

Sept. 2, 1958

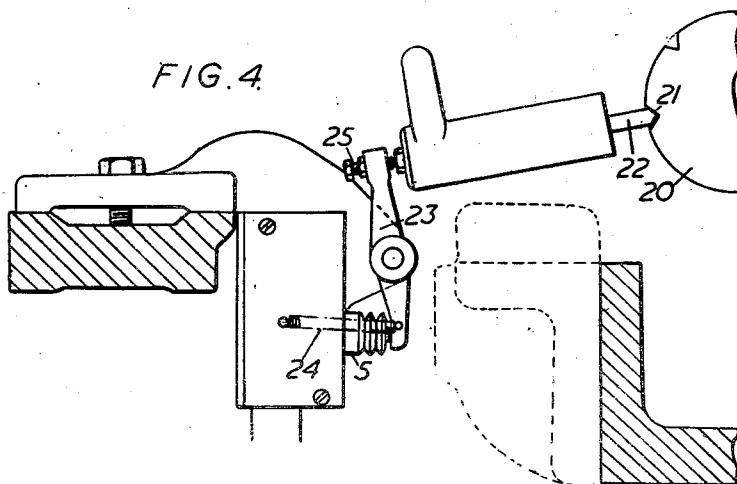
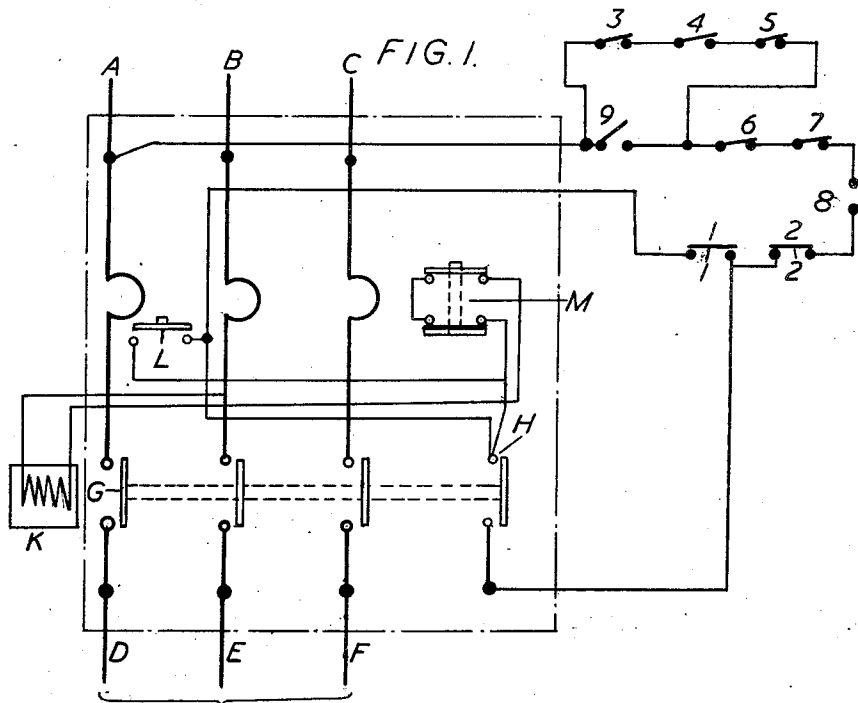
E. START ET AL

2,849,873

STRAIGHT BAR KNITTING MACHINES

Filed May 2, 1955

5 Sheets-Sheet 1



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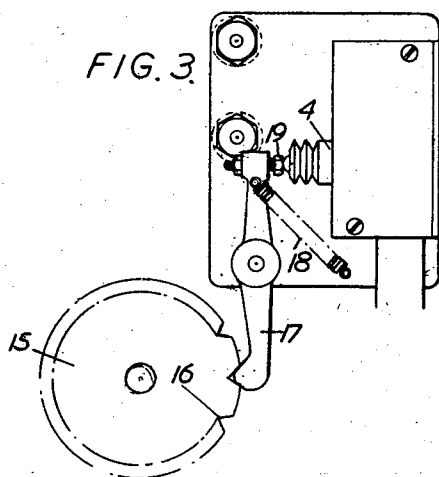
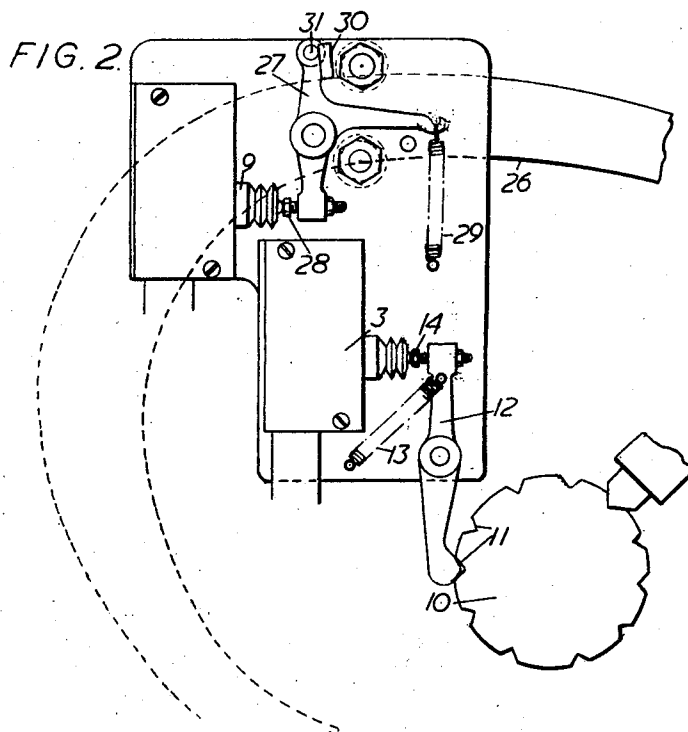
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STRAIGHT BAR KNITTING MACHINES

