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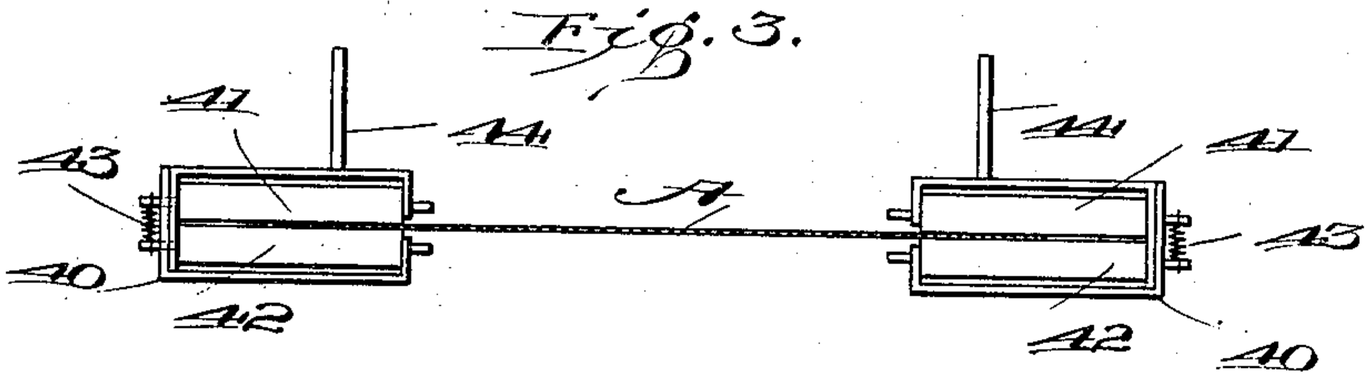
J. & A. DEY.

RIBBON MECHANISM FOR TIME RECORDERS, &c.

APPLICATION FILED JULY 14, 1903.

Fig. 3.



