

Oct. 29, 1946.

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2,410,249

WARNING ALARM SIGNAL FOR PAPER MACHINES

Filed Oct. 20, 1943

2 Sheets-Sheet 1

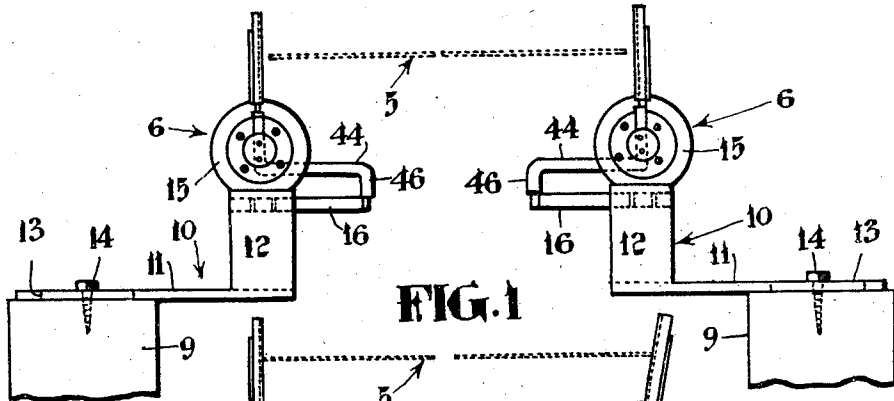


FIG. 1

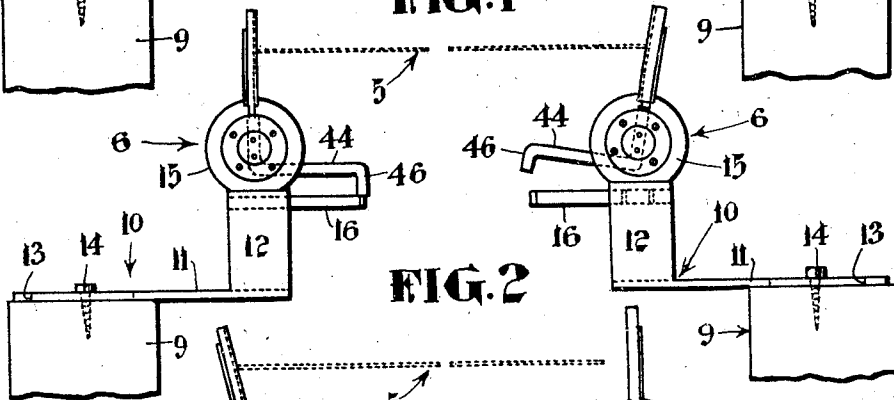


FIG. 2

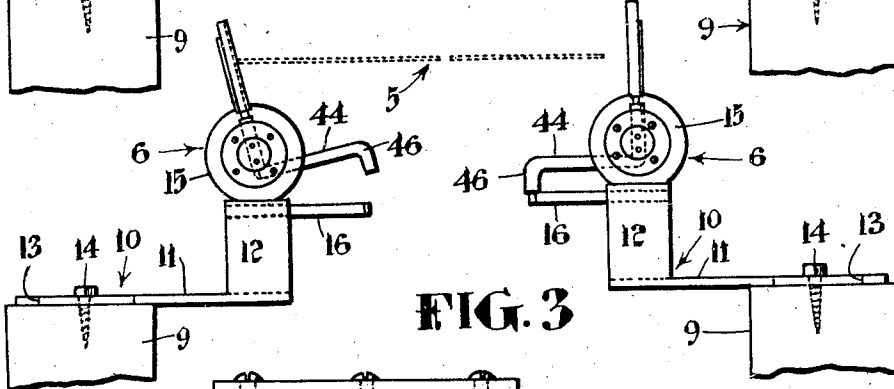


FIG. 3

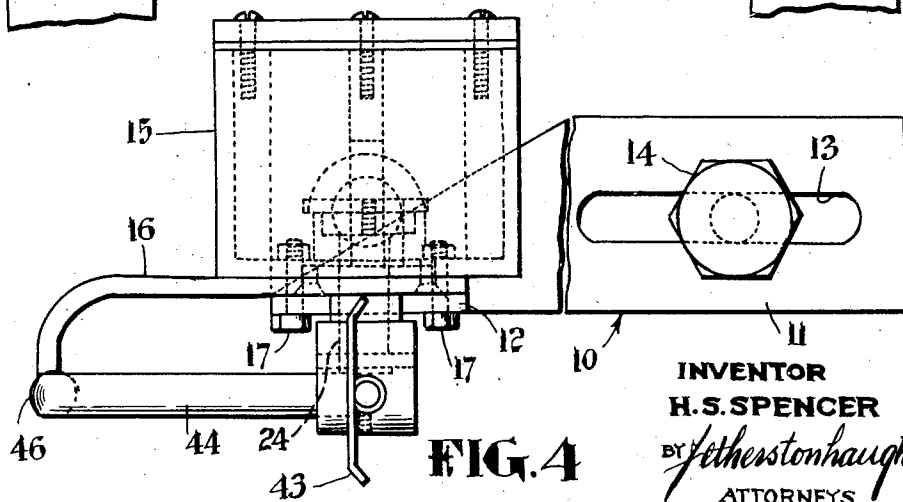


FIG. 4

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2 Sheets-Sheet 2

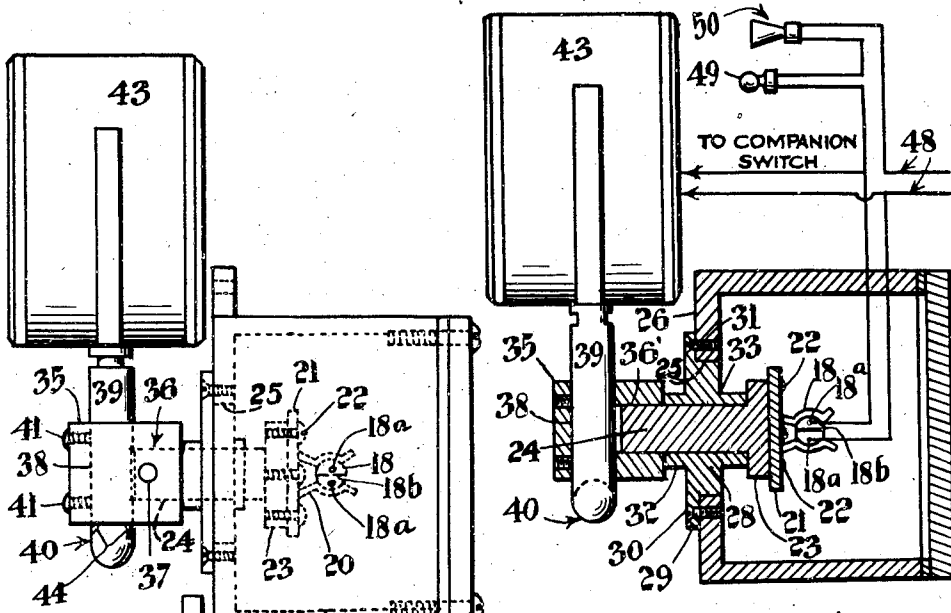


FIG.6

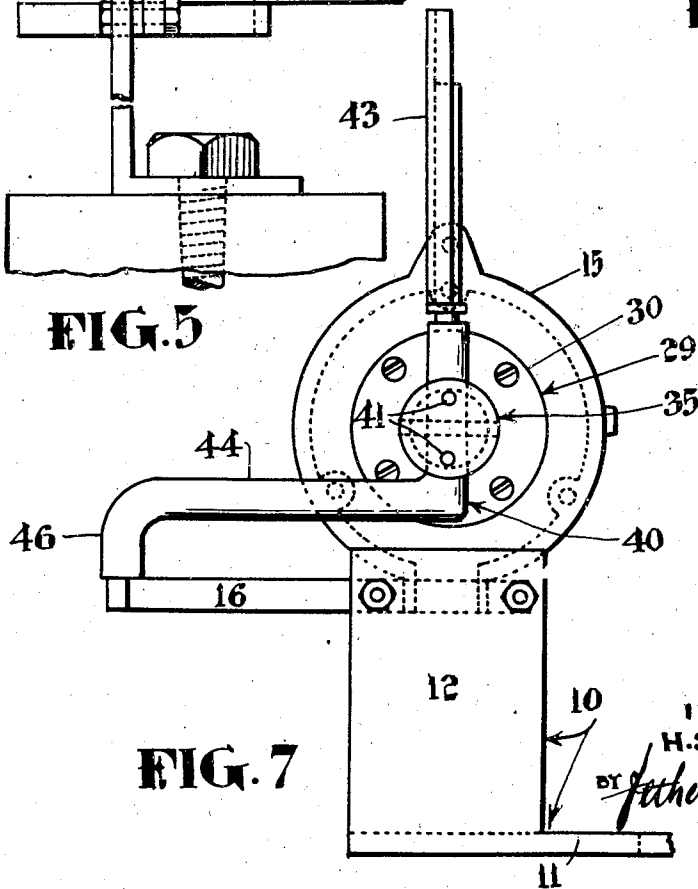


FIG. 7

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WARNING ALARM SIGNAL FOR PAPER MACHINES

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1 Claim. (Cl. 200—152)

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This invention relates to warning alarms for Fourdrinier paper making machines and the object is to provide an alarm mechanism which functions automatically to warn the machine tender whenever the forming wire drifts or wanders too far to either side of its normal path of travel.

In the operation of a Fourdrinier paper making machine it frequently happens that the forming wire will drift laterally to one side or the other of its normal path of travel. If this drift is not noticed and checked in time the wire may be completely ruined and lost.

According to my invention the lateral drift of the forming wire is utilized to effect operation of a warning signal whenever the wire drifts a predetermined distance to either side of its normal path of travel. This is preferably accomplished by arranging two signal-controlling switches at opposite sides of the wire so that one switch functions automatically to effect operation of the signal in response to excessive lateral drifting of the wire in one direction while the other switch functions automatically to effect operation of the signal in response to excessive lateral drifting of the wire in the opposite direction.

