Application August 23, 1956, Serial No. 605,783

11 Claims. (Cl. 200—168)

This invention relates to electrical switch means, and particularly to switches adapted for use with continuous outlet constructions. The invention relates further to textile machinery, and to improved electrical stop motions therefor. The invention has particular application to textile machines having builder motions, such as fly frames.

A principal object of the invention is the provision of novel switch structure adapted for adjustable and removable attachment to continuous electrical outlet constructions, of the type exemplified by Frank Patent No. 2,170,299, issued August 22, 1939.

Another object of the invention is the provision of an improved stop motion for textile machines, utilizing continuous electrical outlets having bus bars which are enclosed and protected, to which a plurality of switches may be readily attached at desired positions along the length thereof.

A further object is to provide electrical stop motions for textile machines including builder motions, wherein the stop motion includes simplified means actuated by the tumbler shaft of the builder motion to prevent operation of the stop motion during periods of reversal. The invention also includes, preferably, provision of structure in the builder motion for deactivating the stop motion circuit prior to periods of reversal, to insure that the machine is not carried by momentum or inertia to an undesired stopping point.

Still another object is to design an improved stop motion of outstanding simplicity and versatility, which is inexpensive to manufacture and apply to textile machines.

Further objects of the invention will be in part obvious and in part pointed out hereinafter.

The invention and the novel features thereof may best be made clear from the following description and the accompanying drawings in which:

Figure 1 is a diagrammatic illustration of an exemplary fly frame incorporating the present invention;

Figure 2 is a fragmentary elevational view of the frame of Figure 1, taken on the line 2—2 thereof;

Figure 3 is an enlarged front elevational view of a preferred switch construction, with the cover plate thereof removed;

Figure 4 is an enlarged sectional view through the switch of Figure 3, taken on the line 4—4 thereof;

Figure 5 is a side elevational view of the rotatable contact and prong of the switch of Figure 3;

Figure 6 is an end elevational view of the element of Figure 5, viewed from the right hand side thereof;

Figure 7 is an elevational view of the fixed prong of the switch;

Figure 8 is an end elevational view of the element of Figure 7, viewed from the right hand side thereof;

Figure 9 is a perspective view of a modified form of the movable contact of the switch;

Figure 10 is a fragmentary and enlarged diagrammatic illustration of the builder motion of the machine of Figure 1;

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Figure 11 is a top plan view of the gap gear of the builder motion of Figure 10;

Figure 12 is a fragmentary perspective view of one of the builder jaws of the Figure 10 builder motion;

Figure 13 is a top plan view of the tumbler shaft cam disc of Figure 10, illustrating its relationship to an associated stop motion circuit switch;

Figure 14 corresponds to Figure 13, illustrating however a modification of the cam disc; and

Figure 15 is an exemplary circuit diagram for the machine of Figure 1.

Referring to the drawings, and particularly to Figure 1 thereof, 20 indicates the frame of a conventional roving or fly frame, having the usual draft rolls 22 mounted thereon. From the draft rolls 22 a row of strands 24 extends to one or more rows of flyers 26 to be wound on bobbins 28 in the usual manner. As is conventional, the bobbins 28 are journaled in a vertically reciprocating or traversing carriage 30. A driving spindle 32 extends upwardly to each flyer 26, passing through the carriage 30 and the associated bobbin 28, and a hollow spindle 34, coaxial with and enclosing the driving spindle 32, is provided for driving each bobbin 28. The bobbins are reciprocated relative to the flyers by the carriage 30, to wind the strands 24 on the bobbins 28 in successive layers of progressively diminishing length, in the well known manner to produce packages 35 having cone shaped ends 36.

Reciprocation of the carriage 30 is effected by a conventional builder motion, which includes a C bracket 38 or the like reciprocable with the carriage 30, and in which is journaled a shaft 40. The shaft 40, between the legs of bracket 38, is provided with oppositely threaded sections, whereby the builder jaws 42, 44 may be moved in unison in opposite directions. As will be understood, intermittent rotation of the shaft 40 during the building of packages on the bobbins 28 effects progressive movement of the builder jaws toward each other, to progressively decrease the amplitude of the bobbin carriage reciprocation.