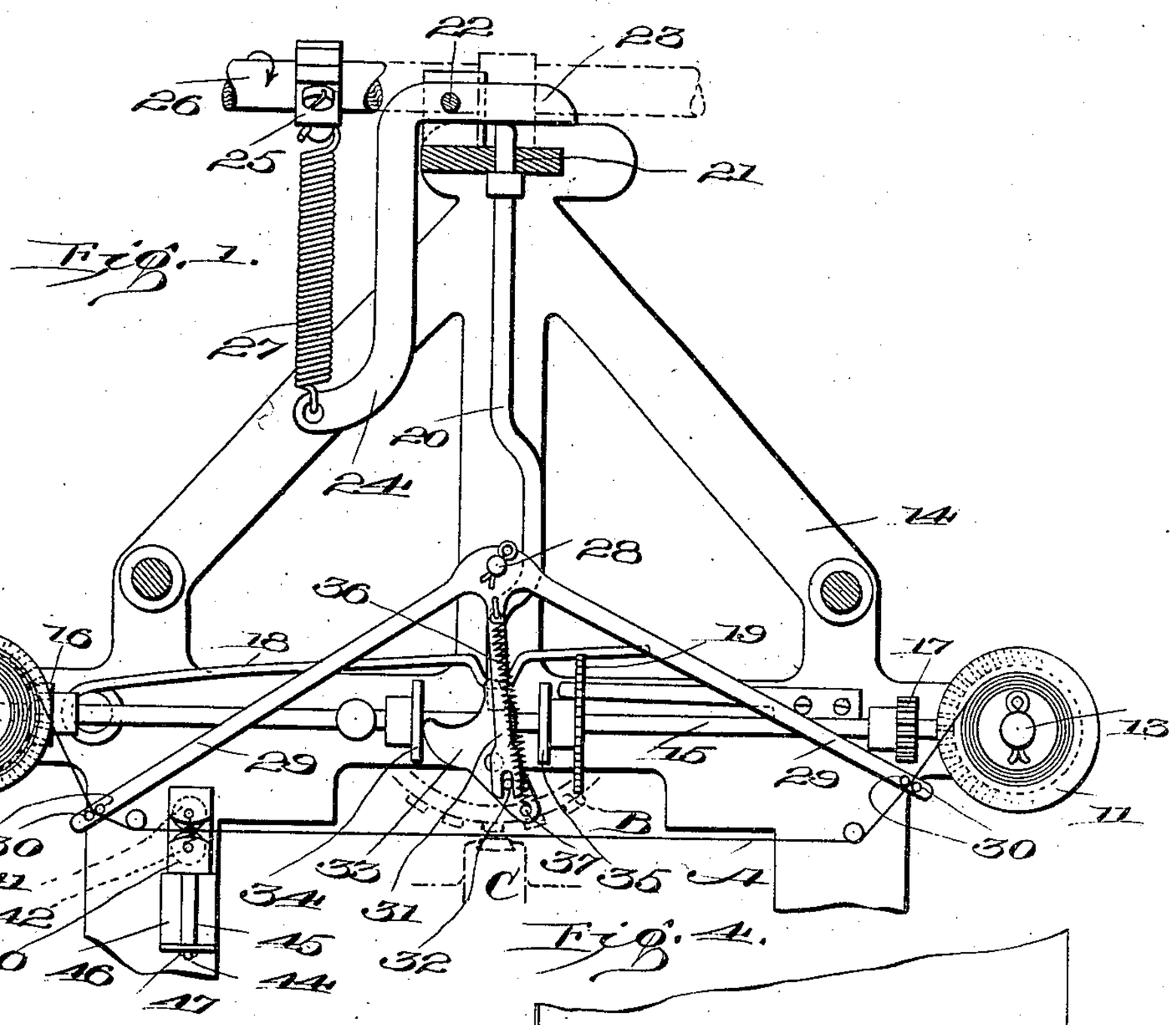


Fig. 1.

Fig. 4.

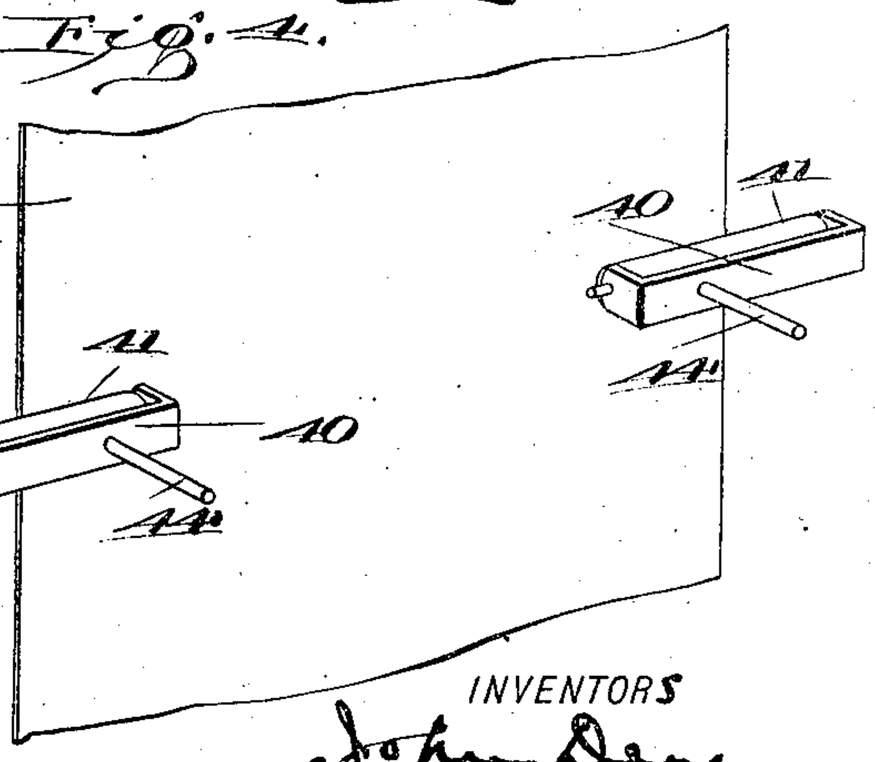
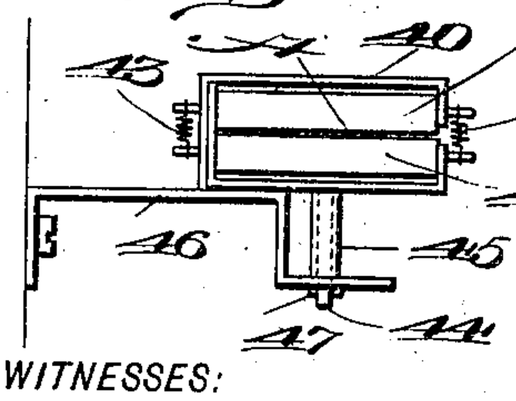


Fig. 2.



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RIBBON MECHANISM FOR TIME-RECORDERS, &c.

No. 848,294. Specification of Letters Patent. Patented March 26, 1907.

Application filed July 14, 1903. Serial No. 165,520.

