

Nov. 14, 1950

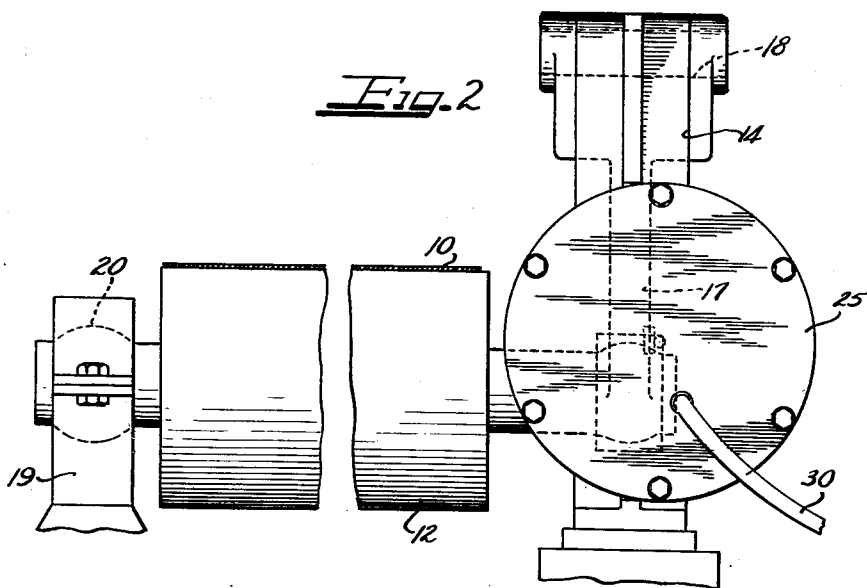
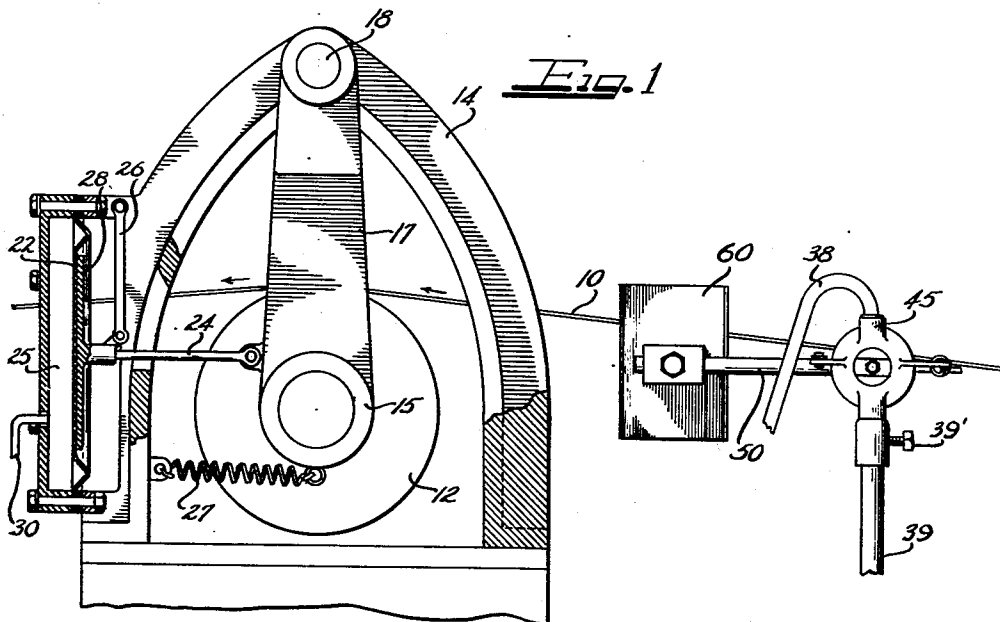
L. HORNOSTEL

2,530,122

WEB GUIDE

Filed May 26, 1948

2 Sheets-Sheet 1



Inventor

LLOYD HORNOSTEL

By *W. H. Smith of Charles M. Smith* Attys.

