Dec. 23, 1947. R. F. DION 2,433,102

ELECTRIC WEFT DETECTOR

Filed March 18, 1946

FIG. 1

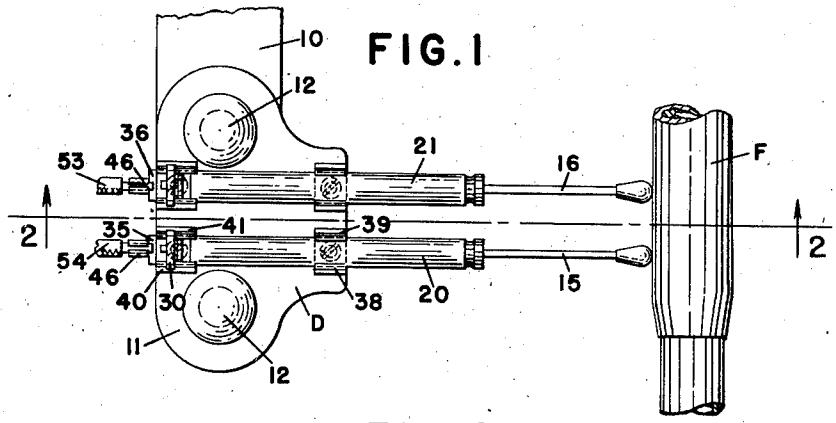


FIG. 2

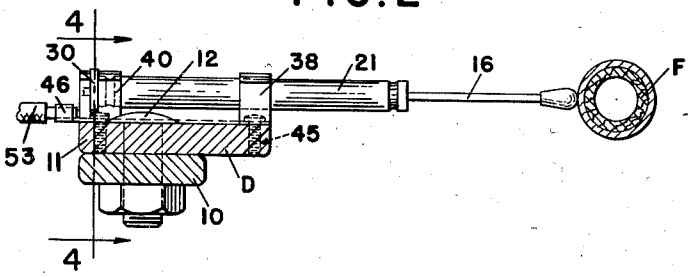


FIG. 3

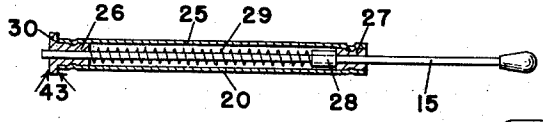
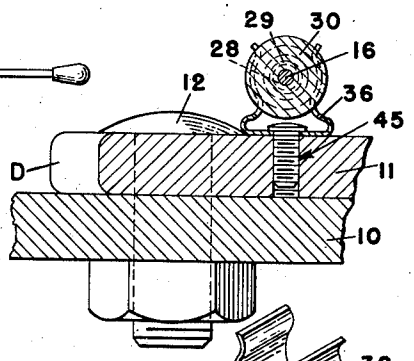


FIG. 4



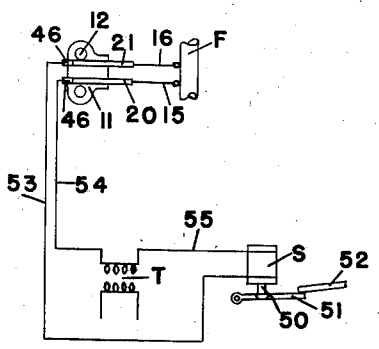
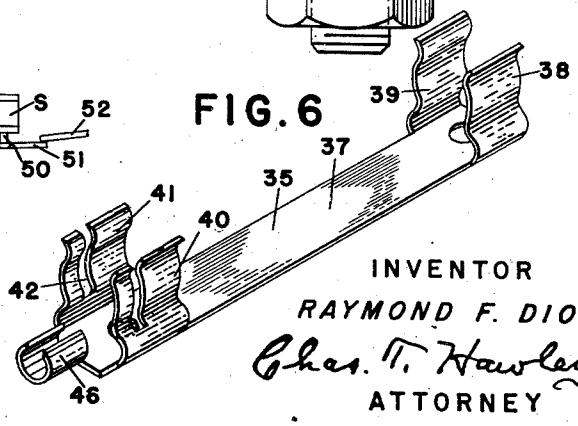


FIG. 5

FIG. 6



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ELECTRIC WEFT DETECTOR

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13 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 mechanism having individual detector units which can be readily removed for renewal in the event of damage or wear.

A type of electric weft detector which has gone into extensive use comprises a base made of insulating material in which are slidably mounted a pair of detector fingers in the form of wires. These wires are surrounded by light compression springs which hold them normally in rearward detecting position but yield when the bobbin engages the fingers. Detectors of this type cannot be readily repaired due to the manner in which the fingers are mounted.