Disposed adjacent the shaft 40 is the usual tumbler shaft 46, which carries a builder dog 48 having arms 50, 52 cooperative with the builder jaws. At its upper end the tumbler shaft 46 carries the usual gap gear 54 (Figure 10) adapted to be driven by the bevel gear 56 fixed on the top or upper cone shaft 58 of the machine. The upper cone shaft 58 rotates continuously, and the gap gear 54 is provided with diametrically opposed peripheral gaps 60 therein, aligned generally with the builder dog arms 50, 52, to permit rotation of the upper cone shaft gear 56 while the gap gear 54 remains stationary. As is well known, the tumbler shaft 46 is spring biased to rotate, but is prevented therefrom by engagement of either of the builder dog arms with the cooperative builder jaw. As each builder dog arm rides over the end of the engaged builder jaw, by reason of the reciprocation of the builder jaws, the tumbler shaft is rotated whereby the gap gear 54 is engaged in driving relationship by the gear 56, and thereby rotated through substantially 180°, at which point the opposite builder dog arm engages the cooperative builder jaw and precludes further rotation, for the moment, of the tumbler shaft. At such time, the bevel gear again rotates free of the gap gear 54, in one of the gaps 60 thereof. Each 180° movement of the tumbler shaft 46, as will be understood, effects reversal in direction of the carriage 30, and decreases the length of its stroke.

It is desirable to stop the machine in the event any strand 24 breaks or becomes unduly slack, and for such purpose each strand between the draft rolls 22 and the flyers 26 may be enclosed by the eye 62 of a drop wire 64, which forms part of an electrical stop motion. Conventional electrical stop motions include an open switch

associated with each drop wire, the switches being arranged in parallel, whereby movement of any drop wire from or beyond a predetermined point will close a circuit and thereby effect stoppage of the machine.

In accordance with the present invention, continuous electrical outlet structures are employed in the stop motion and are arranged transversely of the strand row. As illustrated in Figure 1, a continuous outlet 66 may be mounted on the depending flange 68 of frame 20. Preferably, the continuous outlet is of the type manufactured and sold by the Bulldog Electric Products Co. of Detroit, Michigan, under the trademark "Electrostrip." As best shown in Figure 4, the continuous outlet 66 comprises a continuous back wall structure 70, having reversed edge flanges 72 substantially enclosing and retaining upper and lower bus bars 74. The flanges 72 define between them a receiving slot 76 (Figure 3) into which suitably formed electrical components may be inserted and brought into electrical connection with the bus bars. Continuous outlets of this type are well known and widely used, and commercially available in extended lengths. They are advantageous in that electrical elements may be readily engaged thereto at any desired point or points along the length thereof. Additionally, the bus bars are effectively protected from inadvertent contact. The continuous outlets are readily mounted, as by conventional screws or bolts, extending through the back wall 70 thereof into supporting structures. Continuous electrical outlets of this type have been found to be useful in stop motions of fly frames and other textile machines, in that they are readily and inexpensively applied to existing machinery and form a convenient structure for use with the novel switch means of the present invention.

A preferred switch means in accordance with the present invention is illustrated in Figures 3 to 8. As there shown, the switch indicated generally as 78 comprises a casing 80 having a back wall 82 and side walls 84 integral therewith. The casing preferably is constructed of suitable electrically non-conducting material. A cover plate 86 of conducting or non-conducting material, is adapted to seal tightly with the side walls 84. A generally rectangular metal prong 88 is mounted externally on the casing back wall 82, adjacent the lower end thereof, being provided, as shown in Figure 7, with a plurality of contact points 90 adapted to make firm electrical contact with a bus bar. As shown in Figures 4 and 8, the outer portion 92 of prong 88 is angulated slightly with respect to the base portion thereof. The prong 88 is mounted on the rear wall of the casing by means of rivets 94 extending through the wall 82, and engaging a metal bar 96 disposed on the inner surface of the casing wall.

