March 8, 1955 V. F. SEPAVICH 2,703,591

WEFT STOP MOTION

Filed Jan. 14, 1954

FIG. 1

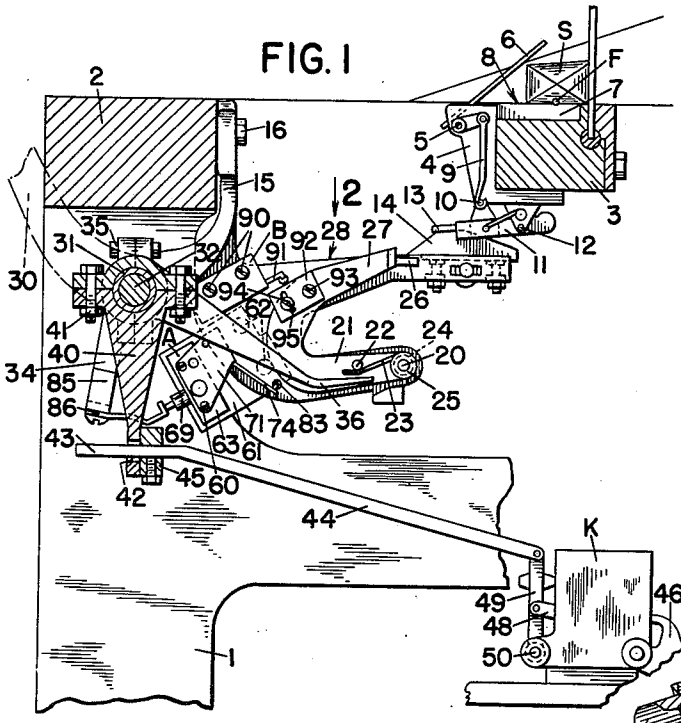


FIG. 3

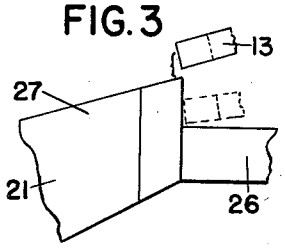


FIG. 4

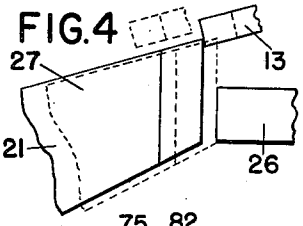


FIG. 6

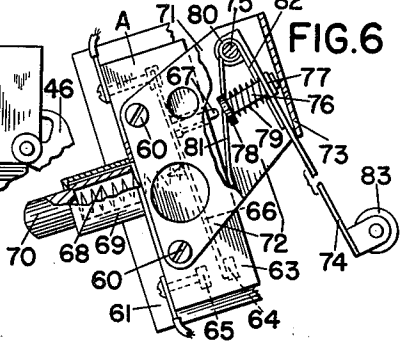


FIG. 2

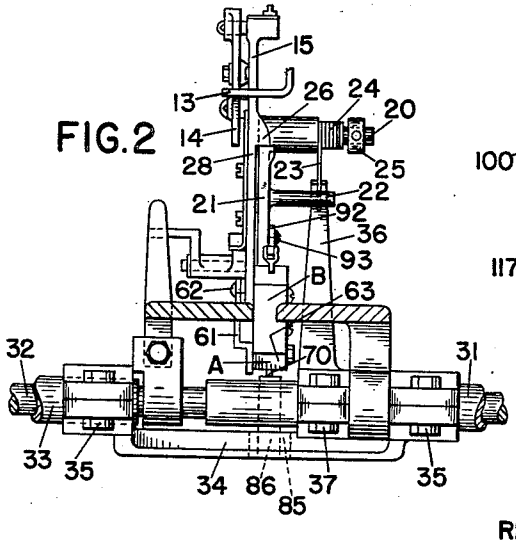
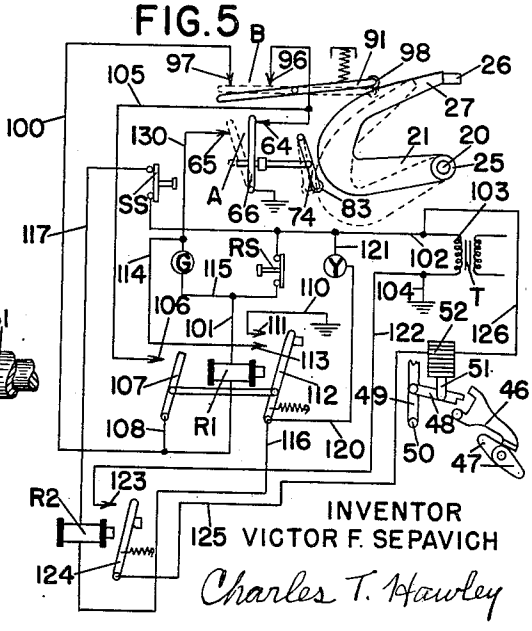