It is an important object of my present invention to provide a detector unit comprising a tube within which a detector finger is mounted for sliding against the action of the spring contained within the tube. The tube has front and back bearings and together with the parts which it supports constitutes a complete unit which can be pressed manually into normal position between spring holders on a support or carrier. Two such units are arranged side by side and either can be removed from its spring holder without disturbing the other.

It is desirable that some means be provided to hold the detector unit against longitudinal motion in its spring holder and it is a further object of the invention to provide one of the bearings for the finger with a shoulder, flange or the like which will engage the spring holder and prevent the unit from moving longitudinally.

It is another object of the invention to mount the unit in such manner that it can spring or snap out of its holder if struck by the shuttle or other part of the loom.

It is a still further object of the invention to provide a loom with a detector circuit permanently connected to spring holders which support detector units removable from the holders without disturbing the connections between them and the circuit.

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

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

Fig. 1 is a plan view of a weft detector mechanism made according to my present invention,

Fig. 2 is a vertical section on line 2—2 of Fig. 1,

Fig. 3 is a longitudinal section through one of the units,

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Fig. 4 is a vertical section on line 4—4 of Fig. 2 on an enlarged scale showing the detector units and the resilient mountings therefor,

Fig. 5 is a diagrammatic view showing a detector loom controlling circuit, and

Fig. 6 is a perspective view of one of the spring holders.

Referring particularly to Figs. 1 and 2, I have shown a support 10 which will be mounted on the loom either in stationary position or so that it can be moved forwardly or to the left as viewed in Figs. 1 and 2 at the time of a replenishing operation of the loom. Mounted on this support is the detector designated generally at D and comprising a base 11 made of insulating material and having provision at the sides thereof for attachment by means of bolts 12 to the support 10. The loom operates with bobbins having metallic ferrules which are normally covered by weft but which are uncovered as weft exhaustion approaches. In Figs. 1 and 2, such a bobbin and its ferrule are indicated at F, and the ferrule is in contact with detector fingers 15 and 16.

The detector fingers 15 and 16 are made of metal wire and are parts of detector units normally supported on but removable from the base 11. These units are designated at 20 and 21 in Fig. 1 and are both alike, hence only one of them will be described in detail. Referring more particularly to Fig. 3 which shows unit 20, the latter comprises a metallic tube 25 having secured therein front and back bearing 26 and 27, respectively, in which the detector finger 15 is slidably mounted. The finger 15 has a shoulder or collar 28 secured thereto and a light compression spring 29 surrounds that part of the finger between the shoulder 28 and front slide bearing 26. Spring 29 normally holds the finger 15 in its rearward detecting position where it can engage the ferrule F as the latter moves forwardly during a detecting operation. The front and back bearings 26 and 27 may be held to the tube 25 in any approved manner, but I have found that it is sufficient if the ends of the tube are pressed against their respective bearings.

The front bearing 26 is provided with a flange 30 which preferably projects somewhat beyond the periphery of the tube 25 for a purpose to be described. It will be apparent that the unit 20 is complete in itself in that it provides a slide bearing at each end of the tube 25 for the finger 15 and contains the spring 29 which holds the finger in normal rear position with respect to the tube.

The base 11 is provided with metallic spring holders for the units 20 and 21 and these holders

are so constructed that each unit can be manually pressed into position and removed from its holder due to the resilience thereof. In Fig. 1 these holders are designated generally at 35 and 36. Each holding means may be substantially as shown in Fig. 6 and can be made of a single piece of resilient material such as sheet metal. A longitudinally extending strip 37 has at the rear end thereof right and left spring clips, prongs, or side members 38 and 39, respectively. The strip 37 also has a front pair of clips 40 and 41. The two pairs of clips are aligned longitudinally and hold the associated detector unit in normal detecting position. The front pair of clips 40 and 41 are split to provide a slot 42 to receive the shoulder or flange 30. The sides of the shoulder provide stop surfaces 43 which engage the front clips and prevent longitudinal motion of the unit. Screws or rivets 45 fasten the spring holders to the base 11. Projecting forwardly from the front pair of spring clips is a contact arm 46 for permanent attachment to a wire of an electric loom controlling circuit.

The two spring support holders are fastened to the base 11 parallel to each other as indicated in Fig. 1 and the units 20 and 21 are placed as indicated with their flanges or shoulders 30 in the slots 42. The units may be thus placed merely by pressing them down manually toward the base against the resilience of the pairs of clips 38—39 and 40—41. When in normal position the clips hold the units against substantial transverse motion to prevent contact between them. If for any reason one of the units should become defective it may be readily removed by hand by an upward motion away from the base and replaced by a similar intact unit by a very simple and quickly performed operation without disturbing the connections between the holders and the detector circuit.

