

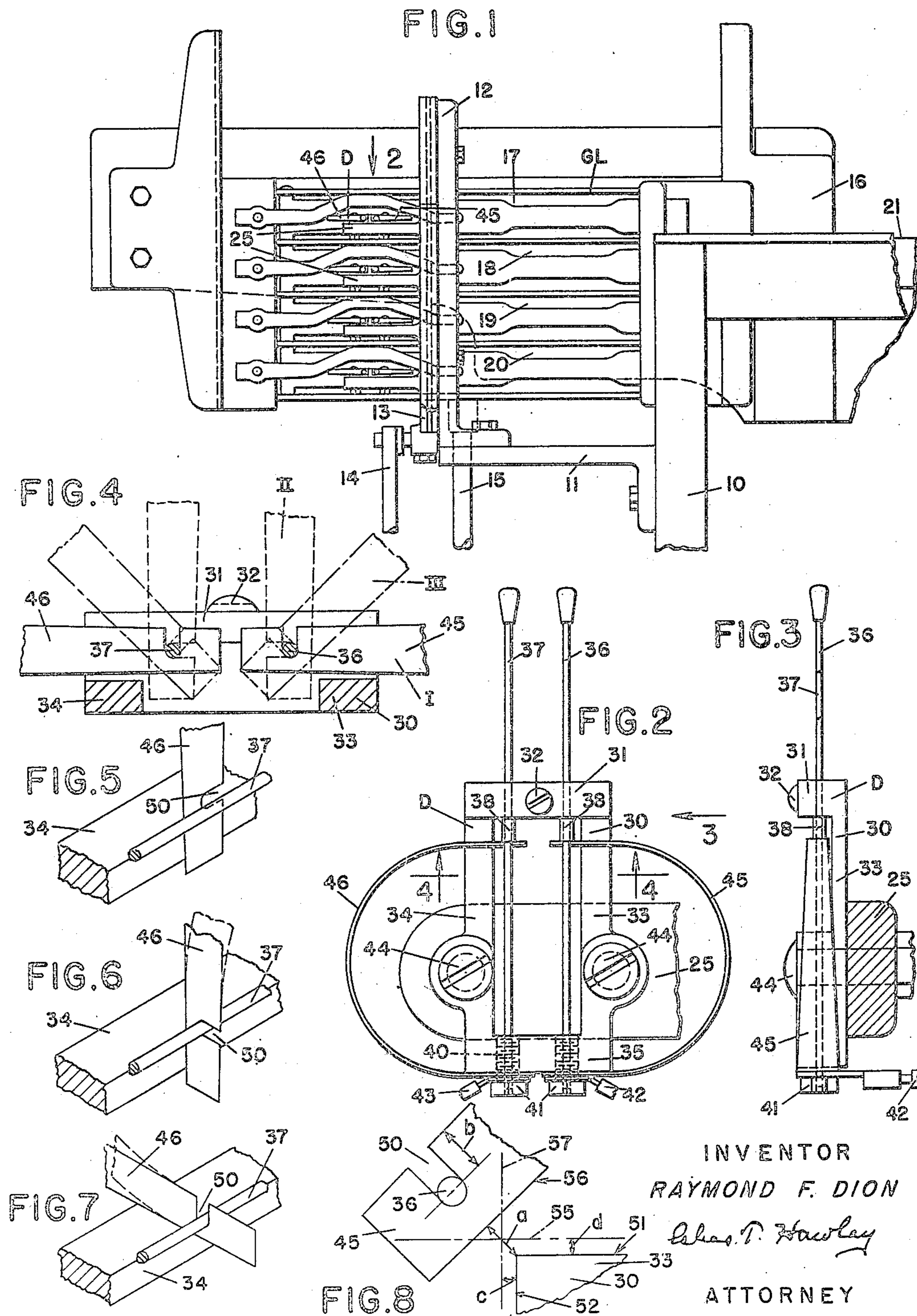
Oct. 25, 1949.

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2,486,009

ELECTRIC WEFT DETECTOR

Filed Dec. 4, 1948



UNITED STATES PATENT OFFICE

2,486,009

ELECTRIC WEFT DETECTOR

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Application December 4, 1948, Serial No. 63,590

6 Claims. (Cl. 139—273)

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This invention relates to improvements in electric weft detectors for looms and it is the general object of the invention to provide a detector which can be used either singly or in a group.

