

[54] **TIGHT WARP DETECTOR**  
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 William Petry

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 [51] **Int. Cl.**..... **D02h 13/08**  
 [58] **Field of Search**.... 28/50, 51; 250/219, 219 DF;  
 139/353, 349; 226/11; 200/61.18

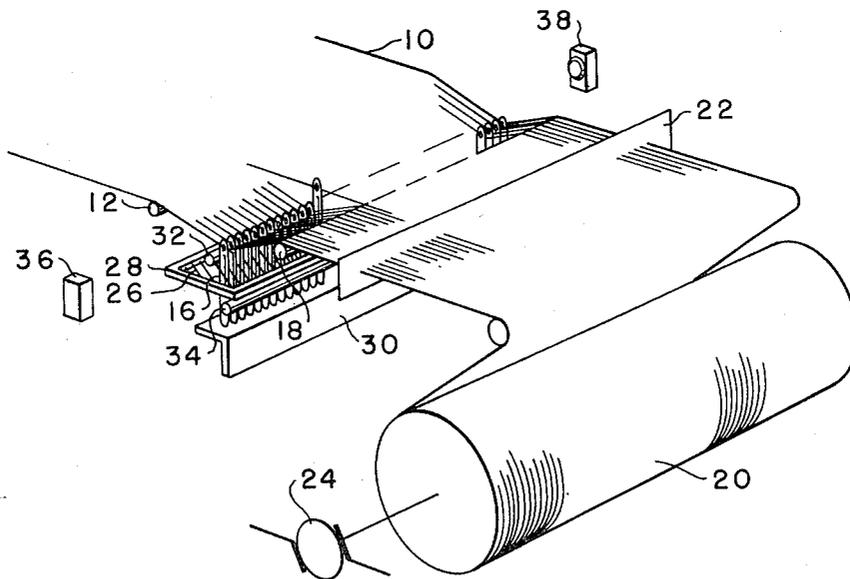
[57] **ABSTRACT**

Apparatus and method to detect a highly tensioned warp yarn being supplied to a textile machine. The warp yarn sheet is scanned to detect a warp yarn or yarns under excessive tension to stop the operation of the textile machine prior to breakage of the detected highly tensioned yarn or yarns and/or damaging stretch in the yarn producing streaks in the fabric produced therefrom.

[56] **References Cited**  
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**1 Claim, 5 Drawing Figures**