Nov. 14, 1950

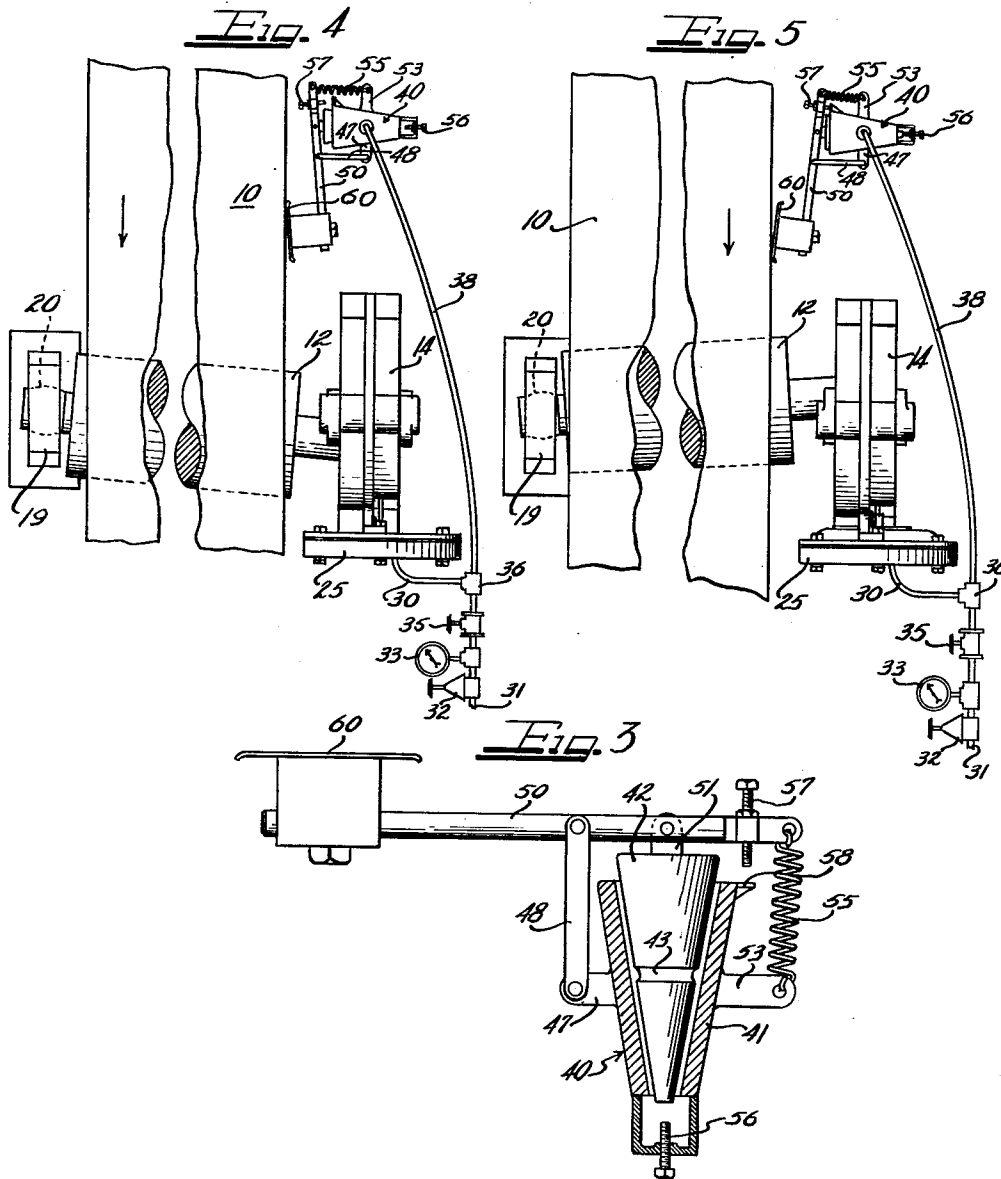
L. HORNOSTEL

2,530,122

WEB GUIDE

Filed May 26, 1948

2 Sheets-Sheet 2



Inventor

LLOYD HORNOSTEL

The Firm of Charles Mills & Co. *Attys.*

UNITED STATES PATENT OFFICE

2,530,122

WEB GUIDE

Lloyd Hornbostel, Beloit, Wis., assignor to Beloit Iron Works, Beloit, Wis., a corporation of Wisconsin

Application May 26, 1948, Serial No. 29,203

6 Claims. (Cl. 74-241)

1

2

This invention relates to paper making machines, and more particularly to a guide to retain a web such as a felt or wire in proper alignment as it travels over supporting rolls.

Various devices have heretofore been made to retain the web centered on the rolls of a paper making machine and maintain it in that position; but such devices have been rather costly to manufacture and are delicate in operation.

In web guides heretofore made, the construction was such that the control member had to be situated close to the point of control. It has been found desirable to have the control member itself located at a point adjacent the operator so that he can conveniently adjust it to properly guide the web. The operating mechanism to move the web on the rolls may be more conveniently placed at a point somewhat remote from the control member.

It is an object of the present invention to provide a web guide for paper making machines which will be simple in construction and economical to manufacture.