FIG. 5



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WEFT STOP MOTION

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Application January 14, 1954, Serial No. 404,095

13 Claims. (Cl. 139—375)

This invention relates to weft stop motions for looms and it is the general object of the invention to provide a stop motion of high sensitivity which will operate to stop the loom even though the knock-off lever of the mechanism is given only a small motion by the knock-off dagger.

Many looms are equipped with a so-called center stop motion comprising a filling fork pivoted to the front of the lay and caused to rise and fall as the lay moves backwardly and forwardly. If weft is present it supports the fork and prevents the latter from moving down into the well in the lay, but if the weft is absent the fork completes its downward motion and in doing so lowers a dagger or other stopping element to a position enabling it to rock the knock-off lever to stopping position as the lay continues to move forwardly. If in weft stop motions as constructed heretofore the filling thread breaks before the shuttle reaches the filling fork the latter can move down all the way into the well and the dagger can give the knock-off lever full motion, but if the thread breaks after the shuttle has passed the fork the weft thread may be long enough to permit only a slight downward motion of the fork and the dagger will not be able to move the knock-off lever sufficiently to effect loom stoppage.

It is an important object of the present invention to provide means supplemental to the usual weft stopping mechanism by which the loom can be stopped even though the dagger is not able to give the knock-off lever a full motion due to presence of a broken thread under the fork.

When the dagger has been able to fall to a position only slightly lower than its normal non-stopping position it will give the knock-off lever a very small angular motion and then free itself from the lever without effecting loom stoppage. It is a further object of the present invention to enable a slight motion of the knock-off lever to close an electric switch the effect of which will be to cause loom stoppage through another of the loom stopping mechanisms even though the weft stop motion itself does not operate.

It is a further object of the invention to provide an electrically controlled stopping means employing primary and secondary switches, the secondary switch being normally open but being closed whenever the knock-off lever has either a small or a large motion, and the primary switch being normally closed, but being opened only when the knock-off lever has a large or full motion. Closure of the secondary switch initiates conditions to effect loom stoppage at a time in the cycle of the loom after the usual time for stopping by the weft stop motion, and the primary switch is so connected to the circuit of the secondary switch that the latter circuit will be opened in the event that the knock-off lever is given a large enough motion to stop the loom mechanically. In this way the stopping which is initiated by the secondary switch will be nullified and cannot cause a second unnecessary stopping after weaving has been resumed subsequent to stoppage by a full motion of the knock-off lever.

It is a further object of the invention to provide the loom with a signal system which will indicate at a glance whether the loom has been stopped due to a full motion of the knock-off lever or whether stoppage has resulted from only a slight motion of the lever. Differently colored lamps, such as green and yellow, are connected into the electric circuit and as set forth herein if only one of these lamps, such as the green, is illuminated it will indicate that the knock-off lever has had a full motion, but

if both the green and the yellow lamps are illuminated they will indicate that stoppage resulted from a very slight motion of the knock-off lever. Furthermore, if the yellow lamp is illuminated it will indicate that a reset button to be described must be pushed to open a holding circuit on a relay which controls the lamps before weaving is resumed.