To all whom it may concern:

Be it known that we, JOHN DEY, residing at Syracuse, in the county of Onondaga and State of New York, and ALEXANDER DEY, residing at Glasgow, in the county of Lanark, Scotland, have invented certain new and useful Improvements in Ribbon Mechanism for Time-Recorders, &c., of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a ribbon-guide; and its object is to provide an improved means for guiding a traveling ribbon, band, or web such that correct alinement and travel thereof may be secured.

The invention will be hereinafter described in detail and the novel features thereof pointed out in the claims.

In the accompanying drawings, Figure 1 is a top plan view showing the ribbon-guide used in connection with the inking-ribbon of a time-recorder for which it is especially adapted. Fig. 2 is a detail in side elevation of the guide-rolls shown in Fig. 1, the ribbon being shown in section. Fig. 3 shows the application of the same principle for controlling the travel of a relatively wide band or web. Fig. 4 shows the application of the principle to a vertically-traveling web.

Similar reference characters refer to similar parts throughout the several views.

Referring first to Figs. 1 and 2, the spools of the ribbon mechanism of a time-recorder are shown at 10 and 11, respectively. These spools are mounted upon studs 12 and 13, carried by frame 14, and they are adapted to be alternately rotated to wind the ribbon first on one spool and then on the other by the reversing mechanism shown. The shaft 15 is mounted so as to slide longitudinally in suitable bearings, these bearings being preferably formed in the studs below the spools, as shown in dotted lines. Carried by this shaft are gears 16 17, adapted to mesh alternately at different positions of the shaft with crown-gears, shown in dotted lines as being carried by the lower flanges of the spools 10 and 11, respectively. The shaft 15 is rotated by means of a spring-pawl 18, which engages a ratchet-wheel 19 on the shaft, the spring-pawl being actuated by a lever 20, provided with a bearing in a suitable part of the framework, as at 21, and adapted to be reciprocated in order to actuate the spring-pawl by a bell-crank lever pivoted at 22, the short arm 23 of which is adapted to engage the end of lever 20. The long arm 24 of this bell-crank lever is connected to an arm 25 on an actuating-shaft 26, preferably through a yielding connection, as by a spring 27. Thus it can be seen that when the actuating-shaft is rotated in the direction indicated by the arrow the bell-crank lever will be rocked in its pivot and the pawl 18 forced inwardly and downwardly, thereby rotating the shaft 15 through a space proportional to one tooth of the ratchet or one stroke of the pawl. With the parts in the position illustrated the gear 16 at the left end of the shaft will be in engagement with its spool, while the gear 17 at the other end is out of engagement, and the ribbon would be wound on the spool 10, while the other spool revolves loosely upon its stud.

In order to reverse the direction of the ribbon when it has all been wound on one spool, we show a reversing mechanism which embodies a lever pivoted upon a stud on the framework, as at 28, and provided with two outer arms 29 29, each of which carries at its end two pins 30 30, between which the ribbon passes. A third arm of the lever, as at 31, is notched or forked at its end to engage a pin 32, carried by a lever 33, pivoted to the framework and adapted when swung upon its pivot to engage alternately collars 34 35, rigid with the shaft 15. A spring 36 is connected at one end to the upper end of the arm 31 and at the other end to a pin 37, carried by the lever 33 below its pivot. The general operation of this reversing mechanism does not differ from well-known devices of this character. A rib or projection is carried by the traveling ribbon A, near each end thereof, and when the ribbon is exhausted on one spool this projection will engage the two pins 30 at the corresponding side of the mechanism and swing the three-armed lever as the ribbon is fed along. Through the described connection between the arm 31 of the lever and the swinging lever 33 the lever 33 will swing upon its pivot, striking the opposite one of the collars 34 and 35 from the one with which it had been before engaged and shifting the shaft 15 longitudinally to bring the actuating mechanism into engagement with the other

spool, thereby reversing the direction of the ribbon. The spring 36 tends to hold the lever 33 on whichever side of its pivot it may be swung and prevents accidental movement thereof.

A section of a printing-wheel is indicated at B, and of the platen at C, as convenient illustrations of the printing mechanism with which the ribbon is to be used. At some convenient point in the passage of the ribbon there is interposed the guide with the operation of which this invention is chiefly concerned and which is shown in top plan in Fig. 1 and in side elevation in Fig. 2.