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5 Sheets-Sheet 2



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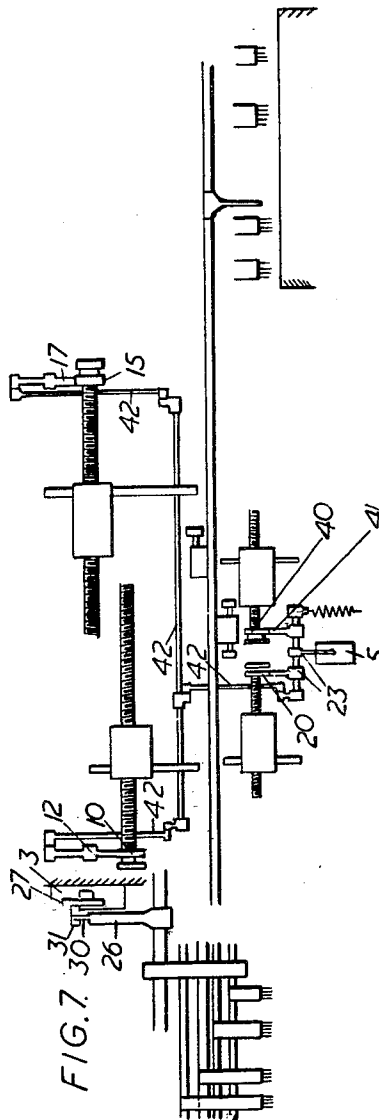
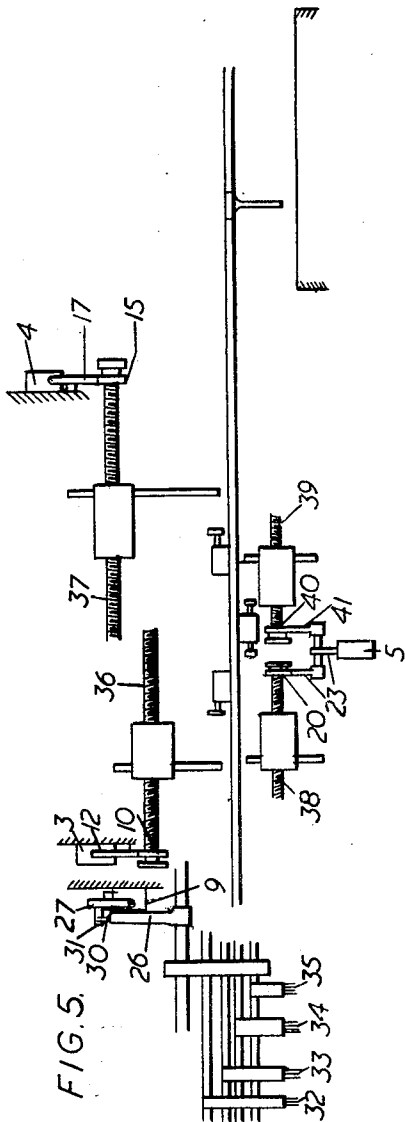
E. START ET AL

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STRAIGHT BAR KNITTING MACHINES