In order that the invention may be clearly understood reference is made to the accompanying drawings which illustrate by way of example the embodiments of the invention and in which:

Fig. 1 is a vertical section through the forward upper part of a loom showing the invention applied thereto,

Fig. 2 is a plan view as viewed from the front of the loom and looking in the direction of arrow 2, Fig. 1, certain parts being in section,

Figs. 3 and 4 are diagrammatic views showing different relations between the knock-off lever and the dagger,

Fig. 5 is a diagrammatic view showing certain parts of the loom and the electric circuits associated with them, and

Fig. 6 is a side elevation, partly in section, and partly broken away, showing the switch the condition of which is changed when the knock-off lever has a full motion.

Referring particularly to Figs. 1 and 2, the loom frame 1 supports a breast beam 2 and is provided with a lay 3 which during loom operation reciprocates backwardly and forwardly in usual manner. The lay has secured to the forward side thereof a casting 4 providing a pivot 5 for a weft fork 6 aligned with a well 7 cut across the lay below the shuttle race 8 along which the shuttle S travels. A rod 9 is operatively connected to the fork and has its lower end pivoted at 10 to a small dagger lever 11 pivotally mounted at 12 for rocking movement with respect to the lay. The lever 11 carries a dagger 13 the vertical position of which is determined by the position of the fork 6. The dagger overhangs a fixed cam 14 mounted on a support 15 secured at 16 to the breast beam 2.

During loom operation the fork 6 will be in the raised position shown in Fig. 1 during flight of the shuttle, and after the shuttle has passed the fork the dagger due to forward motion of the lay will slide down the cam 14 and enable the fork to approach the well 7. If weft thread F is present it will support the fork and the latter through the connections described will hold the dagger 13 in a raised non-stopping position such as shown in full lines in Fig. 3. If on the other hand the weft is broken and does not extend across the well 7 the fork 6 can descend all the way into the well to allow the dagger to assume the low stopping position shown in the dotted lines, Fig. 3. Another condition which can exist is that the weft will break at a point beyond the well and will therefore be under the fork 6 as the lay moves forward. Under this condition, especially if the thread extends for a considerable distance beyond the well, the fork 6 may be able to descend only a slight distance into the well and the dagger will not be able to reach its full down position but will assume some intermediate position such as shown in full lines in Fig. 4. It is this latter condition which frequently results in non-stoppage of a loom equipped with stop motions as heretofore constructed.

The support 15 is provided with a stud 20 on which is pivoted a knock-off lever 21 having a laterally extending lug 22 which receives the upward thrust of arm 23 of a spring 24 coiled around the stud 20 and having an end thereof secured to a collar 25 fastened adjustably in angular position on the stud 20. The support 15 has a stop 26 which normally limits clockwise movement of the knockoff lever as viewed in Fig. 1, and the spring normally holds the lever against this stop with the upper end 27 thereof projecting above the top surface 28 of the support 15 in position to be engaged by the dagger if the latter is below its non-stopping position as the lay advances.

Stopping and starting of the loom is controlled by handles or the like of the ordinary type one of which is shown in dot and dash lines at 30. In the present instance handle 30 which is at one end of the loom and hence not shown in Fig. 2, may be for the brake of the loom and is clamped in usual manner to a sleeve 31 sur-

rounding the shipper rod 32. A second sleeve 33 surrounds rod 32 and is connected to sleeve 31 by a rigid yoke 34 secured to both sleeves at 35. Secured to the sleeve 31 is the usual arm 36 which extends rearwardly and under the lug 22. Arm 36 may be clamped at 37 to the sleeve 31. When the brake lever is in its off position or to the left as viewed in Fig. 1 conditions for loom running will exist and the arm 36 will be in its raised position close to the lug 22.

