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W. R. HEWTON
STOP MOTION FOR LOOMS

1,975,747

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3 Sheets-Sheet 1

Fig. 1.

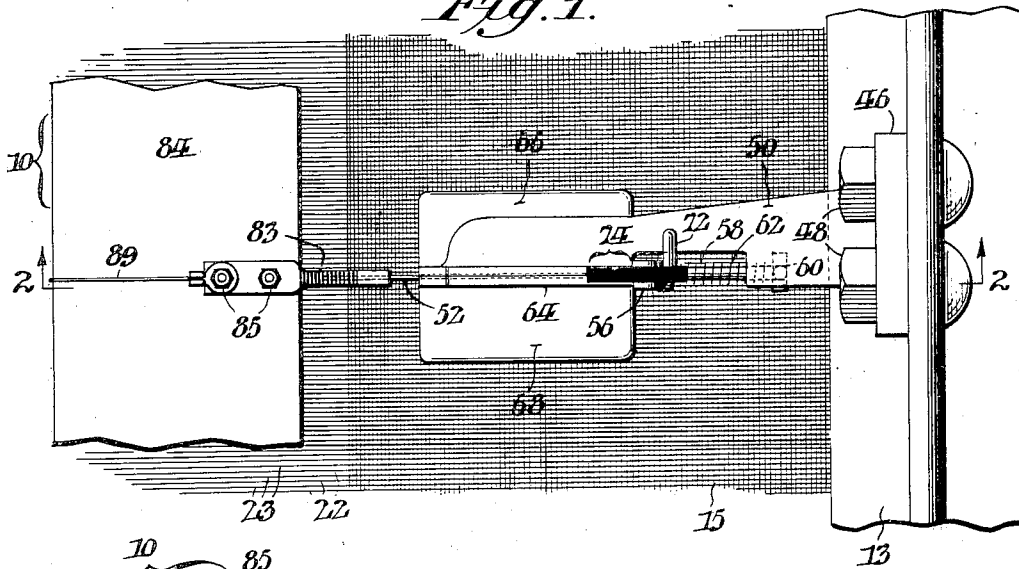
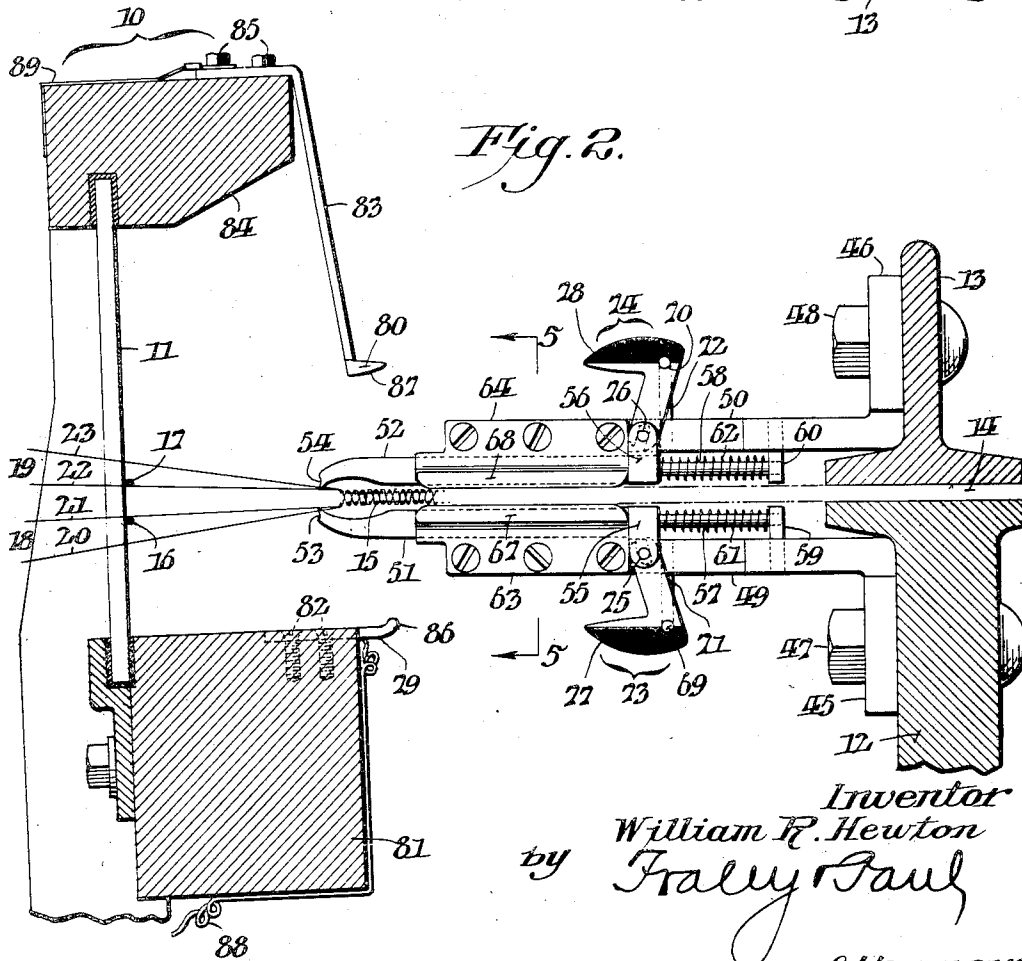


