Dec. 24, 1940. C. E. BROWN 2,226,218

ELECTRIC WEFT DETECTOR FOR LOOMS

Filed July 15, 1940

FIG. 6

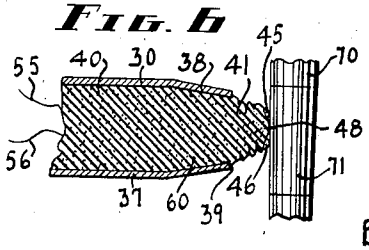


FIG. 1

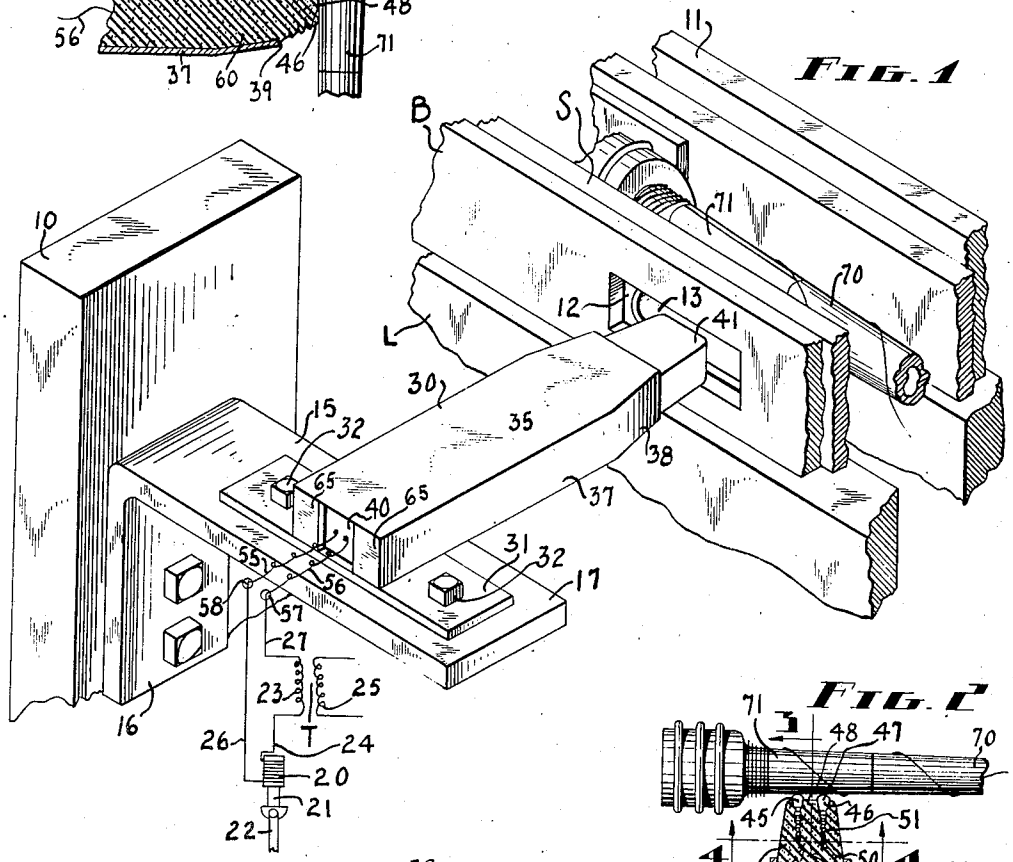


FIG. 2

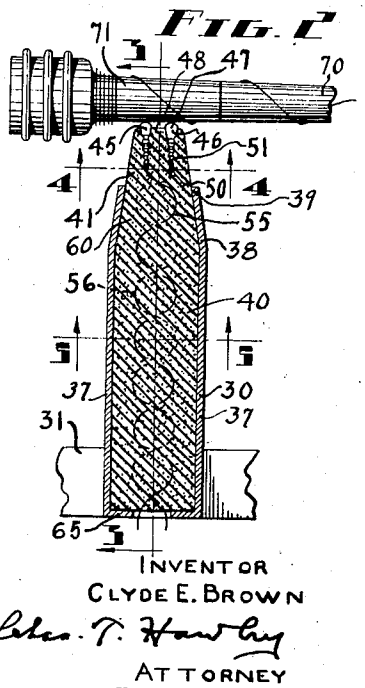


FIG. 3

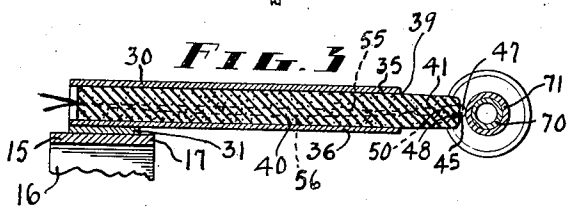


FIG. 4

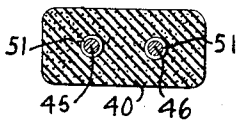
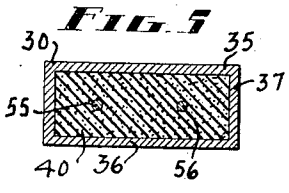


FIG. 5



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ELECTRIC WEFT DETECTOR FOR LOOMS

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5 Claims. (Cl. 139—273)

This invention relates to improvements in weft detectors for looms and it is the general object of the invention to provide a detector of this type capable of use in looms running at high speed and with a minimum of abrasion to the weft being detected.