A second arm 40 is clamped at 41 to the sleeve 31 near an end of the loom and extends downwardly and is provided with a perforation 42 for the forward end 43 of a stop rod 44 having secured thereto a collar 45 for engagement with the lower right side of the arm 40. Rod 44 extends to a well-known warp stop knock-off mechanism designated at K and including a lever 46 which is rocked each beat of the loom by the cams 47 toward and from a link 48 pivoted to a lever 49 the upper end of which is pivoted to the rod 44 and the lower end of which is pivoted at 50 to a stationary part of the loom. The link is controlled by the core 51 of a normally deenergized solenoid 52. The link will normally be down when the solenoid is deenergized so that it will not be engaged by the lever 46, but whenever the link 48 is raised into the path of lever 46 due to energization of the solenoid the lever 49 will be rocked forwardly, to the left, Fig. 5, and act through rod 44 and collar 45 to move the arm 40 in a clockwise direction, thus moving the brake handle from its running position rearwardly, or to the right, Fig. 1, to the stopping position thereof to stop the loom.

It will thus be seen that the brake handle, which may be considered as loom controlling means, can be moved from running to stopping position either by lever 21 and arm 36, which may be considered as primary stopping means, when the knock-off lever 21 has a large motion, or by mechanism K and arm 40, which may be considered as secondary stopping means, consequent upon energization of the solenoid 52. The mechanism K is so timed that it will rock the arm 40 later in the cycle of the loom than the time for rocking lever 21 by the dagger 13, mechanism K thus effecting delayed loom stoppage. The lever 21, when engaging arm 36, operates mechanically and promptly at a given time in the forward motion of the lay to stop the loom on the pick and without utilizing electrical equipment. The mechanism K has two stages of operation the first of which is completed when link 48 is raised into the path of lever 46 and the second of which occurs when lever 46 rocks to move rod 44 forwardly. Both stages must be completed before mechanism K can stop the loom.

The mechanism thus far described is somewhat similar to stop motions heretofore employed in looms.

In carrying the present invention into effect there is provided a primary switch A which is secured by screws 60 to a plate 61 fastened as at 62 to the support 15. The primary switch includes a housing 63 through which the screws 60 pass having therein two electrodes 64 and 65 for engagement one at a time with a snap spring switch blade 66. A plunger 67 slidably mounted in the housing on one side of blade 66 is capable when pressed inwardly of moving the blade from contact with electrode 64 to contact with electrode 65. A compression spring 68 on the opposite side of the blade 66 is guided in a tube 69 fixed to the housing 63. A sliding hollow button 70 receives the left end of spring 68, see Fig. 6, while the right end of the spring is adapted for engagement with the blade 66. When the blade engages electrode 65 the hollow button 70 will be in its outermost position, or to the left, Fig. 6, and the spring 68 will not tend to move the blade 66, but when the button 70 is moved toward the housing 63 it will act through spring 68 to move the blade 66 back into engagement with electrode 64.

A thin sheet metal bracket 71 having side walls 72 joined by a rear wall 73 is held in fixed position by the screws 60. A switch lever 74 is pivoted on a pin 75 on the bracket and has loosely mounted thereon a stud 76 having at its right end, Fig. 6, a head 77 to engage the rear wall 73 to limit movement of the stud to the left, and has at its left end a second head 78 which receives the thrust of a compression spring 79 interposed between the head 78 and the arm 74. A wire spring 80 surrounding the pivot pin 75 has a part 81 thereof engaging the casing and has another part 82 thereof engaging the arm 74 to hold the latter normally yieldingly in rear position, to the right Fig. 1, so that a roll 83 on lever 74 will normally be spaced from the forward lower curved edge of the lever 21. When the lever 74 is in its normal position head 78 will be spaced from the plunger 67, but when lever 21 is given a full rocking motion by the dagger it will engage the roll 83 and move arm 74 to the left, Fig. 6, causing engagement of the head 78 with the plunger 67 to exert a force on the latter tending to move the blade 66 from engagement with electrode 64 into engagement with electrode 65.

