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WARP STOP MECHANISM FOR LOOMS

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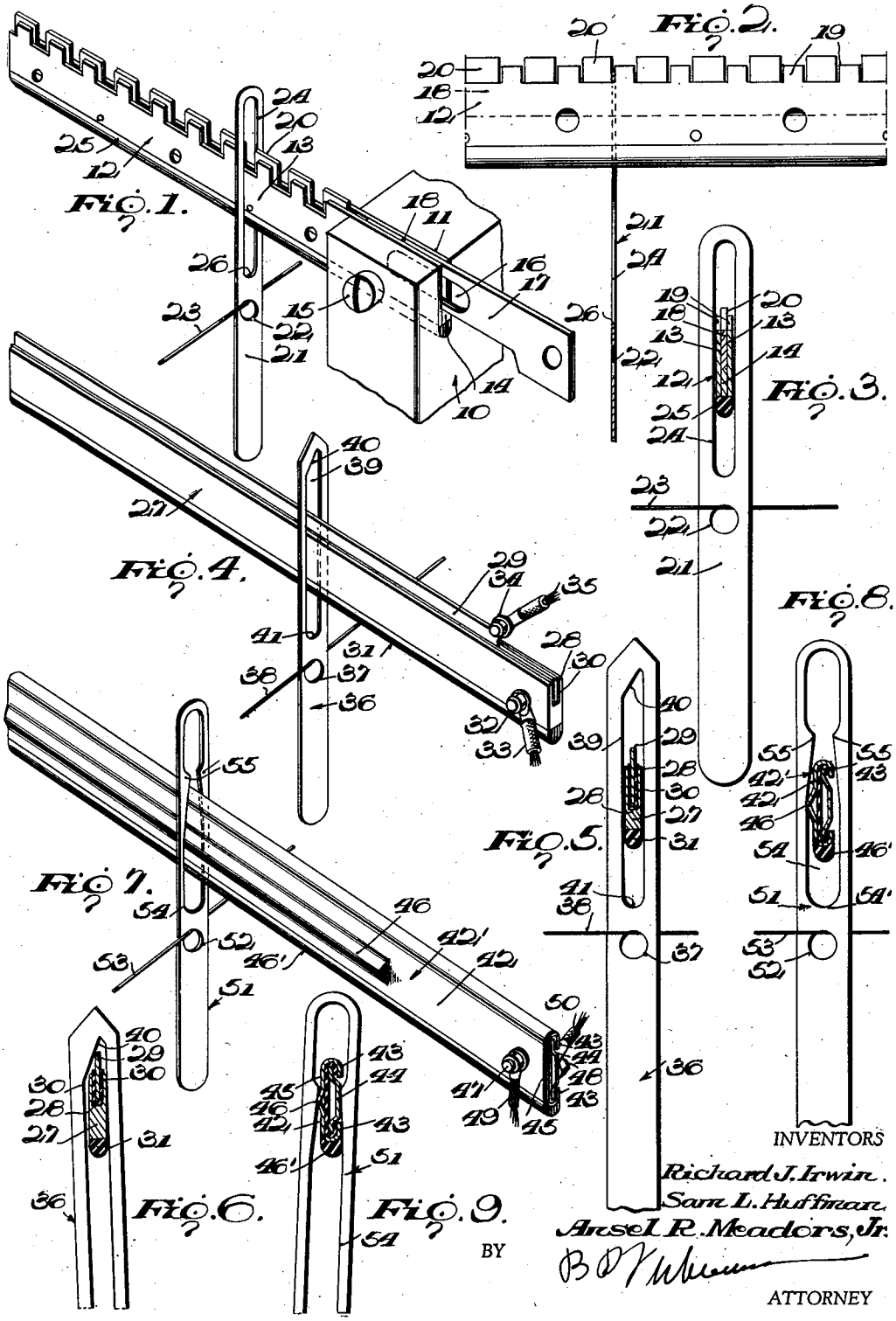


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

FIG. 6.

FIG. 7.

FIG. 8.

FIG. 9.

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WARP STOP MECHANISM FOR LOOMS

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This invention relates to warp stop mechanisms for looms wherein a detector bar device coacts with drop wires.