Electric weft detectors generally comprise a pair of sliding contact rods or fingers which are urged toward detecting position by some form of spring. In some instances bowed leaf springs are used, but they occupy considerable space. In multicolor weft replenishing looms the detector is usually located at the magazine or replenishing end of the loom, and because of adjacent parts of the loom it is customary to mount the feeler so that the springs will lie in vertical planes, extending either above or below the detector. When a gang of the electric weft detectors are used at the drop box end of the loom for the purpose of effecting either automatic weft replenishment or stoppage of the loom upon exhaustion of weft in any active shuttle the detectors are arranged vertically one over the other in such close order that there is no room for vertically arranged leaf springs.

It is an important object of the present invention to provide an electric weft detector employing leaf springs for the detector fingers or rods wherein the springs can either be vertical as is desirable where the detector is at the replenishing end of the loom, or horizontal when a gang of weft detectors are used at the drop box end of the loom.

In order that the springs may remain in operative relation with respect to the detecting rods or fingers but be readily removable it is a further object of the invention to provide those ends of the springs which have direct contact with the detector fingers with open slots so that in the event of damage to a spring it may be readily removed.

When open slots are used with the spring it is necessary to make some provision for maintaining operative relation with respect to the detector finger whether the spring be disposed vertically or horizontally. It is accordingly a further object of the invention to provide a feeler holder or case so constructed that the leaf springs can be either vertical or horizontal, but in either position will be held in correct operative relation with respect to the detector fingers due to the shape of the detector case.

With these and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts hereinafter described and set forth.

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In the accompanying drawings, wherein a convenient embodiment of the invention is set forth,

Fig. 1 shows a gang of drop boxes on a loom associated with a plurality of vertically arranged weft detectors, one for each shuttle box, the leaf springs being disposed horizontally,

Fig. 2 is an enlarged plan view looking in the direction of arrow 2, Fig. 1,

Fig. 3 is a view looking in the direction of arrow 3, Fig. 2, the support for the detector being shown in section,

Fig. 4 is an enlarged vertical section on line 4—4 of Fig. 2 showing the springs for the detector fingers in three different positions,

Figs. 5, 6 and 7 are diagrammatic views showing the manner in which operative relation is established between a weft detector finger and its spring, and

Fig. 8 is a diagrammatic view showing the relation between the weft detector case, a detector finger, and the spring therefor.

Referring more particularly to Fig. 1, the loom frame 10 has mounted thereon a horizontal support 11 to which is secured an upright guide 12. A vertically movable carrier 13 is mounted on the guide 12 for rising and falling motion which is imparted to it by a rod 14 connected preferably to the box lifter mechanism (not shown) which is connected to the box lifter rod 15.

A gang of shuttle boxes GL is mounted on the lay 16 and is adapted for vertical movement thereon by the box lifter rod 15 so that any one of the four shuttle boxes 17, 18, 19 and 20 can be aligned with the shuttle race 21 on the lay. The sliding carrier 13 is provided with a plurality of horizontally extending support feet 25 each of which has mounted thereon an electric weft detector unit designated herein generally at D. The general arrangement of the gang of electric weft detectors as shown in Fig. 1 may be similar to that set forth in Bushey Patent No. 1,873,109.

Each of the detector units shown in Fig. 1 will be the same and the description will be confined to but one of them. Each detector comprises a base or body 30 the rear end of which has a removable cap 31 held thereto by a screw 32. Right and left side walls 33 and 34, respectively, as shown more particularly in Fig. 2, are joined by a front wall 35. Detector fingers or rods 36 and 37 are slidably mounted on the detector base 30, and each finger has a collar 38 secured thereto for engagement with the cap 31.

Bearing metallic bushings 40 are threaded into the front wall 35 and serve as guides for the forward ends of the detector fingers 36 and 37.

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Each bearing bushing has a nut 41, one purpose of which is to establish electric connections with electric wires which run from the detector to electromagnetically operated controls for the loom. In Fig. 2 these wires are designated at 42 and 43. The base 30 and cap 31 are preferably made of electric insulating material, such as hard fiber or a plastic. Bolts or screws 44 serve to hold the base in fixed position on its supporting feet 25.

The matter thus far described, except for the form of the detector base 30, may be the same as that heretofore used.