Yoke 34 has secured thereto an arm 85 to the lower end of which is secured a finger 86 the rear end of which is adapted for engagement with the hollow button 70. When the brake handle 30 is pulled forwardly to take the brake off the finger 86 will engage the button 70 and cause the spring 68 to move the blade 66 against electrode 64. This will be the normal position of the parts 86, 70, 68, 66 and 64 during loom running, and the plunger 67 will be in its right hand position, Fig. 6, but spaced from head 78. When the knockoff lever 21 receives a full motion from the dagger it will act mechanically to move the brake handle to the stopping position, thereby moving the finger 86 away from the button 70 so that engagement of head 78 with the plunger 67 can move the latter to the left and move the blade 66 against electrode 65. The blade 66 and plunger 67 are therefore acted upon by the two springs 68 and 79 both of which can yield when required to do so. Should lever 74 be moved to its left hand position, Fig. 6, before finger 86 has relieved pressure on spring 68, the latter will overpower spring 79 and move stud 76 rearwardly with respect to lever 74, but as soon as finger 86 moves forwardly spring 79 will be free to act. Spring 68 is stronger than spring 79, and has some lost motion between button 70 and blade 66.

A secondary switch B is secured at 90 to the support 15 and has an operating arm 91 to engage a plate 92 held to lever 21 by screws 93 and 94. The latter screw passes through a slot 95 in plate 92 to permit the angle of the latter to be adjusted with respect to lever 21. Switch B has two electrodes 96 and 97 which are normally electrically disconnected when lever 21 is in its normal position. This effect is accomplished by having the roll 98 of the switch arm 91 in engagement with the top surface of the plate 92 to keep the contacts 96 and 97 separated when the lever 21 is in normal position. If, however, lever 21 has a slight motion in a counter-clockwise direction as viewed in Fig. 1 the plate 92 moves down and permits arm 91 to establish electric connection of the contacts 96 and 97.

In addition to the electric equipment already described the loom is also supplied with relays R1 and R2, see Fig. 5, suitably mounted on the loom frame but not structurally shown in Figs. 1 and 2. These relays will be described in connection with the electric circuit shown in Fig. 5. The loom also has two signal lamps G and Y which here are assumed to be green and yellow, and has also a manually operated reset switch RS and a shipper switch SS which is closed during loom operation but opens when the loom stops. These parts are shown diagrammatically in Fig. 5 but not structurally in the drawings.

In operation of the loom it may be assumed that the knockoff lever 21 will be against the stop 26, switch B will be open, blade 66 will be against contact 64, both the relays R1 and R2 and solenoid 52 will be normally deenergized, and switch SS closed. The brake handle will also be in its off position, that is, to the left as viewed in Fig. 1 so that arm 36 is close to lug 22 and collar 45 is close to the lower end of arm 40, and the lamps G and Y will not be illuminated.

Assuming that the weft thread has broken beyond the fork so that the dagger is only slightly below its normal non-stopping position it will give the knock-off lever 21 only a small angular motion to a first position shown in full lines, Fig. 4, as the lay advances and cause closure of switch B but not opening of switch A. The dagger will then snap up away from lever 21 and the latter will return to its normal position shown in dotted lines. When switch B is closed current will flow from the ground, see Fig. 5, through electrodes 96 and 97, wire 100, relay R1, wire 101, normally closed reset switch RS, wire 102, through the secondary winding 103 of transformer T and back to the ground by wire 104. Closure of this circuit energizes the relay R1 the effect

of which is to close the following holding circuit: ground, switch blade **66**, electrode **64**, wire **105**, contact **106**, switch blade **107** of relay R1, wire **108**, wire **100**, relay R1, switch RS, and through the transformer winding **103** back to the ground. Engagement of the blade **107** with the contact **106** maintains energization of the relay R1 so long as switch A remains in the normal position shown in full lines in Fig. 5, even though switch B opens when lever **21** returns to the dotted line position, Fig. 4.

Energization of relay R1 also has other effects, one of which is to complete a signal circuit through the green lamp G as follows: ground, wire **110**, contact **111**, relay blade **112**, contact **113**, wire **114**, lamp G, wire **115**, switch RS, and transformer winding **103** back to the ground. The green lamp is thus illuminated whenever the relay R1 is energized.

A still further effect of the energization of the relay R1 is to establish the following signal circuit through the yellow lamp Y; ground, wire **110**, contact **111**, blade **112**, wire **120**, lamp Y, wire **121** to wire **102** and thence through a transformer winding back to the ground.