In the operation of a loom, it is customary to pass the warp threads through openings in the drop wires, and when too much slack occurs in a warp thread, or the warp thread breaks, the drop wire drops and coacts with the detector bar device for stopping the loom. The drop wires have openings formed therein so that they are mounted upon the detector bar holder. The detector bar device may be of the mechanical type wherein the detector bar reciprocates in the detector bar holder, the holder and bar having teeth at their top edges. When the drop wire drops the normal stroke of the detector bar is prevented and the loom is stopped. There are also electrically operated stop mechanisms for looms, wherein the holder receives therein a stationary detector bar which is insulated from it. When the drop wire drops it makes electrical connection between the holder and the detector bar, closing a circuit, which operates electrical means which stops the loom.

In the operation of mechanical or electrical detector bar devices, the drop wires are subjected to constant vertical movement or vibration, due to the rise and fall of the shed, and to the vibration of the loom. The lower end walls of the openings which receive the detector bar holder impinged against the lower edge of the detector bar holder, frequently forming sharp knurls or edges which project laterally beyond the faces of the drop wires. These knurls or edges engage the warp thread, partially cutting or nicking the same. In weaving fine smooth fabric from nylon or the like, this nicking of the warp threads produces a fuzz upon the woven fabric which is disadvantageous and ordinarily causes the fabric to be sold as seconds.

In accordance with our invention, we attach a resilient bumper or bead to the lower edge of the detector bar holder, and the bottom walls of the openings in the drop wires, strike against this resilient bumper or bead, and the formation of the sharp knurls or edges upon the drop wires is eliminated, and the difficulty referred to is overcome. The resilient bumper or bead is used in connection with the detector bar holder of the mechanical and electrical detector bar devices.

In the accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a perspective view of a mechanical

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detector bar device embodying my invention, the drop wire being held in the raised position,

Figure 2 is an enlarged fragmentary side elevation of the same, the drop wire being in the lowered position,

Figure 3 is a transverse vertical section through the detector bar device, the drop wire being held in the raised position,

Figure 4 is a perspective view of an electrical detector bar device embodying my invention, the drop wire being held in the raised position,

Figure 5 is a transverse vertical section through the electrical detector bar device, showing the drop wire raised,

Figure 6 is a similar view showing the drop wire in the lowered position,

Figure 7 is a perspective view of a further modified form of electrical detector bar device, the drop wire being raised,

Figure 8 is a transverse vertical section through the device of Figure 7, showing the drop wire raised, and,

Figure 9 is a similar view showing the drop wire lowered.

In connection with the first form of the invention, Figures 1–3 inclusive, the numeral 10 designates a support, one being used at each side of the loom and which may be mounted upon the loom sides. These supports serve to hold the detector bar device in place. The support 10, only one of which is shown, is provided with a vertical recess or groove 11, for receiving the detector bar holder 12. The detector bar holder includes spaced metal sides 13, which are secured to a metal spacer 14 by rivets or the like. The detector bar holder is mounted within the recesses 11 and secured to each support 10 by a bolt 15, which passes through a slot 16 formed in the extension 17 of the detector bar 18. The extension 17 of the detector bar may be utilized as means for associating the detector bar with mechanism for reciprocating the same transversely of the loom, but since the details of such mechanism form no part of the present invention they are not shown.

The sides 13 of the detector bar holder are provided at their top edges with teeth 19, longitudinally spaced, as is customary and are of rectangular form. The detector bar 18 is provided at its top with rectangular teeth 20, spaced as shown, and extending above the teeth 19.

The metal drop wires 21, of which only one is shown in the present illustration, has an opening 22 through which the warp thread 23 passes. The drop wire is provided in its upper portion

with an elongated opening or slot 24, to receive the detector bar holder 12, and permit of the free dropping of the drop wires. The detector bar holder serves as a guide for the drop wires.

The numeral 25 designates a resilient bumper or bead, having an upper flat face which is secured to the bottom of the detector bar holder 12. This resilient bumper or bead extends for substantially the entire length of the detector bar holder and for the entire length of the group of drop wires. The lower edge of the bumper or bead 25 is preferably transversely rounded. The bumper or bead 25 is formed of rubber, preferably artificial rubber, and this bumper or bead is secured to the bottom edge of the detector bar holder by vulcanizing the same to the holder, although the bumper or bead may be secured to the holder by cement, or other means. We also contemplate forming the resilient bumper or bead of plastic material having the desired degree of resiliency. This bumper or bead may have about the same degree of compressibility as the tread of the ordinary automobile tire. The sides of the bumper or bead 25 terminate flush with the outer faces of the sides 13, so that the bumper or bead will not interfere with the free dropping of the drop wires. It is preferred that the all-over vertical width of the detector bar holder with the bumper or bead applied thereto, be the same as the all over vertical width of the standard detector bar holder without the bumper or bead, so that it will be unnecessary to change the length of the slot 24 in the conventional drop wires.