Above the metal bar 96 and prong 88, a cylindrical contact 98 of metal or the like is journaled for rotation in the casing wall. A nut 100 threadably engaged to the inner end of contact 98 limits movement of the contact in outward direction, and the outer end of contact 98 is provided with a metal prong 102, having a cam edge 104, best illustrated in Figure 6.

A stub shaft 106, also of metal or other electrically conducting material, is journaled for rotation in the casing cover plate 86, in general alignment with the metal bar 96 and parallel to contact 98, and the reduced inner end 108 of shaft 106 is journaled in a bore 110 provided therefor centrally of the metal bar 96, the casing back wall 82 being provided with a recess 112 adapted to receive the shaft end 108. A movable electrical contact 114 is fixed on the shaft 106, said contact having a flat 116 on its upper side, spaced somewhat from the fixed contact 98, as shown. As will be understood, rotation of the shaft 106 and its contact 114 in either direction from the position illustrated in Figure 3 will bring the movable contact 114 into engagement with the fixed contact 98, establishing electrical connection therebetween. The outwardly extending end of stub shaft 106, that is the end

protruding from the cover plate 86, is drilled or otherwise adapted to receive the end of a drop wire 64, and means, such as set screw 118, may be provided to adjustably engage the drop wire thereto.

The switch 78 is adapted to be conveniently and quickly applied to the continuous outlet 66 at any desired position along its length. For this purpose, the cover plate 86 and the stub shaft 106 mounted therein are removed from the switch, and the contact 98 is rotated, as by means of its kerf or slot 120, approximately 90° from the position illustrated in Figure 4, whereby the prong 102 thereof is disposed longitudinally of the switch casing. The fixed prong 88 may then be positioned over the lower flange 72 of the continuous outlet 66, at any position therealong, this positioning being facilitated by the angulation of the fixed prong. The switch casing may then be rocked into firm contact with the outer face of the continuous outlet, whereby the movable prong 102 is disposed in the slot 76 rearwardly of the upper flange of the outlet. By means of slot 120, the contact 98 may then be rotated to bring the cam edge 104 of prong 102 into firm engagement with the upper bus bar 74 of the outlet, this action being effective to force the contact points 90 of prong 88 into similarly firm contact with the lower bus bar 74 of the outlet and also being effective to securely retain the switch in assembled relation with the outlet. As will be understood, the initial disposition of the prong 102 is necessarily such that rotation thereof into contact with the bus bar will bring the lower portion of the cam edge 104 thereof initially into contact with the bus bar. The casing being thus locked in place, the cover plate 86 and stub shaft 106 may then be mounted thereon, the reduced inner end 108 of the stub shaft being positioned in the bore 110 of bar 96 provided therefor, as previously noted. The cover plate may be secured tightly in place, as by screws or bolts extending therethrough into the casing body bores 122 (Figure 3). The drop wire 64 may then be secured to the protruding end of the stub shaft 106.

Figure 9 illustrates an alternative structure for the stub shaft 106, wherein the stub shaft 106' is provided with radially extending contact pins 124, suitably mounted in the stub shaft. As will be readily understood, the stub shaft is positioned with the angularly spaced pins 124 disposed on either side of the fixed contact 98, so that slight rotation of the stub shaft in either direction will cause one or the other of pins 124 to engage the fixed contact.

The switch of the invention preferably is disposed immediately below the strand with which it will be associated, so that the engaged drop wire 64 will normally be maintained in vertical, upwardly extending position by the strand running through its eye. In such relation, the stub shaft 106 and its drop wire 64 are dynamically unstable, and undue slack or breakage of the associated strand will result in the drop wire swinging to either side of its equilibrium or balanced position. Movement of the drop wire from balanced position is effective, as will be recognized, to rotate the stub shaft 106 and the movable contact 114 thereon, whereby the movable contact engages the fixed contact 98 to complete a circuit between the bus bars 74 of the continuous outlet 66. In some cases, it may be desirable to mount the switches 78 slightly laterally or to the side of their associated strands so that the drop wires engaging the strands will now be normally disposed in an inclined position when the switch is open. With this arrangement, the weight of the drop wire will act continuously to urge the switch to closed position.

