

July 16, 1935.

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2,008,318

GUIDE ROLL

Filed Dec. 1, 1934

2 Sheets-Sheet 1

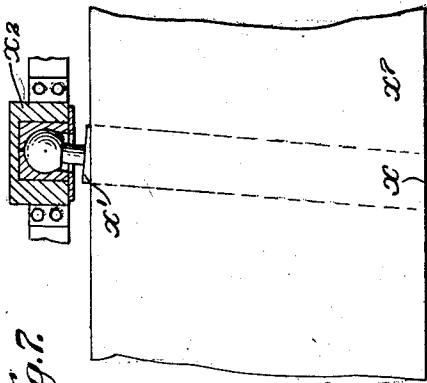


Fig. 1.

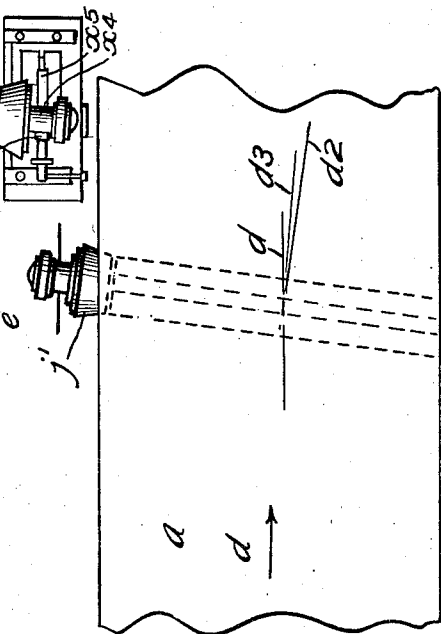


Fig. 2.

Fig. 3.

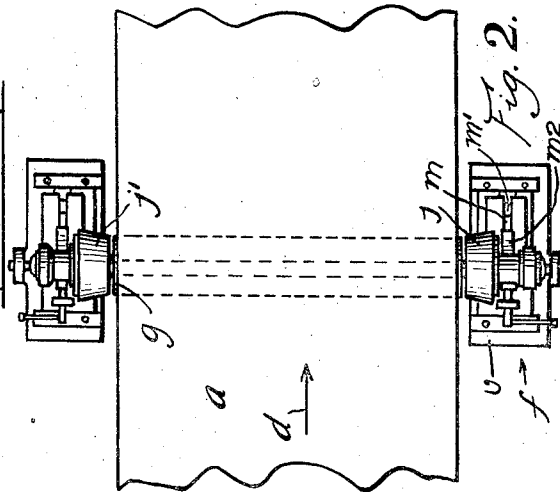


Fig. 3.