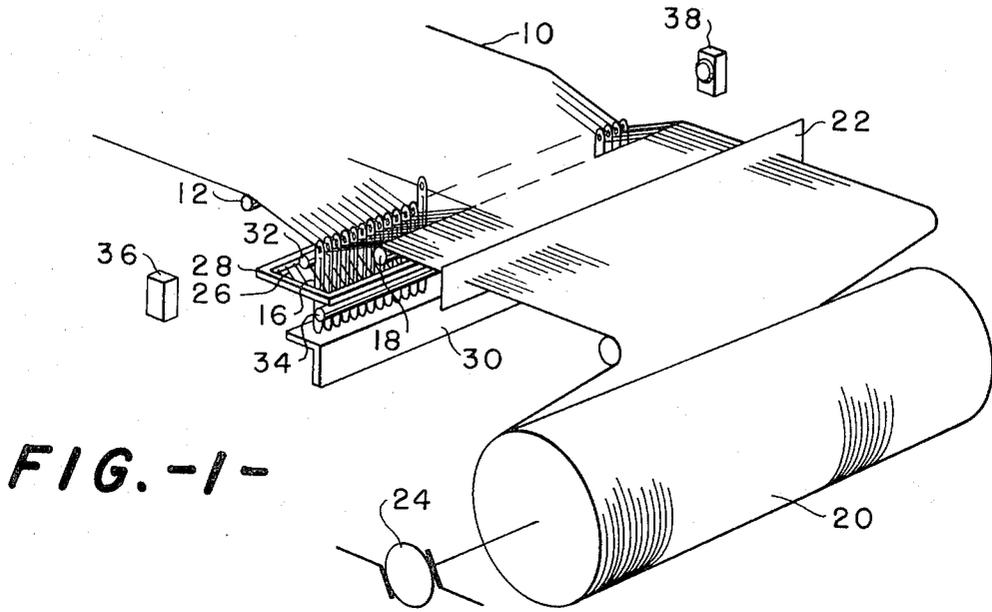


FIG. -1-

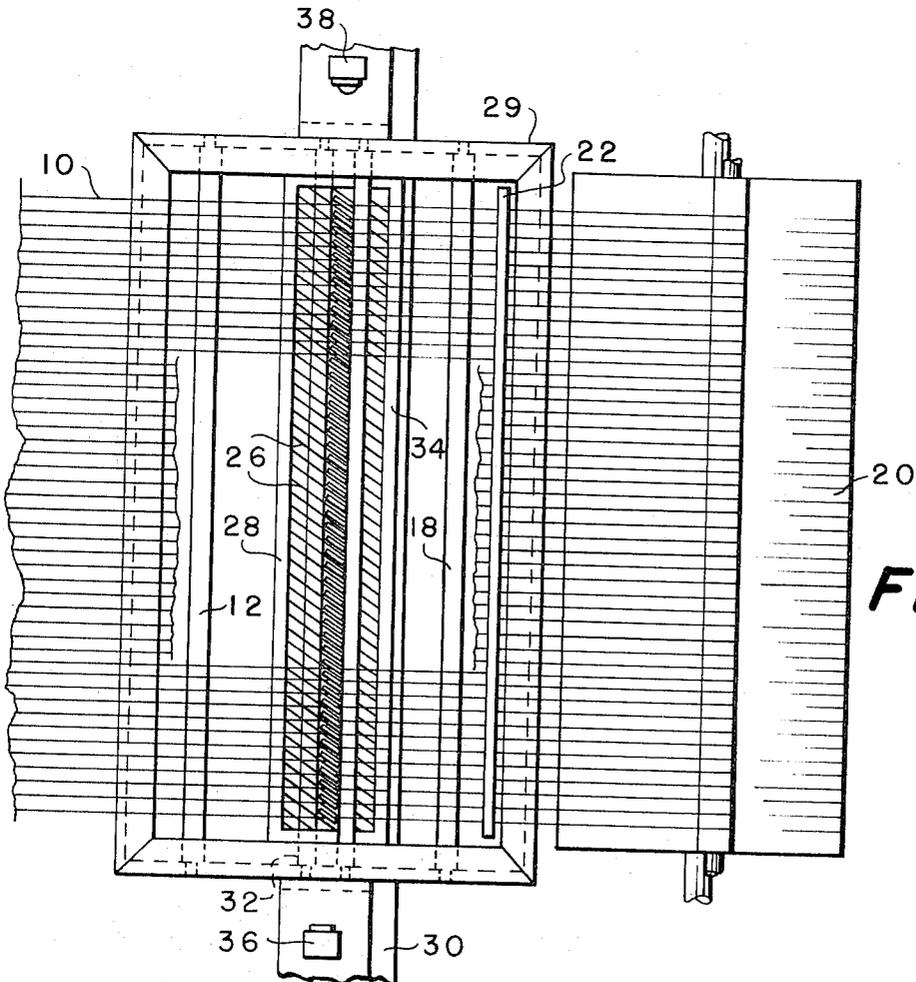


FIG. -2-

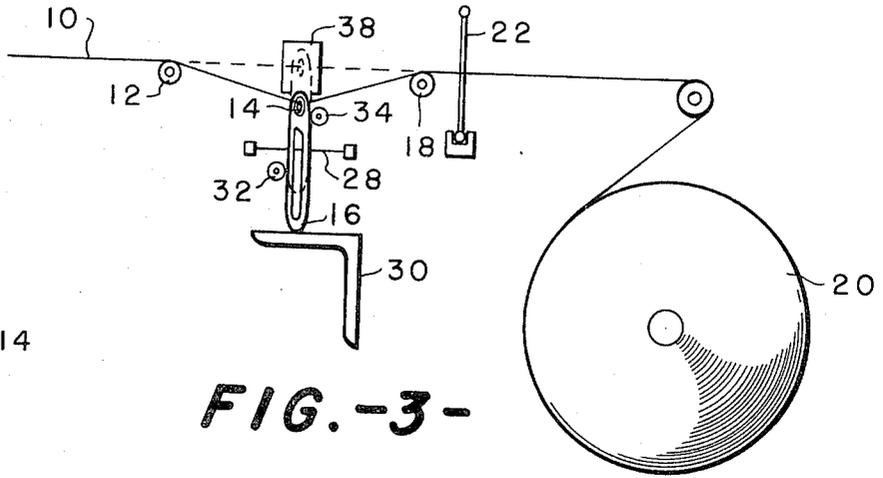


FIG. -3-

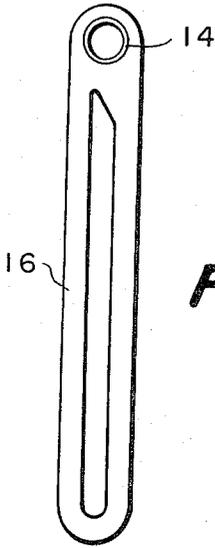


FIG. -4-

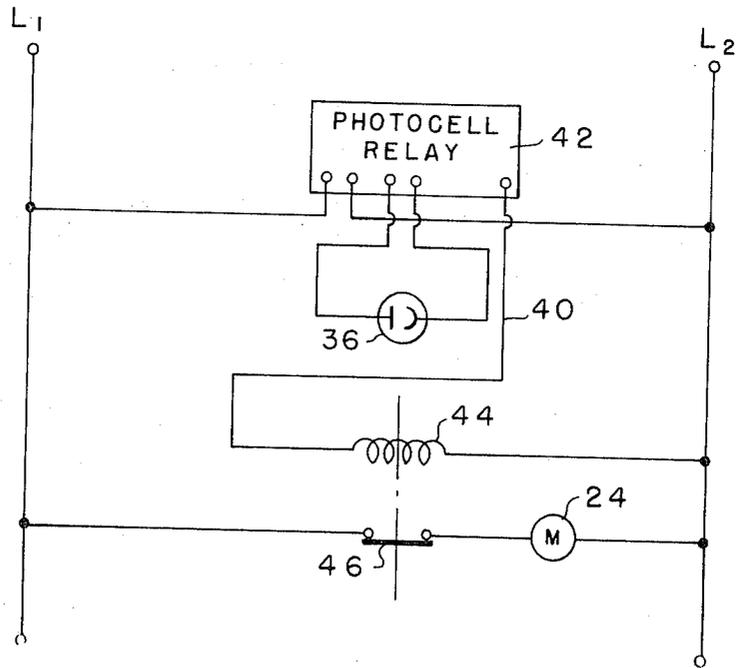


FIG. -5-

**TIGHT WARP DETECTOR**

This invention relates generally to a control for a textile machine which stops the operation of the machine or provides a signal to the operator upon the detection of a yarn under excessive tension.

It is therefore an object of the invention to provide a control system for a textile machine which is efficient in operation and will operate over long periods of time without the necessity of service and repair.

Other objects and advantages of the invention will become clearly apparent as the specification proceeds to describe the invention with reference to the accompanying drawings, in which:

FIG. 1 is a schematic perspective of a warper with the new and novel stop motion system;

FIG. 2 is a top view of the tight warp end detection system of the disclosed invention;

FIG. 3 is a side elevation view of FIG. 2;

FIG. 4 is a front view of the drop wire used in the invention; and

FIG. 5 is a schematic control circuit of the herein disclosed stop motion system.