Another object is to provide a web guide which will be rugged, and relatively free from failures.

A further object is to provide a web guide which lends itself readily to remote control.

A still further object is to provide a web guide which will have full hydraulic control.

Another object of the invention is to provide a web guide control which may be remotely actuated.

Other objects and advantages of the invention will become apparent upon considering the following specification, which, when read in connection with the accompanying drawings, illustrate a preferred form of the invention.

On the drawings:

Figure 1 is an end elevational view partly in cross section, showing a web guide embodying a preferred form of the present invention.

Figure 2 is a side elevational view of the guide roll and actuator shown in Figure 1;

Figure 3 is a cross-sectional plan view of the control valve and control paddle;

Figure 4 is a plan view to somewhat reduced scale of the web guide and control, showing the belt in maximum position towards the left; and

Figure 5 is a view similar to Figure 4, but showing the belt in maximum position toward the right.

Referring to the drawings, a felt web 10 passes over a plurality of rolls (not shown) on which the web must remain centered. A guide roll 12 is supported from a frame 14 in any convenient

manner, such as by mounting the roll in a spherical bearing 15 in the lower end of a link 17, the link being pivotally supported on a pin 18 in the upper part of the frame 14. The opposite end of the roll 12 is supported on a frame 19 which may be an integral part of the frame 14 by means of a spherical bearing 20 so that as the link 17 pivots about the pin 18, the guide roll will rotate freely between the spherical bearings 15 and 20.

The link 17 is joined to an actuating diaphragm 22 by a pressure rod 24 which may be rigidly connected to a diaphragm support 28 and pivotally connected to the link 17 in the usual manner. The diaphragm 22 is held in a diaphragm chamber 25 by means of a link 26 pivotally connected to both the frame and the central portion of the diaphragm support 28. Pressure in the chamber 25 moves the link to the right, as shown in Figure 1, against the tension of a spring 27. Upon release of pressure in the chamber 25, the spring 27 moves the lower end of the link 17 to the left, as seen in Figure 1.

Fluid, such as air, may enter the chamber 25 through a pipe 30. The air is supplied from a source (not shown) through a pipe 31 from whence it passes through a pressure regulating valve 32, the pressure beyond the valve 32 being recorded on a gauge 33. The valve 32 limits the maximum pressure in the line beyond the valve so that it does not rise above a desired maximum, and may be set at any pressure desired.

A bleed or needle valve 35 permits the air to pass slowly into a T 36 from whence it enters the pipe 30 to the chamber 25. The second branch of the T has a pipe 38 connected thereto which leads to a relief valve 40. As shown in Figure 1, the relief valve 40 is mounted on a standard 39 and held in adjusted position by means of a set screw 39'.

The relief valve 40 may comprise a hollow conical member 41 and a solid conical member 42 having an annular groove 43 thereabout, the member 42 fitting within the member 41 and capable of forming a tight fit therein. The air from the pipe 38 enters the hollow conical member 41 at the top adjacent a groove 43 and may bleed out between the members 41 and 42, the amount of bleeding depending upon the separation between the conical members 41 and 42.

The maximum rate of bleeding of the valve 40 is small as compared with the capacity of the diaphragm chamber 25, so that small changes in the setting of the valve 40 do not immediately effect movement of the diaphragm 22.

3

A bracket 47 is mounted on one side of the bleed valve 40, and has a link 48 which is pivoted at one end thereto. A link 49 is pivotally connected to the bracket 47 and has an actuator rod 50 pivotally connected to its opposite end. The rod 50 is pivotally connected to the solid conical member 42 through an ear 51 formed on the base of the conical member 42.

A second bracket 53 is formed on the valve 40 substantially opposite to the bracket 47 and carries a tension spring 55, which is connected at its opposite ends to the bracket 53 and the free end of the actuator rod 50 and constantly urges the valve 40 into closed position.

Regulating screws 56 and 57 contact the tip of the cone 42 and an ear 58, respectively, to limit inward movement of the conical member 42, and permit complete closing of the valve while at the same time preventing binding of the conical members 41 and 42.

A paddle 60 is carried on the end of the actuator rod 50 opposite the spring 55, the paddle 60 contacting the edge of the felt web 10. As the web 10 moves from one side of the roll 12 to the other, it moves the paddle 60 correspondingly, causing the valve 40 either to open or to close.

The paddle may be positioned on the web 10 with the web in its desired position by means of the set screw 38', so that approximately one-half the maximum pressure bleeds out of the chamber 25 through the valve 40. When this condition is attained, the paddle 60 and the roll 12 may be said to be in neutral position and the axis of the roll 12 is at right angles to the direction of travel of the web. As long as the paddle and roll retain this neutral position, the web 10 continues to move over the roll 12 and the roll 12 does not effect its lateral movement.