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5 Sheets-Sheet 3



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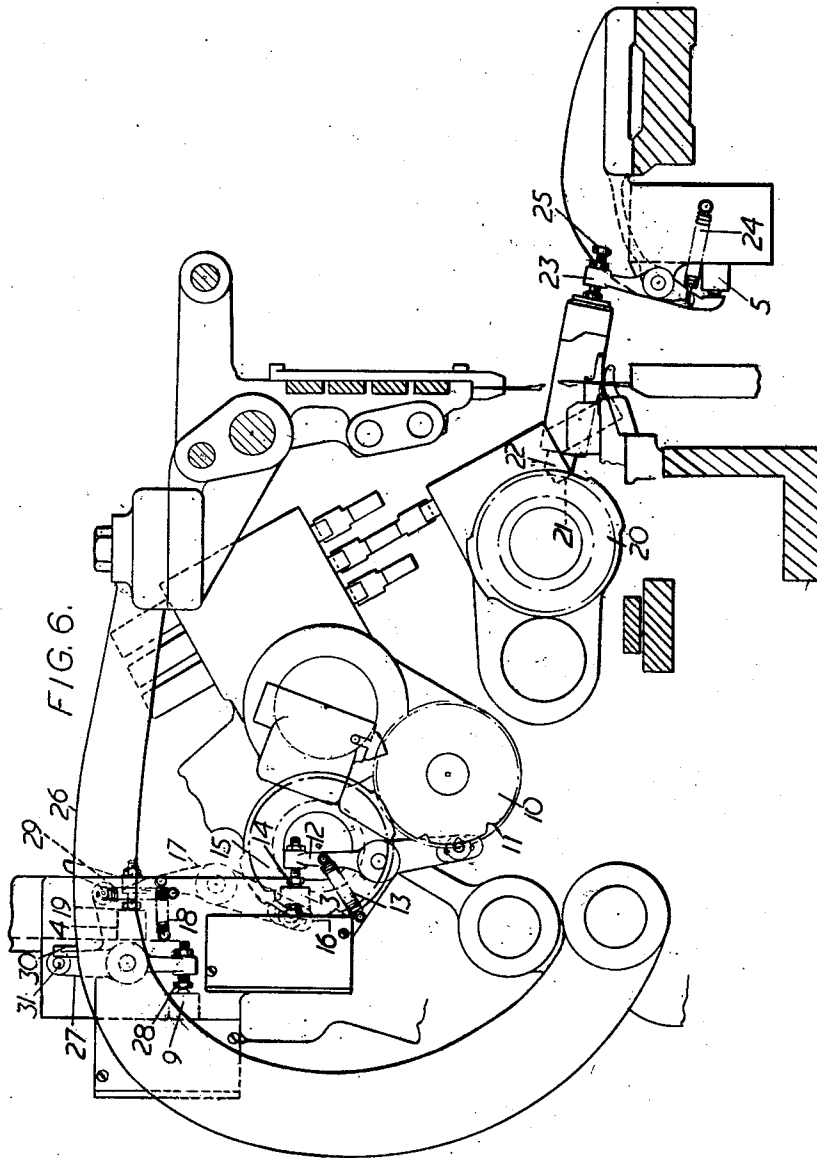
E. START ET AL

2,849,873

STRAIGHT BAR KNITTING MACHINES

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5 Sheets-Sheet 4



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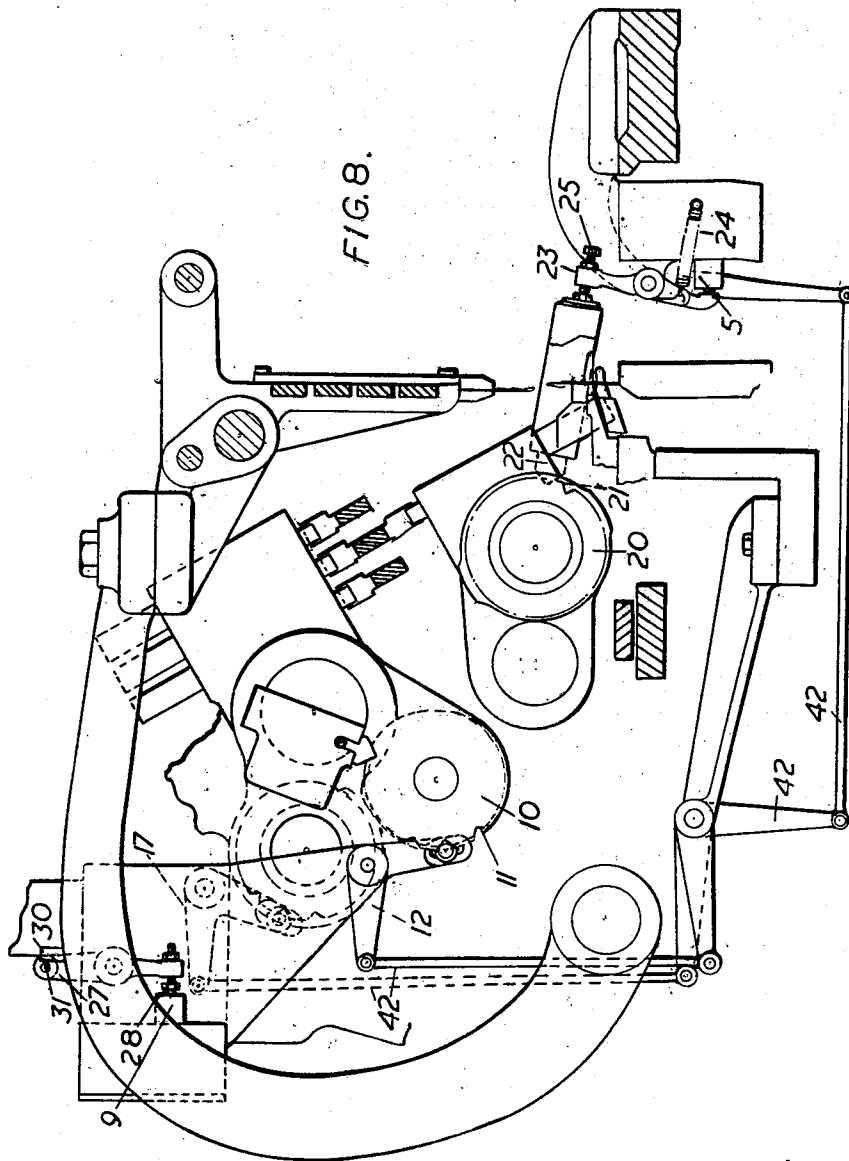
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E. START ET AL
STRAIGHT BAR KNITTING MACHINES