In the preferred embodiment selected for illustration a pair of normally open signal-controlling switches are arranged at opposite sides of the forming wire so that one switch is closed by the adjacent side edge of the wire when the latter drifts laterally a predetermined distance in one direction while the other switch is closed by the opposite edge of the wire when it drifts laterally a predetermined distance in the other direction. The two switches are connected in circuit with a signal mechanism which is operated in response to the closure of either switch.

Proceeding now to a more detailed description reference will be had to the accompanying drawings, wherein—

Fig. 1 is a view showing the application of my invention to the forming wire of a Fourdrinier paper making machine, the forming wire being shown by dotted lines with signal-controlling switch mechanisms arranged at opposite sides of the wire in the open-circuit positions which they occupy when the wire is running straight.

Fig. 2 is a view similar to Fig. 1 but shows the manner in which one switch mechanism is operated to a closed circuit position by the adjacent side edge of the forming wire when the latter has drifted a predetermined distance to one side of its normal path of travel.

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Fig. 3 is a view similar to Fig. 1 but showing the manner in which the remaining switch mechanism is operated to closed circuit position by the adjacent side edge of the wire when the latter has drifted laterally a predetermined extent in the direction opposite to the direction of drift shown in Fig. 2.

Fig. 4 is a top plan view of one of the switch mechanisms shown in the preceding figure.

Fig. 5 is a side elevation of the assembly shown in Fig. 4.

Fig. 6 is a transverse sectional view of the assembly shown in Figs. 4 and 5.

Fig. 7 is an enlarged end elevation of one of said switch mechanisms.