The bus bars of the continuous outlet preferably are in circuit with a relay adapted to open the power circuit of the machine. As will be understood, the various switches mounted on the continuous outlet are thereby disposed in parallel, so that the closing of any switch will be effective to deactivate the machine.

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In roving frames, packages 35 of the type illustrated in Figure 1 are commonly wound with end cones 36 at both ends thereof. It is undesirable that the frame be stopped for any reason when the bobbins are at either end of their traverse, since in such case the strands are prone to run off onto the tapered cone ends, thereby introducing slack and causing loose windings which impair the usefulness of the packages. For this reason, it is desirable to insure that the stop motion circuit is deactivated when the traversing carriage is at either end of its traverse. According to the present invention, this is accomplished in simple fashion by means of a switch 126, actuated by the tumbler shaft 46 of the builder mechanism of the machine.

As illustrated in Figures 10, 13, and 14, a cam disc 128 may be fixedly mounted on the tumbler shaft, and the switch 126 mounted adjacent the periphery of the cam disc, whereby the switch arm 130 bears thereon. The cam disc may be provided with diametrically opposed recesses 132 and the cam disc is so aligned on the tumbler shaft that the switch arm will rest in one or the other of the recesses while the tumbler shaft is at rest, that is while the builder dog 48 is held stationary by the builder jaws 42 and 44. The switch 126 normally is closed, and adapted to be opened by movement of its arm 130 out of a recess 132, whereby the switch will be opened by movement of the tumbler shaft and be maintained open through each period of rotation thereof.

As illustrated in Figure 14, the cam disc 128' may be provided with diametrically opposed lobes 134, and the switch 126' normally closed when its arm 130' is engaged by one of said lobes. Rotation of the cam disc will, in such case, move the engaged cam lobe away from the switch arm, whereby the switch is permitted to open and remains open until again closed by the opposite lobe. The switch may be actuated in other equivalent manner, as by flats formed in the tumbler shaft.

The switch 126, it will be understood, is normally in series with the continuous outlet previously described, that is, in series with the drop wire switches. An exemplary circuit diagram is illustrated in Figure 15, wherein 136 represents an electric motor for running the machine. A power source for this motor is indicated at 138, and a conventional motor starter 140 and motor control switch 142 may be arranged in the circuit for the motor 136. Suitably connected (as shown) in the power circuit for the motor 136 are a relay 144 and a normally closed switch 146, the latter being adapted to be opened by energization of a relay 150 in the stop motion circuit. The relay 144 is a time delay relay, preferably an Agastat Model NE-11, and is adapted to deactivate the stop motion circuit for a predetermined period of time after the motor 136 is started, for a purpose to be explained hereinafter.

The stop motion circuit may receive its power from a suitable transformer 148, and the switches 78, 126 are arranged in series in this circuit as shown. The stop motion circuit includes the relay 150 for opening the switch 146 in the main power circuit, to stop the machine when both the switches 78 and 126 are closed. Also arranged in the stop motion circuit, in parallel branches as shown, are a signal lamp 152 and a relay 154. The time delay relay 144 of the main power circuit normally closes a first switch 156 in the branch of the stop circuit for relay 154, and it also closes a second switch 158 in the branch of the stop circuit which includes the relay 150, the latter branch being connected to the branch containing relay 154 in the manner illustrated. Relay 154, preferably an electrically small, fast operating relay, closes a switch 160 for energizing the relay 150 to stop the motor 136 and therefore the machine, whenever switches 78, 126 are closed. It will be noted, however, that when switch 126 is opened at either end of the traverse of carriage 30, that is during reversing periods, the stop motion circuit will be deactivated or rendered

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inoperative, so that if one of the switches 78 is closed during such times due to slack in its associated strand, the motor 136 will continue to run, and the machine will not be stopped until switch 126 is closed. This occurring on termination of the reversing period.

Switch 126 may be arranged in the branch of the stop circuit containing the relay 150 and the switch 158, by disposing this switch 126 between relay 150 and switch 158. By reason of this disposition of switch 126, lamp 152 will burn as soon as one of the switches 78 is closed, however, the machine will not stop unless switch 126 is closed. Consequently, if a strand becomes slackened to close its associated switch 78 during those periods when switch 126 is open, that is, slightly before and during each reversing period of carriage 30, lamp 152 will burn but relay 150 will not be energized to stop the machine until the reversing period has terminated and switch 126 has been closed. Thus, an indication of slack or breakage in a strand may be immediately given to the operator under all circumstances.