2,849,873

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5 Sheets-Sheet 5



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2,849,873

STRAIGHT BAR KNITTING MACHINES

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Claims priority, application Great Britain May 1, 1954

10 Claims. (Cl. 66—165)

This invention is for improvements in or relating to knitting machines, especially Cotton's patent and other straight bar knitting machines and particularly underwear and outerwear machines or pant frames. In such machines it is customary to have certain parts which are displaced manually and/or automatically into alternative positions, such for example as selvedge stops which are at one stage racked by manual means and at other stages are automatically racked for fashioning purposes. In operation of such mechanism the possibility exists of the racking not being to requisite extent and this may result in selvages of the fabric being incorrectly formed on the wrong needles; a further result may be that the fashioning points may not be properly aligned with the correct needles such that serious damage might be caused to the points, needles and probably the sinkers when the first fashioning operation is carried out by lowering of the points by the conventional narrowing head of the machine.

An object of the invention is to avoid incorrect selvaging and continued damage of parts of the machine which might occur due to inaccurate racking of selvedge stops.

The invention provides a Cotton's patent or other straight bar knitting machine having instrumentalities displaceable along the row of needles, adjusting mechanism for effecting the displacement periodically to register the instrumentalities with different needles, releasable retaining mechanism operable by the adjusting means for stabilising the instrumentalities in their displaced positions, operating mechanism for operating the instrumentalities in their displaced positions and itself displaceable between operative and inoperative positions for each operation of the adjusting mechanism to displace the points and operate the retaining mechanism, an electric circuit for controlling drive to the machine, and at least two electric control switches in parallel in the circuit, one operable by operation of the retaining mechanism and the other operable by the displacement of the operating mechanism such that whenever the operating mechanism is in inoperative position its switch is in "machine non-running" condition and whenever the retaining mechanism is faulty by not having been fully operated to retaining condition its switch is in "machine non-running" condition, so that if this fault of the retaining mechanism occurs when the machine is not running the machine cannot be started, and if it occurs when the machine is running the machine stops immediately afterwards when the operating mechanism next moves to inoperative position.

Conveniently the adjusting mechanism consists of racking mechanism, the operative mechanism is displaceable from the inoperative position to the operative position before each rack and is returned to inoperative position after the rack, the switch operable by the retaining means is normally in "machine running" condition and for each rack is changed first to "machine non-running" condition during the rack and is returned to the "machine running" condition at the end of the rack, and the switch operable by the displacement of the operating mechanism is normally in "machine non-running" condition i. e. when the

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mechanism is in inoperative position and, for each rack, the operating mechanism changes its switch to "machine running" condition when moved to the operative position before a rack and changes the switch back to "machine non-running" condition when moved to its inoperative position after the rack.

Conveniently the instrumentalities are transfer points, the racking mechanism is an adjustable lead screw mechanism for displacing the transfer points' with notched disc and plunger constituting the retaining means, and the operating mechanism is constituted by the narrowing head of fashioning mechanism which carries the transfer points.

Preferably the machine includes the electric circuit composed of starting and retaining circuits, starting and stopping switches operable successively by manually displaceable means, and the aforesaid two electric switches common to both circuits and in series with the starting and stopping switches.

There may be a plurality of the lead screw mechanisms each for adjusting its own transfer points and having its own retaining member, the control switch associated with the retaining means being operable by one or more of the retaining members, and, if not operable by all such members, having one or more additional similar control switches operable by the remaining retaining member or members together or separately.

There may be lever means for transmitting motion of the retaining mechanism and the operating mechanism to the appropriate switches, and the lever means may be operable by the mechanisms positively in one direction and returned by spring means.

In a preferred arrangement the appropriate lever means is formed with a part to have releasable engagement in the notches of the disc as the disc is racked round, with spring means urging the part towards such engagement.

The above and other features of the invention set out in the appended claims are incorporated in the constructions which will now be described, as specific embodiments with reference to the drawings accompanying the specification.

Figure 1 is a circuit diagram showing electric starting means for a Cotton's patent knitting machine, and safety switch means according to the invention.

Figure 2 is a detail view of switch means for one selvedge stop and switch means for a narrowing head.

Figure 3 is a similar view for a second selvedge stop.

Figure 4 is a similar view for third and fourth selvedge stop; and with reference to the accompanying drawings, in which

Figure 5 is a diagrammatic view of fashioning mechanism controlled by means according to the invention.

Figure 6 is a cross-sectional view of the mechanism shown in Figure 5.

Figure 7 is a diagrammatic view of fashioning mechanism controlled by modified means according to the invention.

Figure 8 is a cross-sectional view of the mechanism shown in Figure 7.