The disclosed system detects excessive tension on one or more yarns being supplied to a textile machine such as a warper, loom or knitting machine but preferably the disclosed system is employed to detect a tight warp yarn being supplied to a warper to either stop the operation of the warper before the detected warp yarn breaks or provide a signal to an operator indicating the condition of excessive tension.

Looking now to the drawings and especially FIG. 1, the yarn 10 under tension is successively pulled from the creel (not shown), over the guide bar 12, through the eyelet 14 of the drop wire 16 and over the guide bar 18 to the warper 20 through the reed or comb 22. The warper 20 is driven by motor 24 connected thereto in any suitable manner.

The drop wires 16 are slidably mounted between the bars 26 of the reed 28 suitably mounted in a frame 29. The bars 26 are mounted at an angle to the path of flow of the warp yarn 10 so that the warp yarn can follow a substantially straight path from the creel to the warper 20 through the eyelet 14 of the drop wires 16. The drop wires 16 are of sufficient weight that they will assume the solid position shown in FIG. 3 if the warp tension is correct. To prevent the drop wires 16 from dropping down further, a drop wire stop member 30 is provided to form a rest or stop for the drop wires 16. Bars 32 and 34 are provided to restrict the sideways movement of the drop wires 16 between the bars 26 of the reed or separator member 28. For reasons hereinafter explained a photocell 36 is located on one side of the drop wires 16 and a light source 38 is located on the other side of the drop wires and cooperates with the photocell.

**OPERATION**

In normal operation the warp yarns 10, as described above, are delivered from the creel (not shown) to the warper 20 successively through the eyelet 14 and the

reed or comb 22. Looking at FIG. 3 it can be seen that when the tension on the warp yarn 10 is correct the weight of the drop wire 16 will cause the drop wire and the yarn to assume the solid line position below the photocell 36 and light source 38. In this position the light from the light source 38 is picked up by the photocell 36 causing the resistance of the dark resistant photocell 36 to decrease the resistance thereof, thereby completing the circuit to line 40 through the photocell relay 42, thereby energizing the coil 44 to maintain the switch 46 closed to energize the warper motor 24.

If the tension in one or more of the yarns increases substantially the drop wire 16 will be pulled up to the position shown in dotted lines in FIG. 3 interrupting the light between the light source 38 and the photocell 36. The resistance of the dark resistant photocell 36 will increase breaking the circuit to line 40 through the photocell relay 42, thereby deenergizing the relay coil 44 to allow the switch 46 to open to break the circuit to the motor 24 to stop the operation of the warper 20. If desired, a time delay device may be incorporated to prevent the photocell relay 42 from deenergizing the coil 44 upon a momentary and short-lived increase in the tension of the yarn 10.

Also, if desired, the photocell arrangement can be eliminated and the drop wire 16 can be used as part of the electrical circuit to the motor 24 so that if it is raised off the stop member 30, the circuit to the warper motor 24 will be broken and the motor 24 deenergized. This can be accomplished by either having the stop member 30 as part of the circuit or have a separate member which is contacted by the drop wire when it is raised by undue tension in the yarn.

It can be seen that I have provided a yarn control arrangement wherein the yarn handling machine is stopped before the increased tension in the yarn being handled breaks resulting in lost production while the broken yarn end is being prepared.

Although I have described in detail the preferred embodiments of the invention, I contemplate that many changes may be made within the scope or spirit of the invention, and I desire to be limited only by the claims.

That which is claimed is:

1. A stop motion for a warp yarn take-up machine and warp beam, the rotation of which advances a plurality of yarn ends comprising: a light source, a photocell spaced from said light source, a plurality of drop wires located between said light source and said photocell operably associated with said yarn end, limiting means located under said drop wires to limit the downward movement thereof, the weight of said drop wires being greater than the desired tension in said yarn causing the drop wires to contact said limiting means, drive means driving said warp beam and control means operably associated with said photocell and said drive means to cut off said drive means when the tension of any of the yarn ends exceeds the desired value and raises its associated drop wire between said light source and said photocell.

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