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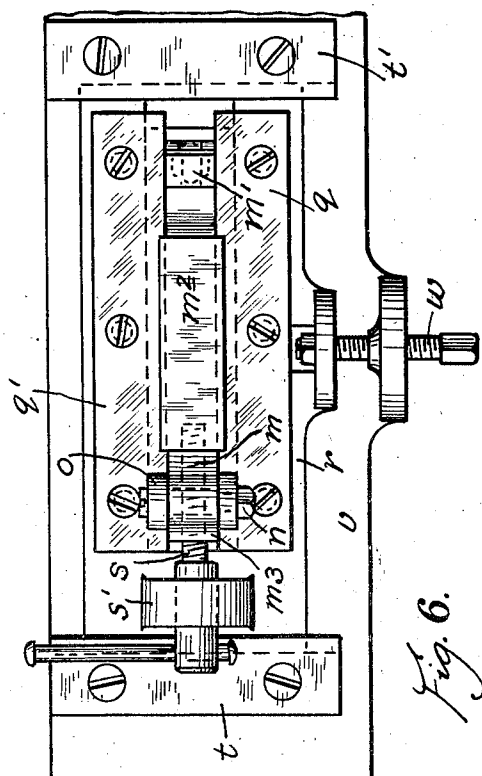
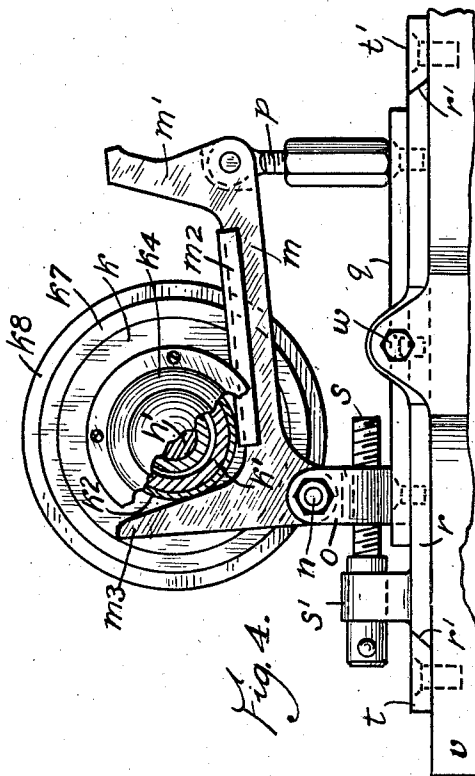
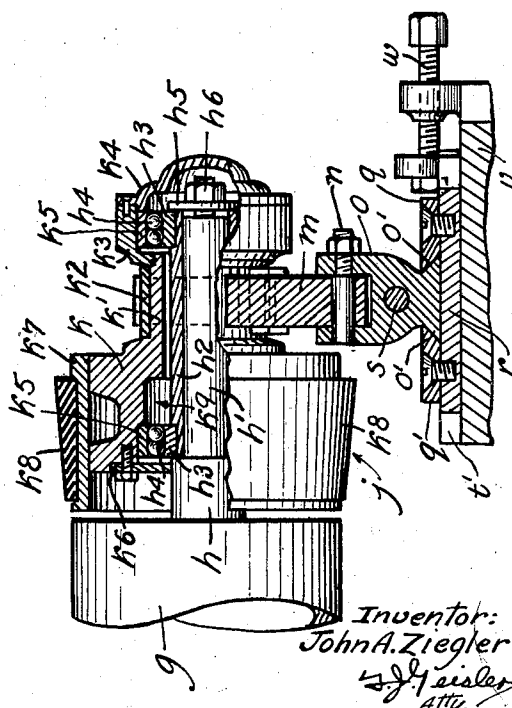
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,008,318

GUIDE-ROLL

John A. Ziegler, Camas, Wash.

Application December 1, 1934, Serial No. 755,546

12 Claims. (Cl. 74-241)

My invention relates to guide-rolls used in paper making and other machines to keep the belt-like carriers or "felts" in such machines in proper position.

In such machines there is a tendency for the felt to creep to one end or the other of the rolls carrying it and thus to get out of its proper position and, if not corrected, finally to come into contact with one side or the other of the machine frame, resulting in trouble and damage. Guide-rolls, as well known, are used to keep the felt in proper position; but those heretofore employed have been complicated and involved operating difficulties, or else tended to cause excessive or uneven wear on the edge of the felt.

The object of my invention is to combine directly with a guide-roll means by which either end of the guide-roll will automatically be moved forward, with the creeping of the felt to that end of the roll, by the frictional drag of the felt, and thereby cause the axis of the guide-roll to be thrown out of perpendicular with the direction of travel of the felt. Since the tendency of the traveling felt is to follow, in general, a path perpendicular to the axis of rotation of the roll with which it is in frictional contact, the moving forward of one end of the guide-roll will cause the felt to creep towards the other end and thus be brought back into alignment.

A further object of my invention is to have the said means in combination with the guide-roll function automatically to cause the axis of rotation of the guide-roll again to assume a position perpendicular to the direction of travel of the felt as soon as the felt is brought back into proper alignment.

A still further object of my invention is to have the neutralizing of the tendency of the felt to creep to one side or the other of the machine, and the bringing back of the felt into proper alignment on the guide-roll, done not only automatically but also in such manner as to avoid injury to or uneven pulling of the felt, and furthermore with such dependability that no supervision or vigilance on the part of the machine tender is required.

The above enumerated and other advantageous features of my improved guide-roll are herein-after fully described with reference to the accompanying drawings, in which:

Fig. 1 illustrates, diagrammatically, a side elevation of a portion of the drier section in a paper machine with my felt guide-roll installed;

Fig. 2 is a fragmentary plan view of a felt in contact with my guide-roll;

Fig. 3 is a similar fragmentary diagrammatic plan view, showing an exaggerated position of my guide-roll due to the felt traveling out of line, and illustrating the cooperative actions of the felt and the guide-roll;

Fig. 4 is a larger scale side elevation of my guide-roll support, and showing an end of the guide roll partly in section;

Fig. 5 is a sectional side elevation of one end of my guide-roll and its support;

Fig. 6 is a top view of the guide-roll support shown in Fig. 4; and

Fig. 7 is a fragmentary plan view, partly in section, illustrating a modified form of my invention.