However, if the edge of the web 10 moves to the left, as seen in the plan views of Figures 4 and 5, the paddle 60 will close the valve 40 causing air pressure to build up in the diaphragm chamber 25 and cause that end of the roll to move to the right, as seen in Figure 1, or to the position shown in Figure 5. The roll 12 would then effect lateral movement of the web 10 to the right, returning the paddle 60 towards its neutral position. As the paddle 60 moves toward its neutral position, it gradually opens the valve 40 wider causing more air to bleed out of the valve and reducing the pressure in the chamber 25. As the pressure in the chamber 25 is reduced, the spring 27 returns the roll 12 towards its neutral position. Thus both the paddle 60 and the roll 12 move towards their neutral position simultaneously and, as the paddle 60 regains its neutral position, the roll 12 has regained its neutral position, and no further lateral movement of the web takes place.

Should the web move to the right, the paddle moves to the right and opens the valve 40 wider permitting more air to bleed out of the diaphragm chamber 25. The reduced pressure in the diaphragm chamber 25 permits the spring 27 to move that end of the roll 12 forward along the direction of travel of the web 10 as seen in Figure 4. Movement of that end of the roll forwardly along the direction of the web causes the web to move laterally to the left as seen in Figure 4 which in turn returns the paddle 60 towards its neutral position. As the paddle 60 moves towards its neutral position, it gradually closes the valve 40 which causes less air to bleed from the chamber 25 and permits air entering the

4

pipe 30 from the bleed valve 35 to build up pressure within that chamber. The increased pressure of the air in the chamber 25 acts on the connecting rod 24 to move that end of the roll 12 to the right as seen in Fig. 1 against the action of the spring 27. Thus the roll 12 and the paddle 60 simultaneously move towards their neutral position and, when the paddle 60 reaches its neutral position, the roll 12 also reaches its neutral position and no further movement ensues.

For each setting of the pressure regulating valve 32, there is a corresponding position of the paddle 60 and hence of the web 10, which will cause just sufficient air to bleed from the valve 40 to retain the roll 12 in its neutral position, or perpendicular to the longitudinal axis of the web. The position of the web on the machine may, therefore, be adjusted by varying the setting of the pressure regulating valve 32.

It will be noted that the neutral position of the web may also be varied on the roll by turning the valve 40 slightly on its standard 39 and retaining it in the desired position by the set screw 39' without varying the setting of the valve 32.

The web 10 is thus kept centered at any desired position on the rolls and maintained in that position constantly.

It is obvious that the guide roll 12 may be placed at any position along the machine, and that the paddle 60 and bleed valve 40 may be positioned at any point on the web convenient to the operator. The operator may thus control the position of his web while not being bothered by the proximity of the guide roll 12.

The heretofore described invention is to be taken merely as a preferred form thereof, and it is to be understood that various changes in size, shape and arrangement of parts may be made without departing from the spirit of the invention or the scope of the subjoined claims.

That which is claimed as new and is desired to be secured by United States Letters Patent is:

1. In a traveling web guide of the character described, a guide roll, a spherical bearing supporting one end of said roll, a frame, a link pivotally connected to said frame, a spherical bearing in the lower end of said link adapted to receive and rotatably support the opposite end of said guide roll, a chamber-defining member carried by said frame, a diaphragm in said chamber, a pressure rod connecting said diaphragm with said link whereby pressure in said chamber moves that end of the roll rearwardly relative to the movement of said web, a spring connecting said link with said frame and constantly urging the last named end of the roll forwardly along the direction of the movement of the web and against the action of said pressure rod, means to supply pressure slowly to said chamber, a bleed valve adapted to bleed air from the source and from said chamber, a paddle contacting the edge of said traveling web, and means connecting the paddle to said bleed valve whereby movement of the web transversely in one direction bleeds air from the chamber and movement of the web transversely in the other direction closes the bleed valve to permit air to build up in the chamber.

2. In a traveling web guide of the character described, a guide roll, a bearing supporting one end of said roll to provide universal movement therefor, a frame, a link pivotally connected to said frame, a bearing in the lower end of said link adapted to receive and rotatably support

the opposite end of said guide roll for movement about said pivot, a pressure rod connected with said link whereby pressure on the rod moves that end of the roll rearwardly relative to the movement of said web, means connected to said link and constantly urging the last named end of the roll forwardly along the direction of the movement of the web and against the action of said pressure rod, means to vary pressure slowly against said rod, a paddle contacting the edge of said traveling web, and means connected to the paddle to actuate said rod whereby movement of the web transversely in one direction increases pressure on said rod, and movement of the web transversely in the other direction decreases pressure on said rod.