Another effect of energization of the relay R1 is closure of the following solenoid relay circuit for relay R2; ground, wire **110**, contact **111**, blade **112**, wire **116**, relay R2, wire **117**, loom controlled normally closed switch SS and wire **102** through the transformer secondary winding back to the ground. This circuit will remain closed until the brake handle moves to its "on" position incident to loom stoppage and opens switch SS. The circuit through relay R2 is dependent upon continued energization of relay R1, since blade **112** will move away from contact **111** as soon as relay R1 is deenergized.

It will thus be seen that incident to energization of relay R1 due to closure of switch B both lamps G and Y will be illuminated and relay R2 will be energized.

The effect of the energization of the relay R2 is to close the following solenoid circuit: ground, wires **104** and **122**, contact **123**, blade **124** of the relay R2, wire **125**, solenoid **52**, wire **126** back to wire **102** and thence through winding **103** to the ground. Energization of the solenoid lifts link **48** into the path of lever **46** and completes the first stage of operation of the mechanism K and this will ordinarily occur before the primary stopping means can act. In the second stage of operation of mechanism K lever **46** will move arm **40** to stop the loom at some later time in the operation of the loom, ordinarily after the primary stopping means could act, with resultant opening of the switch SS, whereupon the relay R2 and the solenoid become deenergized. The other circuits however remain closed so that lamps G and Y continue to be illuminated after the loom has stopped. After the weft break has been corrected the operator will push open reset switch RS, whereupon relay R1 becomes deenergized, and the holding circuit through contact **106** is opened, as are also the circuits through the lamps G and Y due to movement of blade **112** away from the contacts **111** and **113**. The circuits will thus be returned to their normal condition. It will be noted that the condition wherein only a slight motion of the lever **21** occurs is indicated by illumination of both of the lamps G and Y.

When the dagger gives lever **21** a full motion the lever moves through its first position to the second position which it can assume, see dotted lines, Fig. 5, and all of the circuits already traced will be momentarily closed due to closure of switch B as lever **21** passes through its first position, but as soon as lever **21** reaches its second position, lug **22** will engage arm **36** to move the brake handle to loom stopping position and lever **74** will be swung to the left, Fig. 6, due to engagement of roll **83** by lever **21**. The blade **66** will thereupon be moved away from electrode **64** and against electrode **65**, see dotted lines, Fig. 5. As soon as switch A is acted on by the lever **21** the holding circuit for the relay R1 will be opened and the circuits closed incident to energization of relay R1 will be open, thus putting out both lamps and canceling or nullifying stopping of the loom by the mechanism K which had been initiated by closure of switch B. When blade **66** engages electrode **65** the following second signal circuit for the green lamp will be closed: ground, blade **66**, electrode **65**, wire **130**, lamp G, wire **115**, switch RS, wire **102** and through

winding **103** back to the ground. This results in illumination of lamp G alone and thus indicates that the loom has been stopped mechanically due to a full motion of the knock-off lever **21**. After the broken filling has been repaired the brake handle will be pulled forwardly to its running position the effect of which is to cause finger **86** and spring **68** to snap the blade **66** away from electrode **65**, thus extinguishing lamp G and returning switch A to its normal position. Under this last named condition it will not be necessary to open the reset switch RS to extinguish lamp G.

From the foregoing it will be seen that the knock-off lever **21** can have two degrees of movement to one or the other of two positions shown in full lines in Fig. 4 and in dotted lines, Fig. 5 and can effect loom stoppage by reaching either of these positions. When the first position is reached the first stage of operation of mechanism K occurs, but if the knock-off lever has a large motion and reaches its second position it nullifies the first stage and prevents the second stage of operation of mechanism K and substitutes a prompt and direct stoppage through arm **36**. It will further be seen that a very slight rocking movement of the knock-off lever **21** to some such position as that shown in full lines, Fig. 4, which heretofore would have been insufficient to cause loom stoppage, will by the use of the present invention cause loom stoppage through the secondary stopping mechanism due to closure of switch B. The knock-off lever **21** can cause either prompt stopping by direct mechanical engagement with arm **36**, or cause delayed stoppage by the mechanism K in the event that the lever has only a small motion. Furthermore, when both lamps G and Y are illuminated they indicate that a long broken thread extends under the fork and that reset switch RS must be opened, but when lamp G only is illuminated it indicates that the broken weft does not reach the well and that reset switch RS need not be opened. The handle **30** and parts moving with it may be considered to be loom controlling means movable either to running or stopping position.