Referring now to Figure 1 the electric drive control means shown comprises three main feed lines A, B, and C, three motor connections D, E and F, a contactor G with a retaining switch HJ, a contactor coil K, a press button starter L, press button stop and overload contacts M, and power rod operated start and stop switches 1 and 2. These switches 1 and 2 are operated in turn to start the machine by movement of the power rod of the machine first to close the switch 2 causing current to flow in a starting circuit from line A through further switches 3, 4, 5, and 6, 7, 8, then through switches 2 and 1, and, after by-passing the press button starter L, through the press button stop and overload M and through the contactor coil K and then to the line B, whereby the con-

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tactor coil K is energised. This causes operation of the contactor G for current to pass to the motor connections D, E and F to start the machine and retaining switch HJ is also closed by the contactor G. Further slight movement of the power rod causes starting switch 1 to open and open the starting circuit but the contactor G is thereafter maintained operated for current to pass to the motor connections D, E, F by a retaining circuit which comprises the main line A, switches 3, 4, 5, 6, 7, 8 and 2, the retaining switch HJ, the press button stop and overload M, the contactor coil K, and the main lead B.

From the above it will be seen that the switches 3, 4, 5, 6, 7, 8, 2, and 1 are in a starting circuit and the switches 3, 4, 5, 6, 7, 8, 2 and HJ are in a retaining circuit; the switches 3, 4, 5 will be referred to more fully hereinafter, and the switches 6 and 7 are on screw boxes and do not form part of the present invention, nor does the switch 8 which is located in what is known as the "chain auto stop box."

There is also provided in the circuits and in parallel with the switches 3, 4 and 5 a further switch 9 to be hereinafter more fully referred to.

The machine is capable of being stopped by return motion of the power rod such that as it approaches the "off" position the starting switch 1 is closed (to reprepare the starting circuit for subsequent starting). The contactor G still remains operated at this stage because of the retaining circuit so that current still passes to the motor connections D, E and F. Upon slight further movement of the power rod however towards the "off" position this causes switch 2 to open thereby opening the retaining circuit (and also opening the starting circuit) such that the contactor coil is de-energised and the contactor G returns to its initial state and current to the motor connections D, E and F is cut off.

The said switches 3, 4 and 5 are each associated with parts in the machine which are displaceable manually and/or automatically into alternative positions in such manner that if they are not displaced to the desired full extent, one or more of them will be in the open condition and as a result of this both the starting and retaining circuits will be further opened i. e. in addition to the open switch 2, assuming that the power rod is "off." In the instance of the manual control the machine therefore cannot be started by operation of the power rod to close switch 2 until the fault is rectified, and it will be understood that rectifying the fault will not immediately start the machine, even if the power rod is left in the "on" position because of switches 1 and HJ remaining open until the power rod is next operated. This safety measure is of course dependent on the switch 9 being open and it is in fact normally open. However this switch 9 is adapted to be closed upon movement of another part in the machine whose movements are coordinated with the movements of the parts operating the switches 3, 4 and 5. More specifically in the instance of automatic control, and assuming that the power rod has been operated to start the machine so that switch 1 is open and switch 2 is closed, when the parts operating switches 3, 4 and 5 are displaced automatically they are displaced at a time when the switch 9 is closed, by prior movement of said second part, thereby to maintain the retaining circuit through the closed switch 2 until the parts operating switches 3, 4 and 5 have been displaced, whereupon the part operating switch 9 moves back to re-open the switch 9. When the parts operating switches 3, 4 and 5 are in fact automatically displaced, with switch 9 closed, the switches 3, 4 and 5 will be first opened and then will normally become re-closed, so that in spite of the fact that when the part operating switch 9 next operates it opens switch 9, the retaining circuit continues to be maintained by switches 3, 4 and 5 and the machine operates in normal manner. However should any one or more of the switches 3, 4 and 5 not become re-closed i. e. by the parts operating them not being displaced to the requisite extent, the re-

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taining circuit will be temporarily maintained by the closed switch 9 but, when the part operating the switch 9 is next displaced to open the switch 9, the retaining circuit will be completely broken because of this open switch 9 and the open switch 3, 4 or 5; as a result of this opening of the retaining circuit, the machine will stop by contactor G "breaking," and retaining switch HJ is consequently opened. The fault may then be rectified, and it will be understood that rectifying the fault will not cause immediate starting of the machine even if the power rod has been left in the "on" position, because both the starting switch 1 and retaining switch HJ are open at this stage thereby necessitating re-operation of the power rod as before mentioned to operate switches 1, 2 and HJ to re-start the machine.

The switches 3, 4 and 5 and 9 are conveniently employed to safeguard against inaccurate racking of selvedge stops to avoid incorrect selvedging and to avoid continued damage which may be caused by inaccurately positioned fashioning points. For this purpose it should first be explained that selvedge stops of which there are conveniently four, are adapted to be racked manually and automatically at required times by turning of lead screws on which they are mounted. Each of these lead screws is locatable in each of its racked positions by a notched disc on it with which there engages a plunger such that engagement of the plunger with the notches respectively is coincident with correct racking of the selvedge stops, and consequently of the fashioning points moved thereby; the fashioning points are also movable up and down in conventional manner by a narrowing head in the machine. The usual arrangement is that the selvedge stops are at one time racked manually and at another time automatically; the latter movements are carried out whilst the narrowing head is moving downwardly, and the narrowing head moves back upwardly after the full racking of the selvedge stops. The said switches 3, 4 and 5 are, for the purpose of the invention, associated with the said notched disc and plunger devices, and the switch 9 is associated with the narrowing head in the following manner.