3. In a traveling web guide of the character described, a guide roll, a spherical bearing supporting one end of said roll, a frame, a link pivotally connected to said frame, a spherical bearing in the lower end of said link adapted to receive and rotatably support the opposite end of said guide roll while permitting limited longitudinal movement, a pressure chamber-defining member carried by said frame, a diaphragm in said chamber, a pressure rod connecting said diaphragm with said link whereby an increase in pressure in said chamber moves that end of the roll rearwardly relative to the movement of said web, means operable upon a decrease in pressure to move the roll forwardly along the direction of the movement of the web and against the action of said pressure rod, means to supply pressure slowly to said chamber, a bleed valve adapted to bleed air from the source and from said chamber, a paddle contacting the edge of said traveling web, and means connecting the paddle to said bleed valve whereby movement of the web transversely in one direction bleeds air from the chamber and movement of the web transversely in the other direction closes the bleed valve to permit air to build up in the chamber.

4. In a traveling web guide of the character described, a frame, a guide roll mounted in said frame and journaled at one end in a spherical bearing and at the other end in a pivoted link for free rotation with said other end thereof having limited longitudinal movement relative to said web about said one end, a pressure chamber member carried by said frame, a diaphragm in said chamber, a pressure rod connecting said diaphragm with said roll whereby an increase in pressure in said chamber moves that end of the roll rearwardly relative to the movement of said web, resilient means operable upon a decrease in pressure to move the roll forwardly along the direction of the movement of the web and against the action of said pressure rod, means to supply pressure slowly to said chamber, a bleed valve adapted to bleed air from the source and from said chamber, a paddle contacting the edge of said traveling web, and means connecting the paddle to said bleed valve whereby movement of the web transversely in one direction bleeds air from the chamber and effects longitudinal movement of the roll in one direction under the influence of said resilient means, and movement of the web transversely in the other direction closes the bleed valve to permit air to build up in the chamber and effect longitudinal movement of the roll in the opposite direction.

5. In a traveling web guide of the character described, a guide roll, a spherical bearing supporting one end of said roll, a frame, a link pivotally connected to said frame, a spherical bearing in the lower end of said link adapted to receive and rotatably support the opposite end of said guide roll, a chamber-defining member carried by said frame, a diaphragm in said chamber, a pressure rod connecting said diaphragm with said link whereby pressure in said chamber moves that end of the roll rearwardly relative to the movement of said web, a spring connecting said link with said frame and constantly urging the last named end of the roll forwardly along the direction of the movement of the web, against the action of said pressure rod, a fluid pressure line to supply fluid pressure to said chamber, a bleed valve adapted to bleed fluid under pressure into said line, a second bleed valve adapted to bleed fluid pressure from said line and from said chamber, a paddle contacting the edge of said traveling web, and means connecting the paddle to said second bleed valve whereby movement of the web transversely in one direction opens said second bleed valve and bleeds air from the chamber and causes movement of the roll in one direction and movement of the web transversely in the other direction closes said second bleed valve to permit air to build up through the first bleed valve into the chamber and causes movement of the roll in the opposite direction.

6. A guide for a felt web or the like comprising a roll adapted to receive said web, means supporting said roll for rotation about its longitudinal axis, said means including a spherical bearing journaling one end of said roll and a pivoted arm journaling the other end of said roll, said spherical bearing accommodating pivoting movement of said roll about said one end, balanced fluid pressure diaphragm means and resilient spring means for effecting pivoting movement of said arm supporting the other end of said roll, said diaphragm means and said spring means normally maintaining said roll in an intermediate position with its axis of rotation substantially normal to the direction of travel of the web, a bleed valve having a variable orifice controlling the pressure on said diaphragm, and follower means contacting said web for determining the setting of said bleed valve to vary the fluid pressure on said diaphragm thereby causing pivoting movement of said arm and said roll about said one roll end to accommodate shifting of said web relative to said roll, movement of said roll in one direction against the action of said spring means being effected by increased fluid pressure on said diaphragm means and in the other direction by the action of said spring means against reduced fluid pressure on said diaphragm.

LLOYD HORNOSTEL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
711,139	Warren	Oct. 14, 1902
2,199,893	Norton et al.	May 7, 1940
2,291,830	Obenshain	Aug. 4, 1942
2,331,030	King	Oct. 5, 1943