Fig. 2.



Inventor
William R. Hewton
by *Tracy Paul*
Attorneys.

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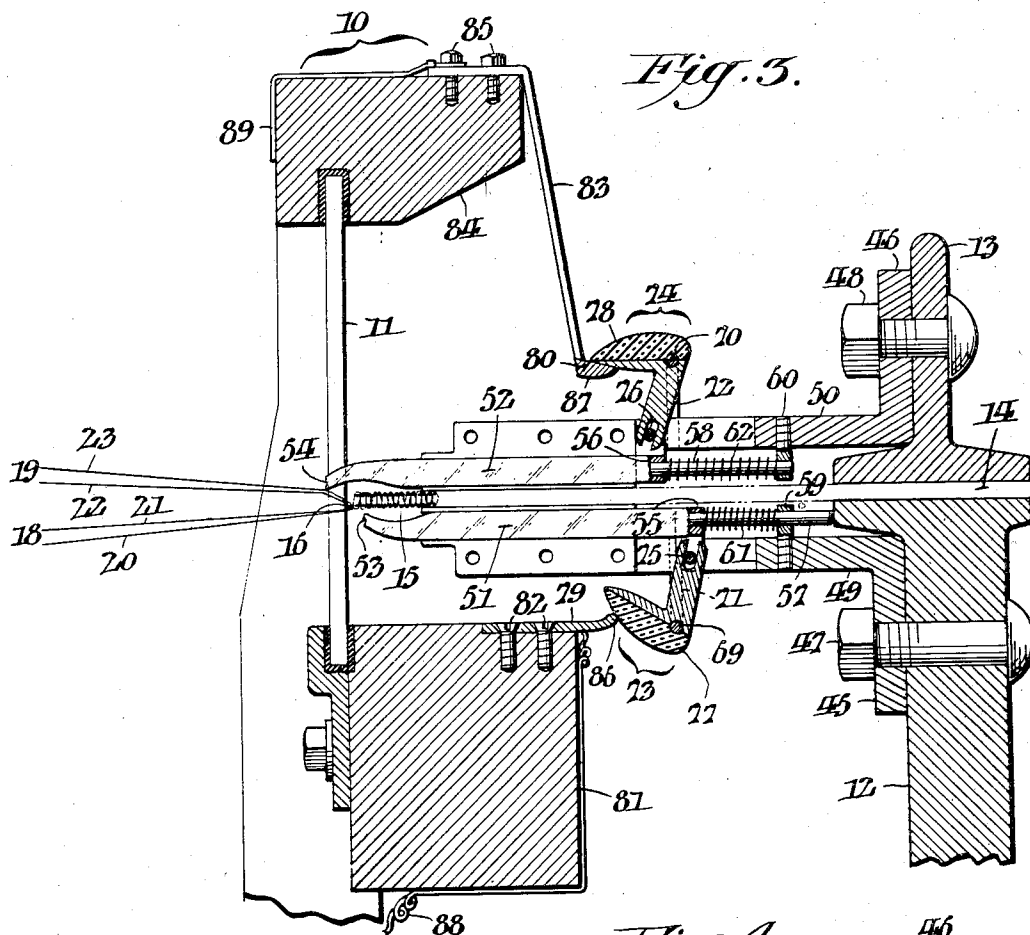
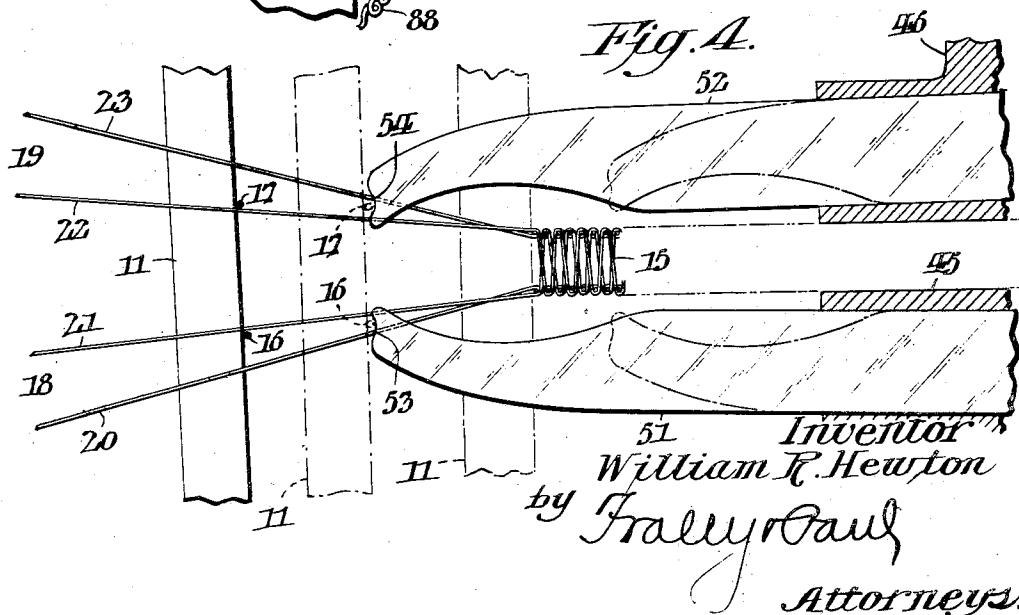
W. R. HEWTON

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3 Sheets-Sheet 2



Inventor
William R. Hewton
by Trally & Paul
Attorneys.

UNITED STATES PATENT OFFICE

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STOP MOTION FOR LOOMS

William R. Hewton, Philadelphia, Pa., assignor
to Collins & Aikman Corporation, Philadelphia,
Pa., a corporation of Delaware

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10 Claims. (Cl. 139—370)

This invention relates to stop motions for looms; and it has reference more particularly to "center" weft stop motions intended for use in connection with multi-shed looms operating on the double plush principle to simultaneously produce two fabrics which are connected through interlacing of the pile warps forming the faces of the respective fabric layers.