Referring now to Figure 2 of the drawings the notched disc 10 is for one of said selvedge stops and its notches 11 are adapted to be engaged by a lever 12 which operates synonymously with a plunger (not shown) for engaging the notches at a spaced location and is biased by a spring 13. This lever 12 is adapted to operate the switch 3, which is a micro switch, and for this purpose there is an adjusting screw 14 at the end of the lever 12. Referring now to Figure 3 the notched disc 15 is for a second selvedge stop and its notches 16 are adapted to be engaged by a lever 17 (similar to lever 12) biased by a spring 18, and this lever 17 is adapted to operate switch 4, which is a micro switch, and for which purpose there is an adjusting screw 19 on the end of the plunger arm 17. Referring now to Figure 4 the notched disc 20 is for a third selvedge stop and its notches 21 are adapted to be engaged by a plunger 22 which in turn is adapted to operate switch 5, which is a micro switch, through the intermediary of a lever 23 (similar to lever 12 and 17) biased by a spring 24 and having an adjusting screw 25 on its end engaging the plunger 22. This switch 5 may also be operated from a fourth selvedge stop through the intermediary of a notched disc (on its lead screw and similar to that shown at 20), a plunger similar to that shown at 22, and an additional arm similar to the top part of lever 23 fixed on the same pivot thereof and having an adjusting screw similar to adjusting screw 25.

Referring again to Figure 2 the narrowing head of the machine is represented by arm 26 and it is adapted to operate switch 9, which is a micro switch, through the medium of a lever 27 having an adjusting screw 28 engaging the switch and biased by a spring 29, and by a

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vertical pin 30 carried by the narrowing arm 26 for engaging a horizontal pin 31 projecting from the lever 27.

In operation of the parts the arrangement is such that, with the narrowing head 26 in the fully raised position the switch 9 is open and in the lowered position it is closed, by releasable engagement of the pins 30 and 31, and the switches 3, 4 and 5 are all closed when the levers 12, 17 and 22 (and consequently the plungers) are in engagement with the notches of the respective notched discs and they are open when the levers are not in engagement with the notches. Dealing now first with manual racking of the selvage stops this is carried out with the narrowing head 26 in the top position whereat switch 9 is open so that if the racking is not to the required extent one or more of the levers 12, 17 and 22 will not engage in the appropriate notches with the result that one or more of the switches 3 to 5 will remain open, and because of this the starting circuit to the motor will be incomplete thereby preventing the machine from being started until the fault is rectified and all the switches 3, 4 and 5 are closed by all the plungers 12, 17 and 22 engaging in the appropriate notches. Rectifying of the fault will not undesirably cause immediate starting of the machine, assuming the power rod to be "on," because of the starting circuit not being completed until the power rod is next operated. This safety arrangement ensures that fashioning points are properly located in line with the correct needles before the machine can be started thereby avoiding incorrect selvaging.

Dealing now with automatic racking it will be remembered that the narrowing head 26 (or which the arm 26 has an arcuate movement causing a horizontal movement of pin 30) first lowers to close the switch 9 before automatic racking takes place so that the retaining circuit is maintained by switch 9 whilst switches 3, 4 and 5 are open during the automatic racking. If this automatic racking is not to a sufficient extent, one or more of the switches 3, 4 and 5 will remain open, and, in consequence, when the narrowing head 26 next rises to its full height thereby opening its switch 9, the retaining circuit to the starting motor will be open such that contactor G will "break" and the machine will stop; retaining switch HJ will therefore be opened. Conversely if all the switches 3, 4 and 5 are closed by correct automatic racking the retaining circuit will remain closed in spite of the switch 9 being open by the raised narrowing head 26 because these switches 3, 4 and 5 and the switch 9 are in parallel. If a fault has occurred the machine is consequently automatically stopped such as to avoid continued damage which might have been caused through the fashioning points not registering correctly with their needles consequent upon the incorrect automatic racking, it being understood that when the narrowing head descended, the mis-positioned points might have fouled the needles and sinkers thereby damaging the points, needles, and probably the sinkers. The fault may then be rectified but this will not immediately result in the machine restarting, assuming that the power rod is "on" because both the starting switch 1 and retaining switch HJ are open at this stage such that re-operation of the power rod will be necessary to re-operate the starting contactor G before the machine can be restarted in normal manner.