Referring first to Fig. 1, *a* indicates the felt in the drier section of a paper making machine, *b* and *b'* the drier rolls, and *c, c* the felt supporting rolls. The arrows *d* indicate the direction of travel of the felt *a*. My guide-roll is indicated by *e*, and the support for one end of the guide-roll by *f*; the latter being assumed to be attached to the front of the machine frame (not shown) on which are journaled also the driers *b, b'* and the rolls *c, c*.

The arrangement of my guide-roll *e* is shown by Fig. 2, and its construction is shown by Fig. 5. It comprises a roller *g* mounted on a shaft *h*, the ends of which are journaled in a pair of rotatable, laterally movable elements, or wheels, *j* and *j'*, alike in construction.

Fig. 5 shows one end of the guide-roll with the wheel *j* partly in section. The diameter of the shaft *h* is reduced at *h'*, and such reduced end of the shaft is fitted with a sleeve *h2*. Annular channels are cut in each end of the sleeve *h2* to accommodate the two rings *h3*, constituting the inner races for the ball bearings *h4*. The end of the shaft *h* is threaded and carries a washer *h5* and a nut *h6*, the function of washer *h5* and nut *h6* being to hold the sleeve *h2*, and with it the races *h3*, in place. The body of the wheel is indicated by *k* and its shape is shown by the sectional view in Fig. 5.

The hub *k'* of the wheel carries a collar or wear ring *k2*, to sustain the wear of the wheel in riding on the supporting rail *m*. On the end of the hub *k'* is threaded a collar or retainer *k3* to which in turn is screwed the end plate *k4*. The collar or retainer *k3* houses one of the outer ball bearing races *k5*. The other outer ball bearing race *k5* is accommodated by a recess in the wheel body *k*. A circular plate *k6* is screwed to the inner end of the wheel body *k* for the purpose of sealing the chamber *k9* for lubricant. The

periphery of the wheel body *k* is provided with a ring *k1* having an annular external channel for holding a conical ring *k8*, surfacing the portion of the wheel which contacts with the felt. The ring *k8* is made of leather, rubber or similar material in order to present a surface on which the traveling felt will have a frictional grip. The thickness of the ring *k8* is graduated, the thinnest edge being that adjacent to the roller *g*, so that the ring *k8* gives to each of the wheels *j* or *j'* the shape of a frustum of a cone with the smaller diameter located inward.

The support for each end of my guide-roll is shown in Figs. 4, 5 and 6. A narrow rail *m* with restraining abutments *m'*, *m3* at its ends, and with a removable bearing surface or facing *m2* is pivoted at one end to an upright support *o*, by means of a bolt *n* and is adjustably supported at the other end by the adjustable screw *p*, so as to be inclined towards the abutment *m3*. The upright support *o* has an elongated base with beveled sides *o'* bearing in parallel guide bars *q* and *q'* screwed to the plate *r*, so that the rail *m* supporting the end of the guide-roll *e* may be properly aligned. An adjustment screw *s* journaled in a lug *s'* of the plate *r* is threaded in the upright support *o* and enables the rail *m* to be aligned on the paper machine frame. The rails *m* and their supports are also adjustable towards and from each other. The plate *r* has its lateral edges *r'* beveled, and this plate slides in the parallel guide bars *t* and *t'* screwed to the base *v* fastened on the machine frame side, and the position of the plate *r* with reference to the plate *v* is adjustable by the adjustment screw *w*.

The purpose of having the rails *m* inclined, as shown in Fig. 4, is to cause each end of the guide-roll normally to bear against the abutments *m3* on the rails *m*, as shown in Fig. 4.

It is to be understood that the construction of the supports for the guide-roll *e* at both ends is the same.