Various forms of weft detectors have been devised heretofore for single shed looms, as well as for double shed looms of the kind above referred to, but these have been unsatisfactory for various reasons, more especially in that they were capable of functioning only during alternate beats of the loom lay, and in that they were complicated and liable to easy derangement and therefore not always dependable in their operation as a means to effect immediate stoppage of the looms upon failure or absence of the wefts, with consequent formation of imperfect fabrics. The foregoing is particularly true of the usual types of stop motions in which a fork and grid detector is used near the shuttle boxes where the weft is slack and unsupported by the reed of the loom lay.

My invention is directed toward overcoming the above mentioned drawbacks, which objective I realize as hereinafter fully disclosed, through provision of a simple and efficient weft stop motion including a highly sensitive detecting means with horizontally-slidable yielding feelers adapted, during each beat stroke of the loom lay, to penetrate the individual sheds formed between the ground warps of the two fabric layers and to engage the wefts concurrently shot through the sheds at a region where they are backed by the lay reeds so that the detection is always positive,—and further including contact means actuated by the feelers and normally operative to withdraw said feelers immediately upon weft detection to relieve the weft of strain as it is beaten into the fabric, but serving as a consequence of non-actuation by the feelers through failure or omission of one of the wefts to close an electric circuit controlling the stop mechanism of the loom thereby to bring the loom instantaneously to a stand still.

Fig. 1 of the attached drawings is a fragmentary view showing, in plan, a portion of a multiple shed loom fitted with my improved stop motion.

Fig. 2 is a fragmentary sectional view longitudinally of the loom taken as indicated by the arrows 2—2 in Fig. 1.

Fig. 3 is a view corresponding to Fig. 2 showing the lay of the loom advancing on a beat stroke.

Fig. 4 is a fragmentary longitudinal detail sectional view on a larger scale showing a portion

of the detector mechanism of my improved stop motion.

Fig. 5 is a detail sectional view taken as indicated by the arrows 5—5 in Fig. 2.

Fig. 6 is a perspective view of one of the feelers embodied in the detector mechanism.

Fig. 7 is a fragmentary plan view of the loom drawn to a smaller scale than the others and showing the electric connections between the weft detector mechanism and the stop mechanism of the loom; and

Fig. 8 is a fragmentary detail sectional view taken as indicated by the arrows 8—8 in Fig. 7.

The double-shed loom delineated in part in Figs. 1, 2, 3, 7 and 8 of these illustrations is of standard construction, its lay being indicated at 10, the reeds of the lay at 11 and the breast beam at 12. A supplementing top rail 13 in the present instance provides in conjunction with the breast beam a narrow interval 14 through which the woven fabric 15 passes enroute to the take-up roller, not shown. At 16, 17 I have indicated the wefts which are shot by the shuttles not shown across the two sheds 18, 19 concurrently formed between the warps 20, 21 and 22, 23 respectively of the two layers of the fabric 15. The loom stopping mechanism is generally indicated by the numeral 25 in Figs. 7 and 8, and, as shown, includes a flexible starting handle 26 which is fulcrumed at 27 to a bracket 28 reaching outward from the frame 29 of the loom, and which, when in "on" position, engages the shoulder 30 of a slot 31 in a guide bar 32 on the loom frame. The starting handle 26 is subject to the pull of a spring 33 which tends to swing it to "off" position when released from the shoulder 30 of the slot 31 in the guide bar 32. A link 34 connects the starting handle 26 with the operating crank 35 of an electric switch 36 which is in circuit with the motor (not shown) for driving the loom. Fulcrumed to swing horizontally on a fixed stud 37 upstanding from the guide bar 32 is a lever 38 which engages the rear of the starting handle 26 and which is pressed inward by a leaf spring 39 as far as permitted by a yoked limiting stop 40. A swivel clevis 41 at the swinging end of the lever 38 affords fulcrum support to a horizontal lever 42 whereof one arm 43 is adapted to be struck by a tappet projection 44 on the lay of the loom as later on explained. All other parts of the loom have been purposely omitted from the drawings since they are not in any way concerned with my invention.