Referring now to Figures 5 and 6 these show conventional fashioning mechanism in the machine controlled by means as above described. More specifically there are four sets of transfer points 32, 33, 34 and 35 carried by the narrowing head represented by reference numeral 26 and displaceable respectively by four lead screw mechanisms 36, 37, 38 and 39. The lead screw 36 carries the notched disc 10, the lead screw 37 carries the notched disc 15, and the lead screw 38 carries the notched disc 20. The lead screw 39 carries a further notched disc 40 equivalent to the disc 20 and for operating with this notched disc 40 there is a lever 41 connected to the

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lever 23 for operating with it, so that both notched discs 20 and 40 operate the same switch 5.

Referring now to Figures 7 and 8 these show a modification for which there is only the one switch 5 and suitable link, lever, and rod mechanism (indicated generally at 42) connecting all the levers 12, 17, 20 and 41, together for all the notched discs 10, 15, 20 and 40 to operate the same switch 5 simultaneously.

What we claim is:

1. A Cotton's patent or other straight bar knitting machine having instrumentalities displaceable along the row of needles, adjusting mechanism for effecting the displacement periodically to register the instrumentalities with different needles, releasable retaining mechanism operable by the adjusting means for stabilising the instrumentalities in their displaced positions, operating mechanism for operating the instrumentalities in their displaced positions and itself displaceable between operative and inoperative positions for each operation of the adjusting mechanism to displace the points and operate the retaining mechanism, an electric circuit for controlling drive to the machine, and at least two electric control switches in parallel in the circuit, one operable by operation of the retaining mechanism and the other operable by the displacement of the operating mechanism such that whenever the operating mechanism is in inoperative position its switch is in "machine non-running" condition and whenever the retaining mechanism is faulty by not having been fully operated to retaining condition its switch is in "machine non-running" condition, so that if this fault of the retaining mechanism occurs when the machine is not running the machine cannot be started, and if it occurs when the machine is running the machine stops immediately afterwards when the operating mechanism next moves to inoperative position.

2. A machine according to claim 1 wherein the adjusting mechanism consists of racking mechanism, the operating mechanism is displaceable from the inoperative position to the operative position before each rack and is returned to inoperative position after the rack, the switch operable by the retaining means is normally in "machine running" condition and for each rack is changed first to "machine non-running" condition during the rack and is returned to the "machine running" condition at the end of the rack, and the switch operable by the displacement of the operating mechanism is normally in "machine non-running" condition i. e. when the mechanism is in inoperative position and, for each rack, the operating mechanism changes its switch to "machine running" condition when moved to the operative position before a rack and changes the switch back to "machine non-running" condition when moved to its inoperative position after the rack.

3. A machine according to claim 2 wherein the instrumentalities are transfer points, the racking mechanism is of adjustable lead screw mechanism for displacing the transfer points with notched disc and plunger constituting the retaining means, and the operating mechanism is constituted by the narrowing head of fashioning mechanism which carries the transfer points.

4. A Cotton's patent or other straight bar knitting machine having in combination an electric circuit for controlling drive to the machine a row of needles, rotatable lead screw means which are in and out of operation at different times, screw nut means adjustable along the lead screw means when in operation by periodic rotations of the latter instrumentalities displaced by the screw nut means along the row of needles, releasable retaining mechanism operable by said periodic rotations of the lead screw means to stabilize the screw nut means in each adjusted position, an auxiliary mechanism which is in and out of operation respectively at said different times and when in operation periodically moves in motions between operative and inoperative positions to operate at least some of the instrumentalities

in their displaced positions in alternate timed relation with said periodic rotations of the lead screw means, at least two electric control switches in parallel in the circuit, one switch being closed upon predetermined adjustments of the screw nut means along the lead screw means and otherwise open, and the other switch being opened by motion of the auxiliary mechanism to inoperative position and otherwise closed, whereby starting and running of the machine is prevented if the screw nut means are not in predetermined positions on the lead screw means at required times.

5. A machine as claimed in claim 4 having the electric circuit composed of starting and retaining circuits, power rod operated starting and stopping switches, and the two electric control switches common to both circuits and in series with the starting and stopping switches, whereby after machine has failed to start or has stopped consequent upon the screw nut means not being in predetermined position of adjustment at required time, and the fault has been rectified, the machine cannot start without off and on power rod operations of the starting and stopping switches.

6. A Cotton's patent or other straight bar knitting machine having in combination an electric circuit for controlling drive to the machine, a row of needles, thread carriers, transfer points, rotatable lead screw means which are in and out of operation at different times, screw nut means adjustable along the lead screw means when in operation by periodic rotations of the latter to adjust the thread carrier and transfer points along the row of needles, notched disc and detent means operable by said periodic rotations of the lead screw means to stabilize the screw nut means and consequently the thread carriers and transfer points in each adjusted position, an auxiliary mechanism constituted by a narrowing head carrying the transfer points and which is in and out of operation respectively at said different times and when in operation periodically moves in motions between operative and inoperative positions in alternate timed relation with said periodic rotations of the lead screw means and consequently with operations of the notched disc and detent means, at least two electric control switches in parallel in the circuit, one switch being closed by the notched disc and detent means when operated by predetermined rotations of the lead screw means with consequent predetermined adjustments of the thread carriers and transfer points and otherwise open, and the other switch being opened by the narrowing head when moved to inoperative position and otherwise closed, whereby starting and running of the machine is prevented if the screw nut means, thread carriers, and transfer points, are not in predetermined adjusted positions at required times.