The means for holding the detector fingers 36 and 37 normally in rearward detecting position comprise leaf springs designated herein at 45 and 46 which are provided, respectively, for the detector fingers 36 and 37. Each of these leaf springs is held against a bushing 40 by a nut 41, as is apparent from Figs. 2 and 3. The springs extend horizontally as shown more particularly in Fig. 1 and are bowed back toward their respective detector fingers and engage the collars 38. The springs tend to move the detector fingers rearwardly, but yield sufficiently to permit the fingers to slide forwardly during a weft detecting operation.

By reference to Fig. 1 it will be seen that the vertical distance between adjacent detectors D is so short that the springs 45 and 46 cannot be disposed vertically as would be desirable if the detector were used at the replenishing end of a multi-color weft replenishing loom. It is for this reason that the detector springs are disposed horizontally as shown in Fig. 1.

There will be times however when the electric weft detector will be used at the plain or replenishing end of a multi-color weft replenishing loom, in which event the springs will need to be disposed vertically because of other structures lying at the sides of the detector. It is an important feature of the present invention to form the case 30 and more particularly the side walls 33 and 34 in such relation with respect to the detector fingers 36 and 37 that the springs 45 and 46 may be either horizontal or vertical, or inclined, and be equally effective in any position to hold their respective detector fingers rearwardly in detecting position.

As shown more particularly in Fig. 8, wherein the relation between detector finger 36, spring 45, and the wall 33 of the case 30 are set forth diagrammatically, it will be seen that the spring is provided with a slot 50 opening laterally and of such form as to receive the detector finger or wire 36. The wall 33 has a top surface 51 and an inner vertical surface 52, the former surface being below and the latter surface being to the right of the detector finger 36. When the spring is horizontal as indicated by line 55, and slot 50 opens upwardly, the bottom edge 56 of the spring is spaced from the top surface 51 by a distance considerably less than the depth of the slot 50, and the spring can therefore not move out of operative relation with respect to the detector finger 36 and its shoulder 38. When the spring is moved to a vertical position as represented by line 57 with slot 50 opening in a direction away from wall 33 the edge 56 of the spring is close to the vertical side 52 of the wall 33 and in such position as to prevent the spring from becoming accidentally dislodged from the detector finger. In both the vertical and horizontal positions, therefore, the wall 33 permits free action of the spring

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45 but prevents it from losing operative relation with respect to its detector finger.

In certain forms of gang detector mechanisms such as shown in Fig. 1 it is desirable to have the detectors nearer their supporting slide structure 13 than is set forth in Fig. 1, in which event the springs will be disposed at an angle. The relation between the wall 33 and the detector finger 36 is such, however, that the distance a between edge 56 of the spring and the nearest part of the wall 33 will be less than the effective depth b of the slot 50. The spring will therefore be prevented from accidental displacement with respect to the finger 36 even if it be inclined. The space c between line 57 and vertical surface 52 of the detector, and the space d between horizontal line 55 and the top surface 51 of the wall will both be smaller than the space a , and all three of these spaces will be of less dimension than the distance b . The relations just described are true also for the other spring 46, finger 37, and wall 34.

Fig. 4 shows the three positions which the springs can assume, the full line position I being that assumed for gang feelers where there is ample room between the detectors and their guide 13, the dotted line position II being that assumed by the springs when the latter is used at the plain end of a weft replenishing loom, and the inclined position III indicating the disposition of the springs, or at least those springs at the right as viewed in Fig. 1, when it is desired that the detectors D be relatively close to their supporting guide 13.

Figs. 5, 6 and 7 indicate diagrammatically the procedure which may be followed in establishing operative connection between a spring and its detector finger. In these figures the left spring 46 is illustrated. Before the spring is attached at its forward end by means of one or the other of the nuts 41 it will be passed down between wall 34 and the detector finger 37 with its plane parallel to the latter until the slot 50 is opposite the detector finger 37, whereupon the spring is given a one-quarter turn from the position shown in Fig. 5 to that shown in Fig. 6. If the spring is to be disposed vertically it will then be bent forwardly and caught under its nut 41. If, on the other hand, the spring is to be disposed horizontally it will then be swung from the position shown in Fig. 6 to that shown in Fig. 7, and then caught under its nut 41. As a matter of fact the springs are sufficiently flexible so that their rear ends can attain the position shown in Fig. 5 even though their front ends are securely held by the nuts 41, and it will not be necessary in all instances to follow the procedure described in detail with respect to Figs. 5, 6 and 7.