While the loom is operating, the warp thread retains the drop wire 21 raised, in about the position shown in Figure 1. Should the drop wire be released by to much slack in the warp thread, or by the warp thread being broken, the drop wire will drop and engage with the teeth of the detector bar holder and the detector bar, and the normal stroke of the detector bar will be arrested, and this effects a stoppage of the loom through the conventional mechanism, which is not shown since it forms no part of the present invention. Due to the operation of the loom, caused by the action of the warp threads and vibrations, the drop wires are frequently thrown upwardly beyond the normal supported position, and when this occurs the lower end wall 26 of the opening 24 will impinge against the resilient bumper or bead 25, and the bumper or bead will prevent the formation of the sharp knurls or edges, which are caused by such end wall impinging against the lower edge of the metal detector bar holder, as is customary, the drop wire being formed of metal.

We contemplate embodying the invention in an electrical detector bar device, shown in Figures 4, 5 and 6. In these figures, the numeral 27 designates a metal detector bar holder, and this detector bar holder extends transversely of the loom and may be clamped within the supports 10. The detector bar holder 27 is provided at its top edge with a longitudinal recess or groove 28, for receiving a stationary metal detector bar 29, projecting above the same. This stationary protector bar 29 is electrically insulated from the protector bar holder 27 by means of insulation 30. The protector bar 29 extends throughout substantially the entire length of the protector bar holder 27 and throughout the entire length of the group or bank of drop wires.

The numeral 31 designates a resilient bumper or bead, identical with the bead 25, and formed of artificial rubber and secured to the bottom edge of the detector bar holder 27 by being vulcanized thereto or by means of cement or other means. The bumper or bead terminates flush with the side faces of the detector bar holder 27 so that it will not interfere with the dropping of the drop wires.

The detector bar holder 27 is provided with a binding post 32, for connection with a wire 33, and the detector bar 29 has a binding post 34 for connection with the wire 35. These wires lead to the electrically operated means which arrest the operation of the loom when the circuit is closed. Since this electrically operated means forms no part of the present invention, it is not shown.

The numeral 36 designates drop wires, one of which is shown for the purpose of illustration. The drop wire is formed of metal and has an opening 37 for the passage of the warp thread. In its upper portion, the drop wire has an elongated opening or slot 39, having an upper inclined curved wall 40, and a lower curved wall 41.

When the loom is operating, the warp thread 38 holds the drop wire 36 in the raised position, as indicated in Figure 4. When undue slack occurs in the warp thread or the warp thread breaks, the drop wire drops, and the inclined wall 40 contacts with the detector bar 29. The inclined wall 40 shifts the drop wire laterally and causes the same to be inclined so that it will contact with the upper portion of the detector bar holder at the side thereof remote from the inclined wall, Figure 6. When this occurs, a circuit is closed for connecting the wires 33 and 35 and the stop means is set into action for stopping the loom. During the operation of the loom, when the drop wires 36 are supported in the raised position they are frequently thrown upwardly beyond the supported position and the lower end wall 41 will strike against the resilient bumper or bead and the formation of the sharp knurls or edges prevented.

In Figures 7, 8 and 9, we have shown in modified form of electrical detector bar device for stopping the loom. This device embodies a detector bar holder 42', formed of sheet metal, and including a side 42, having its top and bottom edges bent to form loops or hollow flanges 43, extending throughout the entire length of the side. The loop or flanges 43 are vertically spaced so that the adjacent side of the detector bar holder is open. A sheet metal detector bar 44 is mounted within the detector bar holder 42' and its edges are held within the loops or flanges 43. The detector bar 44 is electrically insulated from the detector bar holder by insulation 45. The outer face of the detector bar 44 is disposed in a plane inwardly of the plane of the outer faces of the loops or flanges 43. The detector bar 44 extends throughout the entire length of the detector bar and the length of the group or bank of drop wires. The side 42 is provided with a laterally extending rib 46, which may be stamped therefrom, and this rib is V-shaped in cross section and extends throughout the entire length of the group or bank of drop wires.