If desired, a suitable temperature responsive overload switch (not shown) may be provided in the stop motion circuit for energizing the relay 150 to stop the machine in the event of an overload on the transformer 148.

As will be understood, should any one of the normally open switches 78 be closed in the manner described, between reversing periods, relay 154 will be immediately energized, causing the main power circuit relay 150 to be energized and open switch 146 whereby the power circuit for motor 136 will be opened and the machine will stop. At the same time, the time delay relay 144 in the main power circuit will be deenergized to open switches 156, 158 thereby deenergizing relays 150, 154 but not interfering with the branch circuit through signal lamp 152. By virtue of this arrangement, the signal lamp 152 will remain burning so long as switches 78, 126, are closed, to provide a visual indication of machine stoppage, while, as is evident, the main power circuit relay 150 will be deenergized shortly after the machine has been stopped to reclose switch 146. As is well understood, the motor 136 will not be restarted by this closing of switch 146 since the motor control switch 142 again has to be closed before the motor circuit will be closed.

In restarting the machine after stoppage due to slack in one or more of the strands, the defective strand is first repaired or corrected, and the motor control switch is closed to close the power circuit for motor 136. The time delay relay 144 keeps the contacts 156, 158, opened for a short period of time after the motor 136 has been restarted, for example 10 seconds, to enable any slack remaining in the repaired strand to be taken up by its associated bobbin to open the involved switch 78 before the operation of the machine is brought under the control of the stop motion circuit.

It has been found in practice that if one of the strands becomes slack a short time prior to either end of the traverse of carriage 30, and stops the machine at this time, the inertia or the momentum of the builder motion might be sufficiently large to drive the carriage to the end of its traverse. Should this occur, the danger of the strands 24 running over the tapered package ends 36 is again presented. To avoid such possibility, the invention further contemplates the provision of means for opening the switch 126 to deactivate the stop motion circuit a short time prior to the reversal of the carriage 30. A preferred form of such means is illustrated in Figures 10 and 12, and includes notches or recesses 162 constructed in the extreme opposed ends of the builder jaws 42, 44. These notches 162 are arranged in the surfaces of the jaws which are engaged by the outer ends of the builder dog arms 50, 52 and these notches are sufficiently large to permit a respective builder dog arm to move into a notch a short time before the builder dog arm rides completely over its associated builder

jaw to reverse the carriage movement. The tumbler shaft 46, therefore, will be permitted a slight rotation immediately before the ends of the carriage traverse, to cause a corresponding movement of the cam disc 128 whereby the switch 126 will be opened and remain in an opened position until the tumbler shaft rotates approximately 180°, at which time the opposite builder dog arm will strike the adjacent builder jaw to prevent further rotation of the tumbler shaft. In this connection, it will be observed that the builder dog arms 50, 52 are respectively provided with free outer ends 51, 53 extending in opposite axial directions, at right angles to the arms, whereby after each 180° rotation of the tumbler shaft 46 one of these free ends will strike the flat, unnotched portion of the builder jaw to dispose switch arm 130 in a cam disc recess 132 for closing switch 126. Additionally, since the base 45 of the lower builder jaw 44 is larger than the base 43 of upper jaw 42 (see Figure 10) it should be evident that the notch 162 in the lower jaw will be of greater horizontal dimension than the notch of the upper jaw to allow the desired slight rotation of the tumbler shaft 46 when a builder dog arm rides off the jaw 44.

If desired, the notches 162 may be omitted from the builder jaws, and the builder dog arms 50, 52 may be formed with similarly functioning notches or recesses 164. Such notches may be arranged at the extreme outer ends of the builder dog arms, on opposite radial surfaces thereof, as seen in Figure 10. Once again, the notch 164 on the builder dog arm which rides over the end of the jaw 44 is made larger than the notch in the other arm due to the larger base of jaw 44. It will be understood, that by varying the vertical dimension of the notches 162 or 164, whichever the case may be, the time in advance of the reversing periods, at which switch 126 will open, may be varied.

