J. LOWE AND J. J. LYTH.

TENSION EQUALIZER.

APPLICATION FILED APR. 24, 1917.

1,319,961. Patented Oct. 28, 1919.

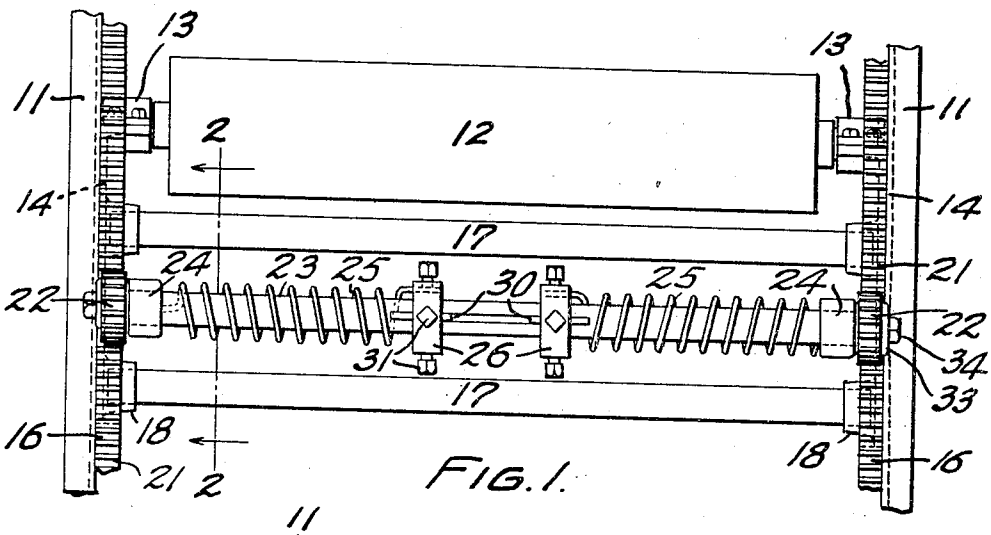


FIG. 1.

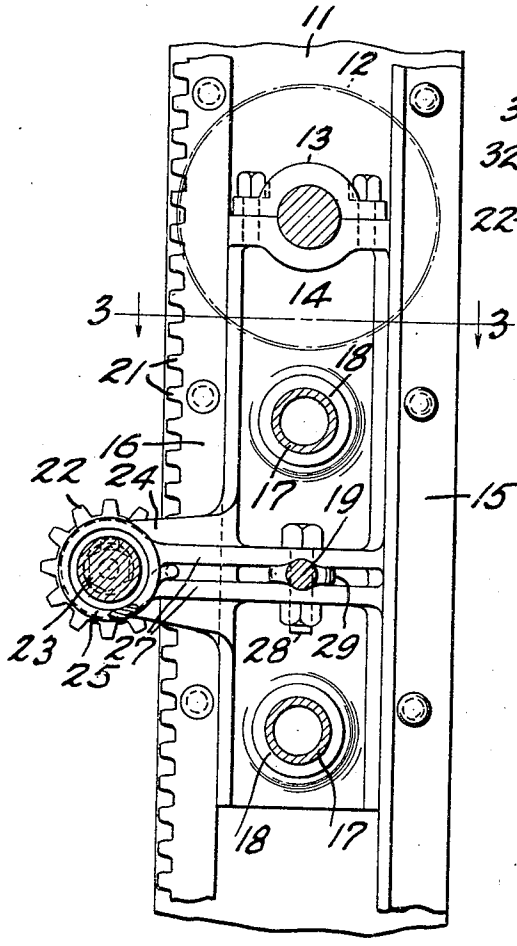


FIG. 2.

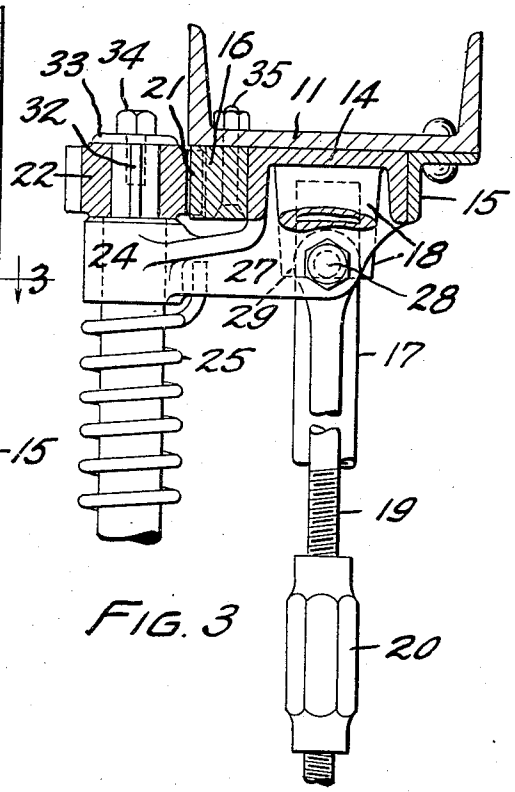


FIG. 3.

Inventors
John Lowe
John J. Lyth

By Fitzsimmons & Vaughan
Attys.