The numeral 46' designates a resilient bumper or bead, identical with the bumper or bead 25, and formed of artificial rubber, and this bumper or bead is secured to the lower edge of the detector bar holder 42' by being vulcanized to the same although it may be secured thereto by cement or other means.

The detector bar holder 42' extends transversely of the loom and may be held in these

supports 10. A binding post 47 is carried by the holder 42' and a binding post 48 is secured to the detector bar 44, and these binding posts are connected with wires 49 and 50 which lead to the electrically operated means which stops the loom. As this means forms no part of the present invention, it is not shown. The bumper or bead 46' extends throughout the entire length of the detector bar holder 42'.

The numeral 51 designates metal drop wires, one being shown for the purpose of illustration. The drop wire 51 has an opening 52 to receive the warp thread 53. The drop wire is provided in its upper portion with an elongated slot 54, having inwardly facing vertically inclined shoulders 55, converging upwardly. The space between the shoulders 55 is sufficiently large for receiving the upper portion of the detector bar holder above the flange 43.

When the loom is operating, the warp thread 53 holds the drop wire 51 raised, Figures 7 and 8. When undue slack occurs in the warp thread or the warp thread breaks, drop wire drops, and one shoulder 55 contacts with the flange 43, shifting the drop wire laterally with respect to the detector bar holder 42', so that the other shoulder 55 contacts with the stationary detector bar 44, Figure 9. The detector bar holder and detector bar are therefore electrically connected and a circuit is closed which operates the electrical means which stops the loom. When the loom is operating, and the drop wire 51 is supported by the warp thread, it is frequently thrown upwardly beyond the supported position by the action of the warp thread or the vibration of the loom, and when this occurs the lower end wall 54' of the opening 54 will impinge against the resilient bumper or bead 46', and the formation of the sharp knurls or flanges upon the drop wire is prevented.

Any suitable number of detector bar devices may be installed upon a loom, depending upon the number of groups or banks of drop wires desired.

It is to be understood that the forms of our invention herewith shown and described are to be taken as preferred examples of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to, without departing from the spirit of our invention or the scope of the subjoined claims.

Having thus described our invention, what we claim is:

1. In a warp stop mechanism for looms, a metallic detector bar holder, a resilient bumper secured to the lower edge of the holder, the opposite side faces of the holder being uncovered, a metal detector bar mounted within the holder and having a part extending above the holder, and a metal drop wire having an elongated opening to receive the holder and an opening to receive the warp thread, the drop wire engaging

parts of the holder and detector bar when the drop wire drops.

2. In a warp stop mechanism for looms, a detector bar holder provided at its top with spaced teeth, a resilient bumper secured to the lower edge of the holder, a detector bar slideably mounted within the holder and provided with teeth, and a drop wire having an elongated opening to receive the holder and an opening to receive the warp thread.

3. In a warp stop mechanism for looms, a metal holder provided at its top with a recess, a resilient bumper secured to the lower edge of the holder, a detector bar mounted within the recess and electrically insulated from the holder and projecting above the holder, and a drop wire having an elongated opening to receive the holder and having an opening to receive the warp thread.

4. In a warp stop mechanism for looms, a metal holder having a main recess and an opening at one side, a resilient bumper secured to the lower edge of the holder, a metal detector bar mounted within the recess and electrically insulated from the holder, and a metal drop wire having an elongated opening to receive the holder and provided with inwardly facing inclined shoulders and having an opening to receive the warp thread, and a flange carried by the side of the holder to engage with one shoulder to shift the drop wire laterally so that the other shoulder will engage the detector bar when the drop wire drops.

5. In a warp stop mechanism for looms, a substantially flat metal holder having oppositely arranged faces, a resilient bumper secured to the lower edge of the holder and terminating substantially at the oppositely arranged faces, and a metallic detector bar carried by the holder.

6. In a warp stop mechanism for looms, a substantially rigid detector bar holder having opposed side faces, a resilient bumper secured to the lower longitudinal edge of the holder and having sides arranged substantially at the side faces of the holder, and a detector bar carried by the holder.

7. In a warp stop mechanism for looms, a metal detector bar holder having opposed side faces, a resilient bumper secured to the lower longitudinal edge of the holder and having sides arranged substantially at the side faces of the holder, and a detector bar carried by the holder.

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