In certain types of weft detectors heretofore used it has been customary to employ a pair of electrodes or contact members to have engagement with a ferrule on the bobbin for the purpose of closing the loom controlling circuit. Such electrodes have customarily been formed of weighted members, such as rods, which have had the effect of abrading the weft due to their weight. It is an important object of my present invention to provide light weight electrodes or contacts which are embedded in an inherently elastic carrier or support, such as soft rubber. A weft detector of this type responds readily to forward pressure of the weft without exerting objectionable force on it.

In electrical weft detectors employing weighted electrodes or the like there is a tendency for the electrodes to rebound from the denuded ferrule on the bobbin at the instant of contact. Springs sufficiently heavy to maintain contact with the ferrule throughout the detecting interval cause the contacts to crush the weft on the bobbin. It is a further object of my present invention to provide a carrier for the electrodes which is inherently resilient and therefore has very little rebounding tendency when struck by the advancing ferrule. A detector made according to my present invention will maintain contact between the electrodes and the ferrule continuously from the instant of initial engagement until the receding lay moves the ferrule away from the detector. A loom equipped with my detector may therefore be operated at high speed with assurance that the electrodes will remain in contact with the ferrule sufficiently long to permit energization of the electro-magnetic controller which is actuated by closure of the controlling circuit when the ferrule and electrodes contact each other.

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 drawing, wherein a convenient embodiment of my invention is set forth,

Fig. 1 is a perspective view of my improved weft detector with adjacent parts for supporting the same, the electric circuit being shown diagrammatically,

Fig. 2 is a plan view of the detector when first contacting the ferrule of an exhausted bobbin, parts being in section,

Fig. 3 is a vertical longitudinal section on line 3—3 of Fig. 2,

Figs. 4 and 5 are enlarged vertical transverse sections on lines 4—4 and 5—5, respectively, of Fig. 2, and

Fig. 6 is a view similar to a portion of Fig. 2, but showing the compression of a body of elastic material by the bobbin when the lay is in extreme forward position.

Referring to the drawings, I have shown a loom frame 10 and lay L having a shuttle binder B forming part of a shuttle box 11 in which is located a shuttle S. The binder is provided with the usual detector slot 12 which registers with a corresponding slot 13 in the front wall of the shuttle when the latter is boxed for detection. Secured to the loom frame 10 is a bracket 15 having a foot 16 bolted to the loomside and having a horizontal plate 17 for a purpose to be described.

Weft detectors may be used either to initiate weft replenishment or to stop looms upon exhaustion of weft in the active shuttle. In either instance, some form of electromagnetic device is employed, such for instance, as a solenoid designated diagrammatically at 20 in Fig. 1. The solenoid has a core 21 which is connected to a controller 22 movement of which effects a change in loom operation. It is not deemed necessary to set forth the details of these controls, since they are well understood, and it is thought sufficient to state that energization of the solenoid will control known mechanism either to initiate weft replenishment or stop the loom. A transformer T may be employed the secondary 23 of which is connected by a wire 24 to one side of the solenoid. The primary 25 of the transformer may be connected to any suitable source of electric supply. Leading from the solenoid is a second wire 26, while that side of the transformer secondary opposite the solenoid has leading therefrom another wire 27. The wires 26 and 27 will normally be electrically disconnected but will be connected at indication of weft exhaustion by my improved detector to be described hereinafter for the purpose of energizing the solenoid when exhaustion of weft occurs.

My present invention relates more particularly to the electrodes or contacts and their supports and in carrying my invention into effect I provide a hollow shell 30 which may be made either of metal or molded compound. This shell has a

base 31 secured by means of bolts 32 to the plate 17. As indicated in Fig. 5 the shell is of rectangular form, having a top 35 and bottom 36 joined by sides 37. The rear part of the shell may be tapered as indicated at 38 in Fig. 2 and has an opening 39 facing rearwardly.

Located within the shell is a body 40 of soft resilient material. This material may be soft rubber molded or otherwise formed to fit snugly within the shell 30, and its rear end 41 projects through opening 39 and is positioned to enter the slots 12 and 13 on detecting forward beats of the lay L.

Embedded in the rear end of the body 40 are two metallic electrodes 45 and 46 which may preferably be alike and have heads 47 which project slightly behind the rear vertical wall 48 of the protruding end 41. Extending forwardly from the heads are shanks 50 which may be formed, as by screw threads 51, with a non-smooth surface around which the body 40 is molded. The electrode 45 is connected to a flexible electric conductor 55 while the other electrode 46 is similarly connected to a flexible conductor 56. These conductors 55 and 56 are embedded within the body 40 and may conveniently be disposed as suggested in Fig. 2 during the molding of the body 40. Wire 56 projects forwardly to a binding post 57 which is connected to wire 27, while wire 55 similarly projects forwardly to be connected to a binding post 58 to which is also connected wire 26.