Inasmuch as the gaps 60 in the gap gear 54 on the tumbler shaft 46 are normally of such size that rotation of the tumbler shaft 46 will cause a section of gearing on gear 54 to be brought into engagement with the cone shaped bevel gear 56, these gaps 60 may have to be circumferentially enlarged to permit slight rotation of tumbler shaft 46 immediately before the ends of the carriage traverse, without effecting a driving engagement between gears 56 and 54. This is due to the fact that one of the builder dog arms will still be in engagement with a builder jaw for a short period of time after such slight rotation of the tumbler shaft to resist further rotation thereof during this short interval. This enlarging of gaps 60 is readily accomplished, when necessary, by removing one or more teeth from each gear section of the gap gear.

It will thus be seen that there has been provided by this invention a structure in which the various objects hereinbefore set forth, together with many practical advantages, are successfully achieved. As various possible embodiments may be made of the mechanical features of the above invention, all without departing from the scope thereof, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative, and not in a limiting sense.

I claim:

1. An electrical switch adapted for use with continuous outlets having spaced bus bars protected by flanges defining a slot, comprising, a casing, metal prongs mounted externally on said casing, one of said prongs being movably mounted, a normally fixed contact in said casing electrically connected to said one prong and being movable to its fixed position for securing tight engagement of said one prong to the corresponding bus bar of a continuous outlet, and a movable contact in said casing electrically connected to the other of said prongs, said movable contact being movable into and out of engagement with said fixed contact.

2. A switch as defined in claim 1, including a shaft journaled in said casing engaged to said movable contact and extending to the exterior of said casing.

3. An electrical switch adapted for use with continuous outlets having spaced bus bars protected by flanges defining a slot, comprising, a casing, a fixed metal prong mounted externally on said casing, a metal prong rotatably mounted externally on said casing, a normally fixed contact in said casing electrically connected to said rotatable prong and being movable to its fixed position for securing tight engagement of said rotatable prong to the corresponding bus bar of a continuous outlet, and a movable contact in said casing electrically connected to said fixed prong, said movable contact being movable into and out of engagement with said fixed contact.

4. An electrical switch adapted for use with continuous outlets having spaced bus bars protected by flanges defining a slot, comprising, a casing having front and back walls, a fixed metal prong externally mounted on the back wall of said casing, the outer portion of said prong lying in a plane adjacent and generally parallel to said back wall, a first shaft extending through the back wall of said casing and rotatably mounted therein, a metal prong fixed to the outer end of said first shaft and extending at right angles therefrom substantially in the plane of said fixed prong, the inner end of said first shaft constituting a normally fixed contact, a second shaft extending through the front wall of said casing and rotatably mounted therein, and a contact extending radially from said second shaft and movable into and out of engagement with the inner end of said first shaft.

5. An electric switch for use with a continuous electrical outlet structure of the type having spaced bus bars protected by flanges defining a slot, said switch comprising a casing, a pair of metal prongs mounted externally of said casing and adapted to engage the bus bars of the continuous outlet, a normally fixed contact in said casing electrically connected to one of said prongs and being movable to its fixed position for securing tight engagement of said one prong to the corresponding bus bar of the continuous outlet, a movable contact in said casing electrically connected to the other of said prongs, and switch actuating means operably connected to said movable contact and moving said movable contact into and out of engagement with said fixed contact for closing and opening said switch.

6. An electric switch for use with a continuous electrical outlet structure of the type having spaced bus bars protected by flanges defining a slot, said switch comprising a casing having front and back walls, a fixed metal prong externally mounted on the back wall of said casing, the outer portion of said prong lying in a plane adjacent and generally parallel to said back wall, a first shaft extending through the back wall of said casing and rotatably mounted therein, a metal prong fixed to the outer end of said first shaft and extending at right angles therefrom substantially in the plane of said fixed prong, the inner end of said first shaft constituting a fixed contact, a second shaft extending through the front wall of said casing and rotatably mounted therein, said second shaft being electrically connected to said fixed prong, a contact extending radially from said second shaft, and switch actuating means operably connected to said second shaft for rotating said second shaft to move the radially extending contact thereon into and out of engagement with the inner end of said first shaft for closing and opening said switch.