In order to illustrate one means of using the detector set forth herein I show a detector circuit in Fig. 5. This circuit includes a transformer T and a solenoid S having a core 50 which when attracted by the solenoid raises a lever 51 operatively positioned with respect to an indicating finger 52. One of the contact arms 46 is permanently connected to wire 54 leading to the transformer, while the other contact arm 46 is similarly connected to wire 53 leading to the solenoid, and wire 55 connects the transformer and solenoid.

Whenever indication of weft exhaustion is given by presentation of a bare ferrule to the detector fingers 15 and 16, the latter are electrically connected and electric current will flow as follows: transformer T, wire 54, arm 46 of unit 20, front clips 40 and 41 of the unit, flange 30 and tube 25 to bearing 26, detector finger 15, ferrule F, detector finger 16, the front bearing of unit 21 and the flange 30 and tube 25 thereof, clips 40 and 41, arm 46 of unit 21, and wire 53 to the solenoid, and thence by wire 55 back to the transformer.

It is to be understood that inasmuch as the rear pair of clips 38 and 39 are integral with the front pair of clips and tube 25 is metallic, current can also flow through the rear bearings 27 which are electric current conducting and also through the rear pairs of clips and along the tube to the front clips. This condition will be true when the tube is made of metal, but I do not wish to be limited in the practice of my invention to such a tube, inasmuch as it will be sufficient if the front bearing 26 and its flange 30 are electric current conducting, since under these conditions the current conducting finger sliding in the bearing 26 will be electrically connected by the flange 30 to the front clips 40 and 41 independently of the tube 25.

From the foregoing it will be seen that I have provided a simple form of electric weft detector comprising a pair of units each complete in itself and comprising a tube provided with front and back bearings in which a detector finger slides. The front bearing is made with a positioning flange 30 which holds the unit against longitudinal motion, and may if desired form part of the detecting circuit by reason of its engagement with the spring clips 40 and 41. This is particularly true if the tube 25 is not made of electric current conducting material, but if the tube 25 is metallic this electric conducting function of the flange 30 is not so important. It will also be seen that the base 11 is provided with resilient detector unit holding spring means so constructed that each unit can be applied to its resilient holder by a simple pressing motion toward the base 11 to spread the pairs of clips, after which the unit will be held firmly in position. Also, the spring holder shown more particularly in Fig. 6 is provided with an integral arm 46 for permanent connection with an external loom controlling detecting circuit. The units are simply made and are cheap and when damaged can be discarded and replaced with similar units without disturbing the base 11 or the connections between the spring holder and the circuit. It will be apparent that if either detector unit should be accidentally struck by a part of the loom it can spring and snap up through the clips.

Having thus described my invention it will be seen that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention and I do not wish to be limited to the details herein disclosed, but what I claim is:

1. A detector unit for an electric weft detector having a pair of resilient spaced electric conducting resilient side members, said unit comprising a tube, an electric conducting detector finger, electric current conducting bearing means within the tube in which the finger is slidably mounted, and flange means integral with and projecting laterally from said bearing means to engage said side members when said tube is inserted between said members, said flange means having two surfaces spaced longitudinally of the tube and transversely thereof, one of said surfaces facing one end of the tube and the other surface facing oppositely to said one surface.

2. A detector unit for an electric weft detector, said unit comprising a tube, an electric conducting detector finger extending within the tube, a bearing for said finger in one end of the tube made of electric conducting material and in electric contact with the finger, and an annular flange extending transversely of the tube and projecting beyond the periphery of said tube, said flange having two surfaces transverse of the tube and spaced longitudinally thereof, one of said surfaces facing in a direction toward that end of the tube opposite to said one end thereof and the other surface facing in the opposite direction.

3. A detector unit for an electric weft detector, said unit comprising a metallic tube, metallic bearings in the front and back ends of said tube, a metallic detector finger slidably mounted in said bearings, and means on said unit providing two

stop surfaces spaced longitudinally of the tube and extending transversely of the unit beyond the periphery of said tube, one of said surfaces facing the back end of the tube and the other surface facing away from said back end.

4. An electric weft detector unit comprising a metallic tube, aligned metal bearings within said tube, a metallic detector finger slidably mounted in said bearings, and a flange fixed with respect to said tube, said flange having two surfaces transverse of the tube spaced longitudinally thereof, said surfaces facing in opposite directions.