The improved means which I have devised for automatically actuating the stop mechanism of a double shed loom, such as briefly described up to this point, for the purpose of bringing the loom to an immediate standstill in the event of absence or failure of either or both weft shots, comprises a pair of vertically aligned brackets 45, 120

46 which are respectively secured to the breast beam 12 and the top rail 13 of the latter by screw bolts 47, 48. Supported for longitudinal sliding movement in the forwardly-projecting horizontal extremities 49, 50 of the brackets 45, 46 immediately below and above the fabric 15 are finger-like detectors or feelers 51, 52 whereof one is illustrated in perspective in Fig. 6. As shown, these feelers 51, 52 are fashioned from thin sheet metal for capacity to enter a dent in the reed 11 of the lay 10 as in Fig. 3, and have their forward ends curved upwardly and downwardly respectively toward the fabric 14 and notched as at 53, 54. During the initial portion of the beat stroke of the lay 10, the feeler fingers 51, 52 penetrate the two sheds 18, 19 as in Fig. 4 in readiness to be engaged by the weft shots 16, 17. Extending rearwardly from lugs 55, 56 secured to the aft ends of the feelers 51, 52 are slide rods 57, 58 having guidance in apertured screw studs 59, 60 which project upwardly and downwardly respectively from the horizontal extremities 49, 50 of the brackets 45, 46. Light helical springs 61, 62 in compression between the lugs 55, 56 and the screw studs 59, 60 serve to yieldingly maintain the feelers 51, 52 in their advanced positions as in Figs. 2 and 4 with said lugs abutting the ends of keeper plates 63, 64 which are screw-attached to the forward ends of the bracket extremities 49, 50. Wings 65, 66 projecting laterally to one side of the bracket extremities 49, 50 and similar wings 67, 68 projecting from the keeper plates 63, 64 jointly constitute an auxiliary guide for the fabric in line with the guide passage 14 in the breast beam of the loom. Fulcrumed to swing about axes 69, 70 provided for them by supports 71, 72 of stout wire on the horizontal bracket extremities 49, 50 are bell-crank-like contact elements 73, 74. As shown in Figs. 2 and 3, the vertical extremities of these swinging contact elements 73, 74 are bifurcated at their ends and engage pins 75, 76 extending crosswise between ears of the lugs 55, 56 on the feelers 51, 52. The horizontal arms of the contact elements 73, 74 are faced on one side with insulation as conventionally indicated at 77, 78 in Figs. 2 and 3, and said arms are curved top and bottom for camming action respectively with opposing contact members 79, 80 carried by the lay 10. The contact member 79, it will be noted, is in the form of a plate which is recessed into the top face of the cross beam 81 of the lay 10 and secured to the latter by screws 82. The contact member 80 on the other hand, is in the form of a tapered forward projection of a metallic tongue 83 which depends from the top rail 84 of the lay 10, and which is secured by screws 85. As shown in Figs. 2 and 3 the projecting end of the contact plate 79 is curved upwardly as at 86 to facilitate camming with the swinging contact member 73 associated with the feeler 51 and the contact member 80 rounded as at 87 to cooperate in a like manner with the swinging contact member 74. Referring to Figs. 7 and 8, the swinging contact elements 73, 74 and the opposing contact members 79, 80 are connected by conductors 88, 89 in an electric circuit in which there is interposed a source of current 90 and a vertically positioned solenoid 91 whereof the armature 92 is coupled with the extremity 93 of the lever 42 hereinbefore described in connection with the stop mechanism 25. It is to be observed here that the arm 43 of the lever 42 is weighted to counterbalance the solenoid armature 92 so that these parts are normally maintained in the illustrated positions.