The operation of my guide-roll is as follows: When the felt *a* is in proper alignment crosswise of the machine on the guide-roll *e* (Fig. 1), the wheels *j* and *j'* (Fig. 2) carried by the ends of the guide-roll *e* will not be in contact with the felt, and hence will be at rest by gravity against the abutments *m3* at the lower ends of the inclined supporting rails *m*. The felt runs over the roller *g* of the guide-roll *e* in the direction indicated by the arrows *d* in Figs. 1, 2 and 3; the roller *g* and its supporting shaft *h* being free to rotate in the journal bearings provided in the wheels *j* and *j'*. As long as the felt *a* runs entirely on the roller *g*, and consequently is centrally located in the machine, the guide-roll *e* will remain in the position shown in Fig. 2. But, when the felt *a* creeps towards either side of the machine, as illustrated in Fig. 3, the frictional drive of the felt on the wheel *j'* with which it thus comes in contact, will cause that wheel to roll forward on its supporting rail, thus advancing the corresponding end of the guide-roll. The further out the felt *a* rides on the wheel *j'* the greater will be the tendency for that end of the guide-roll to be advanced, due to the tapered surface presented by the contacting portion of the wheel *j'*. But as the end of the guide-roll *e* is advanced its axis of rotation is thrown out of perpendicular to the line of travel *d* of the felt. Since the tendency of the felt is to follow a path perpendicular to the axis of rotation of a roller with which it is in frictional contact, as already mentioned, a directional force, indicated by the

line *d2* in Fig. 3, is exerted on the felt *a*. The resultant of the two directional forces *d* and *d2* is to cause the felt to take an intermediate course such as *d3*, which will bring the felt back into the proper position on the roller *g* of the guide-roll. As soon as this occurs, since there is no longer any contact of the felt with the wheel *j'*, that end of the guide-roll moves back against the abutment *m3* of the rail *m*, to its normal position illustrated in Fig. 2.

A similar action takes place if the other edge of the felt *a* moves out onto the other wheel *j*, in which case the corresponding end of the guide-roll is advanced until the position of the felt has been corrected.

While I deem it preferable that both ends of the guide or felt roll be journaled in my above described movable roll positioning bearing, for a simpler construction only one end of the roll might be so journaled, and the other end journaled in any suitable stationary bearing, adapted, however, to permit the axis of the roll angular movement about such bearing. But, in the latter arrangement the last mentioned bearing should be located slightly forward, in the direction of felt travel, of said movable roll positioning bearing, when such bearing is located by gravity at its normal place of rest, that is, at the lower, rearward end of its supporting track *m*, so that the tendency of the felt will be to move towards the movable journal bearing, and cause the latter to function constantly.

In Fig. 7, in which this modified construction is illustrated, the guide roll *x* has its shaft at one end *x'*, pivotally journaled in the stationary bearing *x2*, and the other end *x3* journaled in my movable bearing *x4*, as previously described. The supporting track *x5* for the movable bearing *x4* has its lower end at *x6*, that is to say slightly rearward, in reference to the line of travel of the felt *x7*. Thus the tendency of the felt to creep towards the end *x3* of the guide roll will cause the movable bearing *x4* to be moved forward on the track *x5*.

I claim:

1. In a paper making machine, a guide-roll whose ends are journaled in rotatable wheels movable in the direction of the felt travel, said wheels riding on rails carried by the sides of the machine frame, said rails provided with abutments at their ends, and inclined downwardly in the direction opposite to that in which the felt travels, said wheels normally resting against the lower of said abutments, whereby the felt on creeping towards either side of the machine will contact one of said wheels and roll it ahead, thereby advancing the corresponding end of the guide-roll and effecting the correction of said creeping.

2. In a paper making machine, a guide-roll whose ends are journaled in rotatable wheels movable in the direction of the felt travel, said wheels riding on rails carried by the sides of the machine frame and transversely and longitudinally adjustable thereon, said rails provided with abutments at their ends, and inclined downwardly in the direction opposite to that in which the felt travels, said wheels normally resting against the lower of said abutments, whereby the felt on creeping towards either side of the machine will contact one of said wheels and roll it ahead, thereby advancing the corresponding end of the guide-roll and effecting the correction of said creeping.

3. In a paper making machine, a guide-roll

whose ends are journaled in rotatable wheels movable in the direction of the felt travel, said wheels riding on rails carried by the sides of the machine frame and transversely and longitudinally adjustable thereon, said rails provided with abutments at their ends, and adjustably inclined downwardly in the direction opposite to that in which the felt travels, said wheels normally resting against the lower of said abutments, whereby the felt on creeping towards either side of the machine will contact one of said wheels and roll it ahead, thereby advancing the corresponding end of the guide-roll and effecting the correction of said creeping.

4. In a paper making machine, a guide-roll whose ends are journaled in rotatable wheels movable in the direction of the felt travel, said wheels having cylindrical rail-riding portions, said wheels riding on rails carried by the sides of the machine frame, said rails provided with abutments at their ends, and inclined downwardly in the direction opposite to that in which the felt travels, the rail-riding portions of said wheels normally resting against the lower of said abutments; whereby the felt on creeping towards either side of the machine will contact one of said wheels and roll it ahead, thereby advancing the corresponding end of the guide-roll and effecting the correction of said creeping.