5. In an electric weft detector for a loom, a base made of electric insulating material, a pair of detector units each comprising a tube in which an electric conducting detector finger is slidably mounted, supporting means on said base for each unit made of electric conducting material, the supporting means for each unit having resilient spaced prongs engaging the associated tube, the latter being normally held between the prongs therefor due to their resilience but removable from between the prongs by a movement transverse of the length of the tube, and means on each tube establishing electric contact between the finger thereof and the supporting means therefor and cooperating with the latter to resist longitudinal movement of the unit.

6. In an electric weft detector for a loom, a base made of electric insulating material, two pairs of electric conducting holders, each pair having aligned front and back holders each of which has spaced resilient clips, an elongated detector unit for each pair of holders, each unit comprising a tube in which a detector finger made of electric conducting material is slidably mounted, each unit being insertable into the corresponding pair of holders by a movement transverse of the unit and the associated clips thereafter resiliently holding the unit against movement laterally of the unit, and means on each unit electrically connecting the finger thereof with one of the associated clips and cooperating with the latter to resist longitudinal movement of the unit with respect to the holders therefor.

7. In an electric weft detector for a loom, a base made of electric insulating material, two sets of front and back holders, each holder comprising a pair of resilient electric conducting spaced side members, a detector unit for each set of holders comprising a metallic tube in which is slidably mounted a metallic detector finger in electric contact with the tube, each tube being held between the side members of the corresponding set of holders due to the resilience of said members, the side members springing apart to permit removal of the associated unit in a direction transverse of the unit, and means extending laterally of each tube cooperating with one of the associated holders to prevent longitudinal movement of the unit relatively to the holders therefor.

8. In an electric weft detector for a loom, a base made of electric insulating material, two sets of holder means on the base, each means having spaced resilient electric conducting side members, an elongated detector unit for each set comprising a metallic tube having metallic bearings in the front and back ends thereof in which a metallic detector finger is slidably mounted, each unit being held by the side members of the corresponding set due to the resilience of the members thereof, and means projecting from one bearing of each unit engaging the corresponding holder means to resist longitudinal movement of

the unit, each unit due to the resilience of the corresponding side members being removable from its holder means by a movement transverse of the unit.

9. In an electric weft detector for a loom, a horizontal base made of electric insulating material, two sets of holder means on the base, each holder means comprising spaced resilient electric conducting side members extending vertically away from said base, a detector unit for each set of holder means, each unit comprising a tube in which an electric conducting detector finger is slidably mounted, each tube being held resiliently between the corresponding side members and being removable from said members by a vertical movement away from the base, each unit constructed to connect the finger thereof electrically with the associated holder means when the tube is between its side members, and flange means on each unit projecting laterally therefrom into holding relation with respect to the associated side members to resist longitudinal movement of the unit relatively to its holder means.

10. In an electric weft detector for a loom, a horizontal base made of electric insulating material, two pairs of spaced metallic resilient side members mounted on and projecting vertically away from said base, a detector unit for each pair of members comprising a metallic tube in electric contact with an electric conducting detector finger slidably mounted therein, each pair of said members engaging opposite sides of the corresponding tube and holding the latter in position, and means on each unit engaging at least one of the associated members and cooperating with the latter to resist longitudinal movement of the unit, each unit due to the resilience of its side members being removable from the latter by a vertical motion away from said base.

11. In an electric weft detector means for a loom having an electric detector circuit, a supporting base made of insulating material, two pairs of electric current conducting spaced resilient members permanently connected to the circuit and mounted on and projecting away from said base, and a detector unit for each pair of units, each unit comprising a tube and a detector finger slidably mounted within the tube and electrically connected through the unit to the corresponding members when the tube is between the members, each tube being insertable between the associated members and removable from between said members by a motion transverse of said tube while said members remain electrically connected to said circuit, said members due to their resilience holding the unit therefor in detecting position when the tube is between its members.

12. In an electric weft detecting system for a loom having an electric detector circuit, a supporting base made of insulating material, two pairs of spaced electric current conducting spring members permanently connected electrically to said circuit and secured to and projecting away from said base, a metallic tube held resiliently between the members of each pair, and a metallic detector finger slidably mounted in and electrically connected to each tube, each tube being removable from the corresponding members by a motion transverse of the tube while said members remain electrically connected to said circuit.

13. In an electric weft detector for a loom, a horizontal base made of electric insulating material, two detector units, holder means for each unit secured to said base and including horizon-

tally spaced spring side members made of electric conducting material and projecting upwardly from said base, each detector unit comprising a metallic tube in which is slidably mounted a metallic detector finger electrically connected to the tube, and a flange on each tube, each tube being held resiliently between the side members therefor with the flange thereof in position to engage the associated holder means to resist longitudinal movement of the tube in the holder means and being removable from the members therefor by an upward movement in a direction away from said base.

RAYMOND F. DION.

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