The operation of my improved stop motion is as follows:

Incident to the beat stroke of the lay 10, the previously laid weft shots 16, 17 are carried forward from the full line to the dotted line positions in Fig. 4 and thereby caused to encounter the notched ends 53, 54 of the feeler fingers 51, 52 which at this time respectively penetrate the sheds 18, 19. As a consequence, the feeler fingers 51, 52 are pushed rearward in opposition to the springs 61, 62 causing the elements 73, 74 to swing about their fulcrums 69, 70 so that the insulate facings 77, 78 are positioned in readiness for engagement by the opposing contact members 79, 80 on the lay 10. Upon such engagement (as instanced with reference to the element 73 in Fig. 3) the feeler fingers 51, 52 are quickly retracted from the wefts 16, 17 to relieve strain on the latter and to permit them to be beaten up into the fabric 14 by the reed 11 as the lay completes its beat stroke as shown in dot and dash lines in Fig. 4. However, in the absence or failure of one of the weft shots, for example as in Fig. 3, the corresponding feeler finger 52 is not actuated as a consequence of which the swinging contact element 74 is left undisturbed so that as the beat stroke of the lay continues, the contact member 80 engages the metallic portion of said element to close the circuit through the conductors 88, 89. With attendant energization of the solenoid 91, the lever 42 of the stop mechanism is swung clockwise and its weighted end 43 thereby raised into the path of the tappet projection 44 on the lay. By the ensuing engagement of the tappet 44 with the lever 42, the arm 38 is swung forward on its fulcrum 37 thereby dislodging the starting handle 26 from the shoulder 30 in the slot 31 of the bar 32, whereupon the spring 33 acts to draw said handle leftward in Fig. 8 to off position, thereby causing opening of the motor switch 36 and instant stoppage of the loom.

It is to be understood that I do not consider myself limited to the precise details of construction herein disclosed by way of example since these may be extensively varied without departing from the spirit of my invention as defined in the appended claims.

Having thus described my invention, I claim:

1. A weft stop motion for looms comprising a detector with a feeler adapted to engage the weft and to be thereby moved during the beat stroke of the lay of the loom; a normally open electric circuit; loom stopping means controlled by the circuit; a member on the lay of the loom constituting one contact in the circuit; an element operatively connected to the feeler and constituting an opposing contact in the circuit, said element having a metallic face and an insulate face, whereby, upon actuation of the detector finger by the weft, the aforesaid element is moved to present its insulate face for engagement by the opposing contact member on the lay and as a result effects withdrawal of the feeler, after weft detection, to permit beating up of the weft, and upon non-actuation of the finger and the element associated therewith through absence or failure of the weft, the metallic portion of said element is engaged by the contact member on the lay with attendant closure of the circuit and automatic stoppage of the loom.

2. A stop motion for looms comprising a detector in the form of a feeler finger adapted to engage the weft and be thereby moved during the beat stroke of the loom lay; a normally open

electric circuit controlling means for automatically stopping the loom; a member on the lay of the loom constituting one contact in the electric circuit; a pivoted element constituting another contact in the electric circuit, said element having a metallic face and an insulate face, whereby, upon actuation of the feeler finger by the weft, the said element is swung to present its insulate face for engagement by the contact member on the lay and as a result effects withdrawal of the finger, after weft detection to permit beating up of the weft, and upon non-actuation of the feeler finger through absence or failure of the weft, the metallic face of said element is engaged by the contact element on the lay with attendant closure of the electric circuit and automatic stoppage of the loom.

3. A weft stop motion for double-shed looms comprising detectors in the form of horizontally-slidable rearwardly yielding feeler fingers supported respectively above and below the double fabric being woven and penetrating the respective sheds for engagement and actuation by the wefts shot respectively through said sheds, a normally open electric circuit; loom stopping means controlled by the circuit; and contact members respectively associated with the feeler fingers and constituting opposing contact in the circuit, each such element having a metallic face and an insulate face, whereby upon actuation of either feeler finger by the weft, the corresponding element is moved to present its insulate face for engagement by the coordinated contact member on the lay, and, as a result, effects withdrawal of the finger after weft detection to permit beating up of the weft, and upon non-actuation of the finger and the element associated therewith through absence or failure of the weft, the metallic face of said element is engaged by the contact member on the lay with attendant closure of the circuit and automatic stoppage of the loom.