A frame 40 provides bearings for the ends of two small rollers 41 42, which may, if desired, be pressed together by means of springs 43 at one or both ends thereof. In the middle of this frame and at right angles thereto is attached a stud 44, which passes loosely through the tube 45, carried by an arm 46, projecting from the framework. Where the position of the parts is such that the frame with its stud might tend to work away from the tube, this may be prevented by a pin 47, passing through the stud below the arm 46. Such a ribbon-guide may be interposed at any desired point in the path of the ribbon and may be advantageously used with a ribbon traveling in any plane—that is, whether the axes of the spools are horizontal, vertical, or at any other angle to the framework. It is particularly adapted, however, for use with a ribbon traveling in a vertical plane, with the axes of the spools vertical, inasmuch as under such conditions the ribbon is especially likely to deviate from its path or get out of alinement, thereby preventing the proper action of the printing mechanism and eventually stopping the working of the machine. The reason for this will be apparent upon considering the effect of the guide-rolls upon the traveling ribbon.

The frame 40, which carries the rollers 41, being loosely mounted in the tube 45 is free to turn about therein or to swing on an axis passing through the center of the stud 44. This stud 44, as stated, is preferably attached to the frame at exactly the longitudinal and horizontal centers thereof, and the ribbon should be so adjusted upon its spools that its center will be exactly above the center of the shaft, so that if the shaft were extended upwardly through the center of the frame and the center of the rollers it would pass through the center of the ribbon. This may perhaps be most clearly stated by saying that a plane passed through the longitudinal central line of the ribbon coincides with or includes the axial line of the stud, which is the axial line of the pivotal movement permitted to the rollers. When thus adjusted, the ribbon will travel in stable equilibrium under all conditions, and if its alinement is disturbed by any imperfection, by its own weight, or by any other cause it will be immediately brought back to normal alinement by the action of the guide-rollers. The theory upon which these rollers act appears to be as follows: While the ribbon is traveling with its center in the line of the stud, one-half the ribbon is on each side of said stud. Then the force exerted upon the guide-rollers by the traveling ribbon to make them revolve is equally divided, one-half on each side of the stud or axis, and consequently the longitudinal axes of these rollers remain at right angles to the direction of motion of the ribbon; but if the ribbon is for any cause moved to one side or the other, departing from its intended alinement, the sides of the rollers to which the ribbon has moved will have a greater portion of the rotating force exerted upon them, and consequently the rollers, with the frame, will be swung around, so that the longitudinal axes of the rollers will no longer be at right angles to the line of feed of the ribbon. The result will be that the rollers, friction between which may be caused by the spring or springs, as shown, or by coating them with some suitable frictional material, or both, will roll out the ribbon at an angle to their own axes. This direction will be slightly inclined toward the line of feed of the ribbon, and the ribbon will therefore tend to feed back until its longitudinal central line coincides again with the axis of the roller-supporting frame. When this is accomplished, the force exerted upon the rollers upon each side of the pivot-stud will again be balanced and the desired normal condition be reëstablished.

In Fig. 3 the ribbon or web A is shown as of greater width, and a set of guide-rollers is provided in conjunction with each edge thereof. Each set of rollers pulls the web toward itself, and thereby the web is kept stretched, at the same time insuring the proper alinement thereof. As in the former case, rollers 41 42 are mounted in a frame 40 and are drawn together by springs 43. In this case, however, the studs 44 are differently positioned with relation to the frame, their position depending upon the amount of the ribbon or web which it is desired should be held within the bite of the rollers in order to keep the web properly stretched and alined. The distance to which each set of rollers pulls the web toward itself is determined by the position of its stud. It will pull until there is the same width of web to the right or left of the stud as there is length of roller to the left or right of the stud, or if the stud be one-half inch or one inch from the inner end of the web the web will be pulled until its edge is one-half inch or one inch beyond the center of the stud. The same thing will occur on both sides, so that the web is kept in a stretched condition, and if it be from any cause disturbed in its normal con-

dition it will be gradually drawn back again. There must be pressure between the rollers to grasp the web, and the pressure must be proportioned to the weight of the web or band. This pressure may be obtained from the roughness of the surface of the rollers, which may be of sandpaper, or rubber, &c. When the web or band is suspended vertically, as in Fig. 4, the lower rollers are not needed, as its own weight will keep the web stretched vertically. The principle involved is exactly the same as that of Figs. 1 and 2 and is that normally equal parts of the web are on each side of the stud, as indicated in the drawings, so that the position of the stud determines the hold that the rollers will take of the web. If you move the stud nearer to the end of the roller, its hold on the web will become still less, and if you move the stud farther from the end of the roller its hold on the web will increase in exact proportion. Under some circumstances it may be found necessary in connection with the construction shown in Fig. 4 to supply additional means for keeping the web in contact with the rollers. This may be done by a holding-plate, by doubling the web around the rollers, or in various other readily-suggested ways.