Having now particularly described and ascertained the nature of the invention and in what manner the same is to be performed, what is claimed is:

1. In a weft stop motion for a loom having primary and secondary stopping means, the primary means when actuated acting at a given time in the loom cycle to effect prompt loom stoppage and the secondary means when actuated having two stages of operation both of which must be completed in order to effect loom stoppage, the first stage occurring before said given time and the second stage occurring after said given time, an actuator which upon weft breakage may have either a small motion to one position and be incapable of actuating the primary stopping means or a larger motion in which the actuator passes through said one position to a second position and is effective to actuate the primary stopping means at said given time, and control means for the secondary means effective whenever the actuator reaches said one position to cause said secondary means to have said first stage of operation thereof, said control means tending to continue control of said secondary means after said given time to effect said second stage of operation, and said actuator if reaching said second position thereof preventing the continued control of said control means over said secondary means after said given time to prevent the secondary means from having the second stage of operation thereof.

2. In a weft stop motion for a loom having primary and secondary stopping means, the primary means when actuated at a given time in the loom cycle effecting prompt loom stoppage and the secondary means when actuated having two stages of operation the first of which occurs before and the second of which occurs after said given time, an actuator which upon weft breakage may have either of two degrees of motion, the actuator when having a small motion moving to one position and being incapable of actuating the primary stopping means and the actuator when having a larger motion moving through said one position to a second position and being effective to actuate the primary stopping means at said given means, an electric switch the condition of which with respect to closure thereof is changed by the actuator whenever the latter reaches said one position, electric circuit means including a relay effective due to a change in the condition of said switch to energize said relay,

means controlled by the relay effective when the latter is energized to cause said secondary stopping means to have the first stage of operation thereof, the second stage of operation of the secondary stopping means being dependent upon continued energization of the relay after said given time, and a second switch the condition of which with respect to closure is changed by the actuator when the latter reaches said second position thereof, the second switch controlling said circuit means and opening the latter when the condition thereof is changed by the actuator to cause deenergization of said relay at said given time to prevent the second stage of operation of said secondary stopping means.

3. In a weft stop motion for a loom having primary and secondary stopping means, the primary means when actuated at a given time in the loom cycle effecting prompt loom stoppage and the secondary means when actuated acting in two stages of operation the first of which occurs before and the second of which occurs after said given time, a lever which upon weft breakage may have either a small or a large motion, the lever when having a small motion moving to one position and being incapable of actuating the primary stopping means and the lever when having a large motion moving through said one position to a second position and being effective to actuate the primary stopping means at said given means, a normally open electric switch which is closed whenever the lever reaches said one position, electric circuit means including a switch normally closed with respect thereto closed whenever said normally open switch is closed and causing said secondary means to have the first stage of operation thereof, said electric circuit means including a relay which is energized when said electric circuit means is closed and the second stage of operation of the secondary means being dependent upon energization of said relay after said given time, and the lever whenever reaching said second position thereof causing opening of said normally closed switch to effect deenergization of said relay at said given time to prevent the second stage of operation of said secondary means.

4. In a weft stop motion for a loom having loom controlling means which is in running position when the loom is in operation and is moved to stopping position when the loom is to be stopped, a lever for the controlling means which upon weft breakage will have either a small motion which is incapable of moving the controlling means from running to stopping position or a large motion which is effective at a given time in the cycle of the loom to move the controlling means to stopping position, stopping means effective when the lever has either a small or large motion to have a first stage of operation prior to said given time to be followed normally by a second stage of operation after said given time, the stopping means being effective to move the controlling means to stopping position only when having both of said stages of operations thereof, and means effective when the lever has said large motion only to prevent the stopping means from having said second stage of operation thereof.