The body 40 has its rear end tapered as indicated at 60 corresponding to the taper of the shell 30, the tapered parts of the shell and body limiting rearward motion of the elastic material with respect to the shell which contains it. I do not wish necessarily to be limited to the particular means set forth herein for holding the body 40 in fixed relationship with respect to the shell. The front ends of the sides 37 may have projecting therefrom wings or the like indicated at 65 for the purpose of holding the front of the body of elastic material in the shell.

In operation, the shell 30 is fixed and the rear end 41 of the elastic material projects sufficiently to permit forward deformation thereof relatively to the shell 30. As the lay advances the weft supply will engage the electrodes 45 and 46 and also the rear wall 48, as indicated in Fig. 2. Continued forward motion of the lay causes compressing the elastic mass so that it assumes the form shown in Fig. 6. The bobbin 70 will be of usual form and will have a metallic ferrule 71 which when uncovered will be presented to the contacts 45 and 46 on detecting beats of the loom. These two contacts will therefore be in circuit with the solenoid 20 and the latter will be energized to initiate a change in loom operation, as already described.

The wires 55 and 56 are curved in the general form shown in Fig. 2 and are therefore subjected to a minimum of deformation as the body 40 is compressed by the forward push of the bobbin. The threads 51 or their equivalents serve to hold the electrodes 45 and 46 securely in place in the rear end 41 of the body 40. The rubber or other material of which the body 40 is made is compressed forwardly with no appreciable tendency to draw away from the bobbin, hence the contact between the electrodes 45 and 46 and the ferrule 71 is maintained continuously throughout the detecting period of the loom. Furthermore, the rear wall 48 is soft and therefore causes no abrasion of the yarn on the bobbin, and the electrodes 45 and 46 are capable of slight relative movement which may be caused by the changing shape of the mass of weft on the bobbin or caused by slight obliquity of the bobbin with respect to the axis of the shuttle.

From the foregoing it will be seen that I have provided a simple form of electrical weft detector for looms wherein the electrodes are embedded in a mass of soft pliable material, such as rubber, which yields forwardly under impact of the bobbin during detecting operation. It will also be seen that the wires connected with the electrodes are disposed in sinusoid form and are therefore subjected to a minimum of breaking strains during repeated detecting operations.

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. In an electrical weft detector to operate with a bobbin having a metallic ferrule which becomes part of a loom controlling circuit when weft exhaustion occurs, a stationary support, a body of soft elastic electric insulating material mounted on the support, a pair of spaced electric contacts embedded in said material and positioned for engagement with the ferrule of the bobbin being detected, and electric conducting wires connected to the contacts forming part of the controlling circuit.

2. In an electrical weft detector to operate with a bobbin having a metallic ferrule which becomes part of a loom controlling circuit when weft exhaustion occurs, a fixed support, a body of soft elastic electric insulating material mounted on the support and having a portion thereof projecting rearwardly from the support, a pair of spaced electric contacts held by the projecting portion of said body of elastic material for engagement with the ferrule, and wires connected to the electrodes and forming part of the controlling circuit.

3. In an electrical weft detector for a loom having a controlling electric circuit and operating with a weft supply having a metallic ferrule to be uncovered as weft exhaustion approaches and form part of the circuit, a fixed support, a body of soft elastic rubber mounted on the support, a pair of spaced electric contacts embedded in the rubber, and electric conducting wires out of contact with each other and connected one to each of the contacts and embedded in the body of rubber, said wires forming part of the aforesaid control circuit, engagement of the ferrule with the contacts closing said circuit and effecting compression of the rubber in a forward direction relatively to the support to maintain the contacts in engagement with the ferrule.

4. In an electrical weft detector for a loom having a controlling electric circuit and operating with a weft supply having a metallic ferrule to be uncovered as weft exhaustion approaches to form part of the circuit, a fixed support, a body of soft elastic rubber mounted on the support, a pair of spaced electric contacts embedded in the rubber, and an electric conducting wire connected to each contact and embedded in the rubber and extending forwardly from the contact therefor in a sinuous form, said wires being out of contact with each other and forming part of the aforesaid controlling circuit, engagement of the ferrule with the contacts closing the aforesaid

circuit, the rubber being compressed by the ferrule and maintaining the contacts in engagement with the ferrule.

5. In an electrical weft detector for a loom having a controlling electric circuit and operating with a weft supply having a metallic ferrule to be uncovered as weft exhaustion approaches and form part of the circuit, a fixed support, a body of soft elastic rubber mounted on the support, a pair of spaced electric contacts embedded in the rubber, and electric conducting wires out of contact with each other and connected one to each of the contacts and embedded in the body of rubber, said wires forming part of the aforesaid control circuit, engagement of the ferrule with the contacts closing said circuit and effecting compression of the rubber in a forward direction relatively to the support to maintain the contacts in engagement with the ferrule, said wires being bent on themselves to have portions extending laterally of the direction in which the compressing force of the ferrule is exerted on the body of rubber.

CLYDE E. BROWN.