If for any reason a spring should become deformed or lose its resilience it can be detached from its corresponding detector finger by procedures the reverse of that already described so that the spring will be moved for instance from the position of Fig. 6 to that of Fig. 5, after which the rear end of the spring can be lifted and the spring then removed by loosening its nut 41 for replacement of another similar spring.

The springs are preferably symmetrical about a longitudinal axis as indicated in Fig. 3, so that a single form of spring will suffice for both sides of the detector.

From the foregoing it will be seen that the invention sets forth a simple form of electric weft detector employing leaf springs for the detector fingers wherein the springs may be either horizontally or vertically disposed, and it will

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also be seen that the springs can be disposed obliquely or in an inclined position, such as that set forth in III, Fig. 4, where it is desired to have the detectors nearer their supporting slide 13 than is set forth in Fig. 1. It will be seen that in all positions of the spring it will be held against accidental dislodgment from its detector finger by the adjacent wall of the case or body 30. Furthermore, the fact that the spring has an open slot simplifies assembly and also removal of the broken spring, both of these operations being carried on while the detector fingers are applied to the base 30. The detector unit can be used either at the replenishing side of a loom where there is little available space at the sides of the detector, in which event the springs will be vertical, or it can be used in a gang in association with other similar detectors at the drop box end of the loom where the small distance between detectors prohibits the use of the spring in vertical position, in which event the springs will be disposed horizontally.

Having thus described the invention it will be seen that changes and modifications of the foregoing specific disclosure may be made without departing from the spirit and scope of the invention.

What is claimed as new is:

1. In an electric weft detector for looms, a base formed of electric insulating material, an electric detector rod slidable in said base, a wall forming part of said base having vertical and horizontal surfaces, and a leaf spring capable of being either vertically or horizontally disposed relatively to said base and held at one end thereof on the base and having a laterally opening slot near the other end thereof through which the rod extends, the slot being of such length as to contain the rod whether said other end of the leaf spring engages either one or the other of said surfaces of the wall.

2. In an electric weft detector for looms, a base formed of electric insulating material, an electric detector rod slidable in said base, a wall forming part of said base, and a leaf spring held at one end thereof to said base and having the other end thereof formed with a lateral slot receiving said rod and opening in a direction away from said wall, said slot being of such depth as to contain said rod when that part of said other end of the spring opposite to said slot engages said wall.

3. In an electric weft detector for a loom, a base formed of electric insulating material, an electric detector rod slidable on the base, a leaf spring held at the forward end thereof to said base and having a laterally opening slot which receives said rod near the other end thereof, and a wall on said base substantially parallel to said rod, on that side of the spring opposite to said slot, said wall arresting lateral motion of said other end of said spring relatively to said rod in

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a direction from the rod toward said wall while the rod is in said slot.

4. In an electric weft detector for a loom, a base formed of electric insulating material, an electric detector rod slidable on the base, a leaf spring held at the forward end thereof to said base and having a laterally opening slot which receives said rod near the other end thereof, means mounting said spring for angular adjustment relatively to said base around the axis of said rod, and a wall on said base on that side of said rod opposite to the open end of said slot effective in all angular positions of the spring relative to said base to arrest movement of said other end of the spring in a direction from the rod toward said wall while the rod is in the slot.

5. In a weft detector for use singly at the weft replenishing end of a loom or jointly with similar detectors in a vertically arranged gang of detectors adjacent to the drop boxes of a loom, a base formed of electric insulating material, a detector rod slidable on said base, a leaf spring for the rod, and means holding the spring either vertically or horizontally disposed relatively to the base, said spring having an open slot in one end thereof through which the rod passes, said base effective whether the spring is vertically or horizontally disposed relatively to the base to arrest movement of said one end of the spring in a direction laterally of said rod and opposite to the direction in which said slot opens while the rod is in said slot.

6. In a vertically arranged gang of electric weft detector units for the drop shuttle boxes of a loom, means supporting said units in vertically spaced relationship, a pair of electric detector rods for each unit, a bowed leaf spring for each rod, each spring extending for a distance from the corresponding rod greater than the height of unoccupied space between adjacent units, each spring having near one end thereof a laterally opening slot receiving the corresponding rod, means holding each spring to the associated unit in such angular position relatively thereto other than vertical as to avoid engagement with adjacent units, and means on each unit arresting lateral movement of said one end of a spring thereof relatively to the corresponding rod while the latter is in the slot corresponding thereto.

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