5. In a weft stop motion for a loom having loom controlling means which is in running position when the loom is in operation and is given a movement to stopping position when the loom is to be stopped, primary stopping means for the controlling means, a lever which upon occurrence of weft breakage can have either of two degrees of motion, the lever when having the lesser motion moving to one position but being incapable of operating the primary stopping means and the lever when having the greater motion moving through said one position to a second position and moving the controlling means to the stopping position thereof at a given time in the loom cycle, secondary stopping means effective whenever the lever reaches said one position thereof to initiate movement of said controlling means to stopping position prior to said given time and tending to complete said movement to stopping position at a time subsequent to said given time, and preventing means effective if the lever reaches said second position thereof to prevent the secondary means from completing said movement of the controlling means to stopping position.

6. The weft stop motion set forth in claim 5 wherein the secondary stopping means includes a solenoid which is energized when the lever reaches said one position and includes also a regularly moving lever having a working stroke after said given time effective if the solenoid is energized to complete said movement of the controlling means, and the preventing means effects deenergization of the solenoid prior to said working stroke.

7. The weft stop motion set forth in claim 5 wherein the secondary stopping means is controlled by electric means including a relay and a holding circuit therefor which is closed prior to said given time and must be kept closed after said given time to enable the secondary means to complete said movement of the loom controlling means to stopping position, and the lever when reaching said second position thereof effects opening of the holding circuit at said given time.

8. The weft stop motion set forth in claim 7 wherein electric signal circuit means are provided to illuminate two signal lamps when said holding circuit is closed and said electric signal circuit means become ineffective to illuminate either of said lamps when said holding circuit is opened, and additional electric signal circuit means is closed by said lever to reilluminate one only of said lamps when the lever reaches said second position thereof.

9. In a signal system for a loom having two stopping means therefor one of which acts to stop the loom if the broken weft is in non-supporting position relative to the weft fork and the other one of which acts to stop the loom if the broken weft is under the weft fork, two differently colored electric signal lamps, electric circuit means controlled by one of said stopping means effective when the latter stops the loom to illuminate one only of said lamps, and other electric circuit means controlled by the other stopping means effective when the latter stops the loom to illuminate both of said lamps.

10 In a signal system for a loom having two stopping means therefor one of which acts to effect prompt loom stoppage if the broken weft is in non-supporting position with respect to the weft fork and the other one of which acts to effect delayed stoppage if the broken weft is under the weft fork, two differently colored electric signal lamps, electric circuit means controlled by the stopping means which effects prompt loom stoppage effective to illuminate one only of said lamps if the loom is stopped promptly and other electric circuit means controlled by the stopping means which effects delayed stoppage effective to illuminate both of said lamps if the loom is stopped by the means which effects delayed stoppage.

11. In a signal system for a loom having two stopping means therefor one of which acts to stop the loom if the weft fork is unsupported by the broken weft and is able to complete its motion into the well on the lay and the other one of which acts to stop the loom if the broken weft is under the fork and permits the fork to descend only part way into the well, two electric circuit means, one closed when one of said stopping means operates and the other closed when the other stopping means operates, and two differently colored electric signal lamps, closure of one of said electric circuit means effecting illumination of one only of said electric lamps and closure of the other electric circuit means effecting illumination of both of said lamps.

12. In a signal system for a loom having two stopping means one of which acts to stop the loom if the broken weft is in non-supporting position with respect to the weft fork and the other of which acts to stop the loom if the broken weft is under the weft fork, two electric signal lamps, electric circuit means closed by one of said stopping means when the latter stops the loom to effect illumination of one only of said lamps, and other electric circuit means closed incident to operation of the other stopping means to stop the loom to effect illumination of the other lamp.

13. In a signal system for a loom having two different stopping means controlled by a lever which under one condition of weft breakage has a small motion and under another condition of weft breakage has a large motion, the lever when having a small motion effective to cause one of said stopping means to stop the loom and when having a large motion effective to cause the other stopping means to stop the loom, two differently colored electric signal lamps, electric circuit means closed when one of said stopping means stops the loom and including both of said lamps, and other electric circuit means closed incident to stoppage by the other stopping means and including one only of said lamps.

No references cited.