Obviously the invention here disclosed may be embodied in different manners in a variety of organizations without departing from the scope thereof.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In ribbon-guiding mechanism, a roller over which the ribbon is adapted to pass, said roller being pivotally mounted to swing substantially in the plane of the ribbon, and means for holding the ribbon in contact therewith, the inclination of the axis of said roller with respect to the longitudinal center line of the ribbon being controlled by the relative areas of contact between the ribbon and the roller upon the two sides of the pivot of the latter.

2. In ribbon-guiding mechanism, in combination, a pivotally-mounted supporting member, and two rollers journaled therein adapted to receive therebetween the ribbon, the entire surface of said rollers within the range of contact of said ribbon being substantially parallel, and said pivotally-mounted supporting member being free from contact with said ribbon.

3. In ribbon-guiding mechanism, in combination, a pivotally-mounted supporting member, and two rollers journaled therein adapted to receive therebetween the ribbon, the entire surface of said rollers within the range of contact of said ribbon being substantially parallel, and the effective length of said rollers exceeding the width of said ribbon.

4. In ribbon-guiding mechanism, in combination, a pivotally-mounted supporting member, and two spring-pressed rollers journaled therein adapted to receive therebetween the ribbon, the entire surface of said rollers within the range of contact of said ribbon being substantially parallel, and said pivotally-mounted member being free from contact with said ribbon.

5. In ribbon-guiding mechanism, in combination, a pivotally-mounted supporting member, and two spring-pressed rollers journaled therein adapted to receive therebetween the ribbon, the entire surface of said rollers within range of contact with said ribbon being substantially parallel, and the effective length of said rollers exceeding the width of said ribbon.

6. In ribbon-guiding mechanism, a pivotally-mounted roller, a second spring-pressed roller adjacent thereto, the surfaces of said rollers being substantially parallel and the ribbon being adapted to pass therebetween, and means whereby the inclination of the axis of said first-mentioned roller with respect to the longitudinal center line of said ribbon is controlled by the relative areas of contact between said ribbon and roller upon the two sides of the pivot of the latter.

7. In ribbon-guiding mechanism, in combination, a pivotally-mounted supporting member and two rollers journaled thereon adapted to receive the ribbon therebetween, the entire surface of said rollers within range of contact with said ribbon being substantially parallel, and the effective length thereof exceeding the width of said ribbon, and said pivotally-mounted member being free from contact with said ribbon.

8. In a ribbon-guiding mechanism, in combination, a pivotally-mounted supporting member, two rollers journaled thereon adapted to receive the ribbon therebetween, the entire surfaces of said rollers within range of contact with said ribbon being substantially parallel, and springs arranged to hold said rollers in contact with the ribbon, the inclination of the axis of said rollers with respect to the longitudinal center line of said ribbon being controlled by the relative areas of contact between said ribbon and said rollers upon the two sides of the pivot of the same.

9. In a ribbon-guiding mechanism, in combination, a pivotally-mounted frame, a pair of rollers journaled in said frame, the surfaces of said rollers being substantially parallel and the ribbon being adapted to pass therebetween, and a pair of springs, one arranged at each end of said rollers and adapted to hold the same in contact with said ribbon, the inclination of the axis of said pivotally-mounted frame being determined by the relative areas of contact between said ribbon and the rollers upon the two sides of the pivot of the frame.

10. In a ribbon-guiding mechanism, in

combination, a pivotally-mounted frame, means upon which said frame is pivoted, a pair of rollers journaled within said frame, and springs for pressing the ends of each of said rollers in the direction of the other, said rollers being adapted to receive the ribbon therebetween, the entire surface of said rollers within range of contact with said ribbon being substantially parallel and the length of said rollers exceeding the width of said ribbon, the inclination of the axis of said rollers with respect to the longitudinal center line of said ribbon being controlled by the relative areas of contact between said ribbon and said rollers upon the two sides of the pivot of the frame.

11. In a ribbon-guiding mechanism, in combination, a pivotally-mounted roller over which the ribbon is adapted to pass, spring-pressed means for engaging and holding the ribbon throughout its width in contact therewith, and means whereby the inclination of the axis of said roller with respect to the longitudinal center of the ribbon is controlled by the relative areas of contact between the ribbon and the roller upon the two sides of the pivot of the latter.

In testimony whereof we affix our signatures in the presence of two witnesses.

JOHN DEY.
ALEXANDER DEY.

Witnesses:
B. E. SNYDER,
MILLIE HILDE.