7. An electric switch for use with a continuous electrical outlet structure of the type having spaced bus bars protected by flanges defining a slot, said switch comprising a casing, a fixed metal prong mounted externally on said casing, a metal prong rotatably mounted externally on said casing and adapted to facilitate engagement to the bus bars of a continuous electrical out-

let, a normally fixed contact in said casing electrically connected to said rotatable prong and being movable to its fixed position for securing tight engagement of said rotatable prong to the corresponding bus bar of the continuous outlet, a movable contact in said casing electrically connected to said fixed prong, and switch actuating means operably connected to said movable contact and moving said movable contact into and out of engagement with said fixed contact for closing and opening said switch.

8. An electric switch for use with a continuous electrical outlet structure of the strip type having spaced bus bars disposed adjacent to the upper and lower edges of the strip respectively with protective flanges on the upper and lower edges of the strip and extending inwardly toward each other to cover the bus bars, and the strip and protective flanges defining a slot; said switch comprising a casing, a pair of metal prongs mounted externally of said casing and adapted to engage the bus bars of the continuous outlet, a fixed contact rotatably mounted in said casing and having an outer end rigidly secured to one of said prongs, a movable contact rotatably mounted in said casing and electrically connected to the other of said prongs, said fixed contact being adapted to be loosened and tightened for adjustably securing said one prong in wedged engagement with the corresponding bus bar at any desired position along the electrical outlet strip, the fixed contact when tightened being adapted to cooperate with said one prong to serve as the sole support for said switch on the electrical outlet strip, and said movable contact being movable into and out of engagement with said fixed contact for closing and opening said switch.

9. An electric switch for use with a continuous electrical outlet structure of the strip type having overhanging flanges on the upper and lower edges of the strip extending inwardly toward each other, and bus bars concealed within the junctures between the flanges and the upper and lower edges of the strip respectively; said switch comprising a casing, metal prongs mounted externally of said casing and adapted to penetrate between the flanges and the strip to engage the concealed bus bars, a first shaft rotatably mounted in said casing and having an outer end rigidly secured to one of said prongs, the inner end of said first shaft constituting a fixed contact, a second shaft rotatably mounted in said casing and electrically connected to the other of said prongs, a contact extending radially from said second shaft, said first shaft being adapted to be loosened and tightened for adjustably securing said switch to the electrical outlet strip at any desired position therealong, said first shaft when tightened causing said one prong to forcibly penetrate between the strip and corresponding

flange for wedged engagement with the respective one of concealed bus bars, said first shaft and said one prong constituting the sole supporting means for said switch on the electrical outlet strip, and said second shaft being movable to move said radially extending contact thereon into and out of engagement with the inner end of said first shaft for closing and opening said switch.

10. In combination with a continuous electrical outlet comprising an insulation strip provided with inwardly extending flanges at its upper and lower edges, and spaced bus bars disposed between the respective flanges and the insulation strip, an electrical switch comprising a casing, externally mounted metal prongs carried by said casing, said metal prongs being received between the respective flanges and the insulation strip and adapted to engage said bus bars, one of said prongs being mounted for arcuate movement, means on said last-mentioned prong providing a progressively increased degree of pressure by said prong against the corresponding bus bar in response to the arcuate movement thereof in one direction for tightly securing the casing of said switch to said electrical outlet with said prongs in engagement with said bus bars, the arcuate movement of said prong in the opposite direction serving to loosen the securement of said casing to said electrical outlet for removal therefrom and adjustment therealong, a fixed contact in said casing electrically connected to one of said prongs and a movable contact in said casing electrically connected to the other of said prongs, said movable contact being movable into and out of engagement with said fixed contact to close and open said switch.

11. The structure defined in claim 10, wherein said means comprises a cam edge on said prong extending from a lowermost point at one end of the prong to an uppermost point at the other end of the prong.

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