4. A weft stop motion for double shed looms comprising detectors in the form of horizontally slidable rearwardly yielding feeler fingers supported respectively above and below the double fabric being woven and normally penetrating respectively sheds for engagement and actuation by the wefts shot through said sheds; a normally open electric circuit controlling an automatic loom stop means; contact on the lay of the loom corresponding to the detectors on the lay of the loom connected in the electric circuit; and pivoted elements adapted to be respectively actuated by the feeler fingers and constituting opposing contacts in the circuit, said elements having metallic and insulate portions, whereby upon actuation of the corresponding feeler fingers by the wefts, the said elements are moved to present their insulate portions for engagement by the corresponding contact members on the lay and as a result effect withdrawal of the fingers after weft detection to permit beating up of the wefts, and upon actuation of the fingers and the associated element through absence or failure of the weft, the metallic portions of said elements are engaged by the corresponding contact members on the lay with attendant closure of the circuit and automatic stoppage of the loom.

5. A stop motion for looms comprising a flat blade-like detector finger of thin sheet metal within the shed confined to horizontal sliding movement, and formed with a weft engaging

notch in its forward end; means permitting rearward yielding of the finger when engaged by the weft on the beat strokes of the lay; and means automatically operative to stop the loom upon non-actuation of the feeler finger through absence or failure of the weft.

6. A stop motion for looms comprising a flat blade-like detector finger of thin sheet metal within the shed confined to horizontal sliding movement with capacity for penetrating a dent in the reed of the lay of the loom, said finger having a weft engaging notch in its forward end; means permitting rearward yielding of the finger when engaged by the weft on the beat strokes of the lay; and means automatically operative to stop the loom upon non-actuation of the finger through absence or failure of the weft.

7. A stop motion for looms comprising a flat blade-like detector finger of thin sheet metal within the shed confined to horizontal sliding movement and penetrating the reed on the lay of the loom, said finger being formed with a weft-engaging notch at its forward end; means permitting rearward yielding of the finger when engaged by the weft on the beat stroke of the lay; means for withdrawing the finger after weft detection to permit beating up of the weft; and means automatically operative to stop the loom upon non-actuation of the feeler finger through absence or failure of the weft.

8. A weft stop motion for looms comprising a flat blade-like detector finger of thin sheet metal within the shed confined to horizontal sliding movement and penetrating the reed on the lay of the loom, said finger being formed with a weft engaging notch in its forward end; means to permit rearward yielding of the finger when engaged by the weft on the beat strokes of the lay; an electric circuit with contact means closed upon non-actuation of the feeler finger through absence or failure of the weft; and means operated by closure of the circuit to automatically stop the loom.

9. A weft stop motion for multi-shed looms comprising flat blade-like detector fingers of thin sheet metal within the shed or the like arranged one above the other within the shed and confined to horizontal sliding movement, said fingers penetrating the reed on the lay of the loom and being provided at their forward ends with notches to engage the wefts respectively placed in the several sheds; means permitting independent rearward yielding of the fingers when engaged by the wefts on the beat strokes of the lay; and means automatically operative to stop the loom upon non-actuation of any one of the feeler fingers through absence or failure of the corresponding weft.

10. A weft stop motion for double-shed looms comprising a pair of flat blade-like detector fingers of thin sheet metal supported within the shed with capacity for independent horizontal sliding movement respectively above and below the double fabric being woven, said fingers penetrating the reed on the lay of the loom and having weft engaging notches in their forward ends; means permitting independent rearward yielding of fingers when engaged by the wefts on the beat strokes of the lay; and means automatically operative to stop the loom upon non-actuation of either of the fingers through absence or failure of the corresponding weft.

WILLIAM R. HEWTON.