Referring more particularly to the drawings, 5 designates the upper run of the forming wire of a Fourdrinier paper making machine. An alarm controlling switch mechanism assembly generally indicated at 6 is arranged at each side of the forming wire. This assembly comprises, in each instance, a vertical standard 9 supporting a switch-housing bracket 10 which is adjustable toward or away from the adjacent side edge of wire 5. Bracket 10 comprises a plate portion 11 provided with an upward extension 12. The plate portion 11 rests on the upper end of standard 9 and is provided with an elongated slot 13 through which a fastening bolt 14 is threaded into a bolt hole provided in said standard, the major axis of slot 13 being at right angles to the adjacent side edge of the forming wire. A switch housing 15 and a horizontally extending stop member 16 are fastened to the bracket extension 12 by stud bolts 17 or other suitable fastening means. Housing 15 contains a mercury-tube switch 18 which is carried by clips 20 secured to an insulating disk 21 made of hard rubber or other suitable insulating material. Disk 21 is fastened by screws 22 to the inner flanged end 23 of a shaft 24 which extends inwardly through a shaft opening 25 provided in the housing wall 26 which lies close to and parallel with the adjacent side edge of wire 5. The shaft 24 is rotatably journaled in a bearing bushing 28 which extends through opening 25 and is provided with an attaching flange 29 which is fastened by screws 30 to the outer side of housing wall 26. Bushing 28 is formed with an enlarged intermediate portion 31 which fits the opening 25 and with end portions 32 and 33 of substantially reduced diameter compared with said intermediate portion. The outer end of shaft 24 carries a cylindrical member 35 provided with a socket 36 in which the said outer end of the shaft is secured by a pin 37 or other