5. In a paper making machine, a guide-roll whose ends are journaled in rotatable wheels movable in the direction of the felt travel, said wheels having cylindrical rail-riding portions, wear collars mounted on said rail-riding portions, said wheels riding on rails carried by the sides of the machine frame and transversely and longitudinally adjustable thereon, said rails provided with abutments at their ends, and adjustably inclined downwardly in the direction opposite to that in which the felt travels, the rail-riding portions of said wheels normally resting against the lower of said abutments, whereby the felt on creeping towards either side of the machine will contact one of said wheels and roll it ahead, thereby advancing the corresponding end of the guide-roll and effecting the correction of said creeping.

6. In a paper making machine, a guide-roll having projecting journal portions at its ends, rotatable members mounted on said journal portions, the mounting thereof including ball bearings and lubricant retaining elements, peripherally mounted friction rings carried by said rotatable members, rails carried by the sides of the machine frame, said rails provided with abutments at their ends, and inclined downwardly in the direction opposite to that in which the felt travels, said rotatable members adapted to ride on said rails and normally resting against the lower of said abutments.

7. In a paper making machine, a guide-roll having projecting journal portions at its ends, rotatable members mounted on said journal portions, the mounting thereof including ball bearings and lubricant retaining elements, peripherally mounted friction rings carried by said rotatable members, rails carried by the sides of the machine frame and transversely and longitudinally adjustable thereon, said rails provided with abutments at their ends, and adjustably inclined downwardly in the direction opposite to that in which the felt travels, said rotatable members adapted to ride on said rails and normally resting against the lower of said abutments.

8. The combination described by claim 7 with

the friction rings made conical and with the smallest circumferences of said rings opposed to each other.

9. In a paper making machine, a guide-roll having projecting journal portions at its ends, rotatable members mounted on said journal portions, the mounting thereof including ball bearings and lubricant retaining elements, said rotatable members having rail-riding portions, peripherally mounted friction rings carried by said rotatable members, rails carried by the sides of the machine frame and transversely and longitudinally adjustable thereon, said rails provided with abutments at their ends, and adjustably inclined downwardly in the direction opposite to that in which the felt travels, the rail-riding portions of said rotatable members adapted to ride on said rails and normally resting against the lower of said abutments.

10. In a paper making machine, a guide-roll having projecting journal portions at its ends, rotatable members mounted on said journal portions, the mounting thereof including ball bearings and lubricant retaining elements, said rotatable members having rail-riding portions, wear collars mounted on said rail-riding portions, peripherally mounted friction rings carried by said rotatable members, rails carried by the sides of the machine frame and transversely and longitudinally adjustable thereon, said rails provided with abutments at their ends, and adjustably inclined downwardly in the direction opposite to that in which the felt travels, the rail-riding portions of said rotatable members adapted to ride on said rails and normally resting against the lower of said abutments.

11. In a paper making machine, a guide-roll having projecting journal portions at its ends, rotatable members mounted on said journal portions, the mounting thereof including ball bearings and lubricant retaining elements, said rotatable members having rail-riding portions, wear collars mounted on said rail-riding portions, peripherally mounted, conical friction rings carried by said rotatable members with the smallest circumferences of said rings opposed to each other, rails pivotally mounted on bases movably supported for transverse and longitudinal adjustment on the sides of the machine, means for effecting said adjustments of the supporting bases of the rails, said rails provided with abutments at their ends, and adjustably inclined downwardly in the direction opposite to that in which the felt travels, the rail-riding portions of said rotatable members adapted to ride on said rails and normally resting against the lower of said abutments.

12. In a paper making machine, a felt-roll guiding means comprising a movable bearing in which one end of the felt-roll is journaled, and supported on a trackway inclined downwardly in the direction opposite to that in which the felt travels, said trackway provided with abutments at its ends to limit the movement of said movable bearing, the latter being normally held by gravity against the lower of said abutments; the other end of the felt-roll journaled in a stationary bearing, adapted to permit the roll journal angular movement about such bearing; said stationary bearing located slightly forward, in the direction of felt travel, of said movable bearing when the latter bearing is at its place of rest at the lower end of said trackway; whereby to cause the felt to tend to move towards said movable journal bearing, and cause the latter to function constantly.

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