7. A Cotton's patent or other straight bar knitting machine having in combination an electric circuit for controlling drive to the machine, a row of needles, a plurality of rotatable lead screws which are in and out of operation at different times, a screw nut adjustable along each lead screw when in operation by periodic rotations of the lead screws instrumentalities displacedly adjusted by the screw nut means along the row of needles, a notched disc and detent device for each lead screw and operable thereby and for stabilizing the screw nuts in each adjusted position, a link and lever mechanism common to the notched disc and detent devices to be operable thereby, an auxiliary mechanism which is in and out of operation respectively at said different times and when in operation periodically moves in motions between operative and inoperative positions to operate at least some of the instrumentalities in their displaced positions in alternate timed relation with said periodic rotations of the lead screw means and consequently with operations of the notched disc and detent devices, two control switches in parallel in the circuit, one switch being closed by said link and lever mechanism when the notched disc and detent devices are operated by

predetermined rotations of the lead screws and otherwise open, and the other switch being opened by motion of the auxiliary mechanism to inoperative position and otherwise closed, whereby starting and running of the machine is prevented if the screw nuts are not in predetermined positions on the lead screws at required times.

8. A Cotton's patent or other straight bar knitting machine having in combination an electric circuit for controlling device to the machine, a row of needles, two pairs of rotatable lead screws which are in and out of operation at different times, a screw nut adjustable along each lead screw when in operation by periodic rotations of the lead screws instrumentalities displaced by the screw nut means along the row of needles, a notched disc and detent device for each lead screw and operable thereby for stabilizing the screw nut means in each adjusted position, an auxiliary mechanism which is in and out of operation respectively at said different times and when in operation periodically moves in motions between operative and inoperative positions to operate at least some of the instrumentalities in their displaced positions in alternate timed relation with said periodic rotations of the lead screw means, four electric control switches in the circuit three of the switches being in series with one another and all in parallel with a fourth switch, one of the three switches being closed by the one notched disc and detent device when operated by its lead screw and otherwise open, the second of the three switches being closed by the second notched disc and detent device when operated by its lead screw and otherwise open, the third of the three switches being closed commonly by the third and fourth notched disc and detent devices when operated by their lead screws and otherwise open, and the fourth switch being opened by motion of the auxiliary mechanism to inoperative position and otherwise closed, whereby starting and running of the machine is prevented if either one of the screw nut means on the lead screws of the one pair or the pair of screw nut means on the other pair of lead screws is not in predetermined positions on the lead screws at required times.

9. A Cotton's patent or other straight bar knitting machine having in combination an electric circuit for controlling drive to the machine and composed of starting and retaining circuits, power rod-operated starting and stopping switches and at least two electric control switches in parallel in both circuits and in series with the power rod switches, a row of needles, thread carriers, transfer points, rotatable lead screw means which are in and out of operation at different times, screw nut means adjustable along the lead screw means when in operation by periodic rotations of the latter for adjusting the positions of the thread carrier and transfer points along the row of needles, notched disc and detent means operable by said periodic rotations of the lead screw means to stabilize the screw nut means in each adjusted position, a narrowing head carrying the transfer points and which is in and out of operation respectively at said different times and when in operation periodically moves in motions between operative and inoperative positions in alternative timed relation with said periodic rotations of the lead screw means, one of said control switches being closed by the notched disc and detent means when operated by the lead screw means and otherwise open, and the other control switch being opened by movement of the narrowing head to inoperative position and otherwise closed, whereby starting and running of the machine is prevented if the screw nut means is not in predetermined position on the lead screw means at required times and after rectifying such a fault the machine cannot be started without power rod-operation of the starting and stopping switches.

10. A Cotton's patent or other straight bar knitting machine having in combination an electric circuit for

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controlling drive to the machine, a row of needles, thread carriers traversable along the row of needles to different extents, transfer points adjustable along the row of needles, a narrowing head carrying the transfer points, a pivoted arm carrying the narrowing head and movable when required between different pivoted positions in which the narrowing head is operative and inoperative to associate the transfer points with the needles, rotatable lead screws which are in and out of operation with the narrowing head, screw nuts adjustable along the lead screws by periodic rotations of the latter for adjusting the positions of the thread carriers and transfer points along the row of needles, disc means rotatable with the lead screws, notches in the disc means, detent means releasably engaging the notches by rotations of the notched disc means to stabilize the screw nuts, thread carriers and transfer points in adjusted positions, electric control switch means in parallel in the circuit whereof one switch means is located adjacent

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said pivoted arm of the narrowing head and the other switch means is adjacent said detent means, two switch lever means whereof one switch lever means is disposed to be operated by said pivoted arm to open the one switch means when the narrowing head is in inoperative position, and the other switch lever means is disposed to be operated by the detent means to close the other switch means when engaging the notches in the disc means, spring means returning the one switch lever means and closing the one switch means upon return of the narrowing head to operative position, and spring means returning the other switch lever means to open the other switch means when the detent means is disposed between the notches.

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