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suitable fastening means. The cylindrical member 35 is provided with a transverse opening 38 in which the vertical arm 39 of an L-shaped pad holder 40 is secured by set screws 41, said arm 39 extending above the member 35 and having a wire engaging pad 43 secured to the upper portion thereof. The lower horizontal arm 44 of pad holder 40 is positioned below the cylindrical member 35 and terminates in a downwardly directed portion 46 which normally rests on the stop member 16. The arm 44 of the pad holder serves as a counterweight which normally holds the wire engaging pad 43 and shaft 24 in the position shown in Figs. 1, 5, 6 and 7. In this position of shaft 24 the mercury-tube switch 18 is arranged horizontally so that at least one of the switch contacts 18a is above the mercury level 18b and is therefore electrically isolated from the companion contact. The pad 43 of each switch mechanism is located in the path of lateral movement of the upper run of the Fourdrinier wire 5 and is normally spaced a small distance of approximately $\frac{1}{2}$ to $\frac{3}{4}$ inches away from the adjacent side edge of the wire when the latter is running straight in its normal path of travel.

When the wire, as viewed in Figs. 1 and 2, drifts laterally a predetermined distance to the right, the right hand side edge of the wire will act against the pad 43 of the right hand switch mechanism to rotate shaft 24 in a clockwise direction (Fig. 2) thus tilting the switch 18 to a closed circuit position in which the gap between the switch contact 18a is bridged by the mercury 18b. Similarly, if the wire drifts laterally a predetermined distance to the left the left hand end of the wire will act against the pad 43 of the left hand switch mechanism, as shown in Fig. 3, and will turn the shaft 24 of this mechanism in a counter-clockwise direction so that the shaft carried switch will be tilted to a closed circuit position in which the gap between the switch contacts 18a is bridged by the mercury 18b. When the side edges of the wire move away from the switch operating pads 43 the latter and their associated switch carrying shafts are returned to the normal position shown in Fig. 1 by the counterweight action of the horizontal arms 44 of the

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pad holders 40. The two switches 18 are connected in parallel in a signal circuit comprising supply mains 48, signal lamp 49, and an electrically operated horn or other audible signal 50, said circuit being closed to energize the signal elements 49 and 50 by the closure of either of the wire actuated switches 18.

While my invention has been designed primarily for application to Fourdrinier paper making machines, it will be understood that it is also useful in other relations. The invention may be used, for example, in connection with paper dryers to sound an alarm whenever the travelling drier felt which serves to support and press the paper web against the drying cylinders tends to wander an excessive distance to either side of its normal path of travel. The invention may also be used in various other relations where it is desirable to sound an alarm whenever an element intended to travel in a straight line tends to wander laterally to either side of its normal path of travel.

Having thus described what I now consider to be the preferred embodiment of my invention and several possible modifications thereof, it will be understood that various modifications may be resorted to within the scope and spirit of the invention as defined by the appended claim.

I claim:

A switch mechanism comprising a switch housing, a shaft extending through and rotatably journaled in one wall of said housing, a mercury switch mounted on said shaft within said housing, a member fitted on an end of the shaft located outside of said housing and provided with a transversely extending opening, an L-shaped arm having one arm thereof extending through said opening to provide a switch closing member, the other arm of said L-shaped member extending laterally to one side of said shaft and serving as a counterweight for biasing the shaft to a switch opening position, and a bracket carried by said housing and arranged to provide a supporting stop engageable with the last mentioned arm of the L-shaped member to limit rotation of said shaft in a switch opening direction.

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