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN LOWE AND JOHN J. LYTH, OF VALLEYFIELD, QUEBEC, CANADA.

TENSION-EQUALIZER.

1,319,961. Specification of Letters Patent. Patented Oct. 28, 1919.

Application filed April 24, 1917. Serial No. 164,260.

To all whom it may concern:

Be it known that we, JOHN LOWE and JOHN J. LYTH, both subjects of the King of Great Britain, and residents of the city of Valleyfield, in the Province of Quebec and Dominion of Canada, have invented certain new and useful Improvements in Tension-Equalizers, of which the following is a full, clear, and exact description.

This invention relates to improvements in tension equalizing devices for use in connection with textile, paper or other machinery operating on material in the form of long ribbons, which it is desired to keep at approximately uniform tension.

The principal object of the invention is to provide a device which will keep a substantially uniform tension on the material to be treated within certain limits.

A further object is to provide a device which will not be jammed by unequal tension in the opposite edges of the ribbon, and which will maintain itself in the horizontal or other set position and exert greater tension on the tight side of the ribbon of material.

A still further object is to provide a device which will not drop suddenly in the event of breakage or sudden slackening of the ribbon of material, but will drop at gradually decreasing rate.

At the present time, it is customary to use in textile, paper and similar machinery rolls floating on the ribbon or web of material, and by their weight maintaining a uniform tension of the material. These rolls are for the most part horizontally disposed and vertically movable in guides. If the ribbon of material is not of uniform tension across its width, the tendency is to raise one side of the floating roll more than the other, and to overcome this, the rolls have been mounted in guides of considerable length. Even with these elongated guides, there is a binding tendency which it is desirable to overcome. Another disadvantage of an ordinary floating roll is that if the ribbon of material breaks or suddenly slackens, the tension roll drops so rapidly as to injure either the material or the roll itself.

According to the present invention, these disadvantages are overcome by providing a tension equalizing device, in which the roll will maintain itself at the predetermined angle without the use of elongated guides. A spring is arranged to be wound up during the fall of the roll, so that the gradual increasing tension of the spring will absorb the momentum of the roll and reduce its rate of fall, finally bringing it to rest.

In the drawings which illustrate the invention:—

Figure 1 is a front elevation of the device.

Fig. 2 is a section on the line 2—2, Fig. 1, the roll being removed.

Fig. 3 is a section on the line 3—3, Fig. 2.

Referring more particularly to the drawings, 11 designates a pair of uprights forming the frame of a separate tension equalizing device or part of the frame of a machine, with which the device is incorporated, and 12 the tension roll itself. The roll is revolubly mounted in bearings 13 carried at the upper ends of shoes 14, which bear against the frame members 11, and are confined to vertical movement by guides 15 and 16. The shoes 14 are connected across the machine by stays 17 which may be of tubular construction. In the case of the tubular stays shown, the ends thereof are seated in bosses 18 formed on the slides 14. Intermediate the stays 17, a stay rod 19 is provided, connecting the slides on opposite sides of the machine, and provided with a turn buckle 20 for tightening up the device after assembly. The apparatus thus far described forms a simple light-trussed framework carrying the roll 12, which will be vertically movable.

In order to insure that the frame and roll maintain absolutely horizontal position while rising and falling, the guides 16 of each frame member 11 are provided with rack teeth 21, with which pinions 22 mesh. These pinions are rigidly mounted at opposite ends of a shaft 23 journaled in bearings 24 carried by the slides. It will thus be seen that if vertical movement is imparted to one end of the frame or roller, rotation of the pinion at that end is caused and is transmitted through the shaft to the pinion at the opposite end, which climbs on the rack teeth and imparts a similar and equal movement to the frame at its end.

In order to regulate the rate of fall of the device, one or more springs 25 are provided on the shaft 23, one end of the spring being fixed relatively to the bearing 24 and the opposite end to a collar 26 fixedly mounted on the shaft. Thus, rotation of the shaft causes winding or unwinding action of the spring. The spring is so ar-

ranged that when the roll drops, the spring is wound up and the gradually increasing tension resulting reduces the rate of fall and finally stops the downward movement. For convenience in construction, the brackets carrying the bearings 24 are formed with two spaced webs 27, between which the end of the spring may be anchored, and also between which the end of the tension rod 19 may be pivoted by means of a bolt 28, the rod being formed with an eye 29 for this purpose. The collars 26 are conveniently attached to the shaft 23, by means of keys 30 holding the rollers against revolution and a pair of set screws 31, in each collar, one holding the key against slipping longitudinally between the collar and shaft and the other holding the collar against slipping longitudinally on the shaft. The pinions 22 are preferably held against revolution on the shaft by keys 32, and against escape from the shaft by caps 33 secured by cap screws 34.

The guide member 16, which carries the rack teeth 21 may conveniently be secured to the frame member 11 by bolts 35 having the heads thereof sunk flush with the surface of the guide, while the other guide member 15 may be a simple angle iron and be riveted to the frame.

It will be observed in the drawings that the springs shown are of the helical type, and are two in number. It is obvious, however, that the number and type of springs may be varied if desired.

Having thus described our invention, what we claim is:—

1. In a device of the class described, upright rack toothed guides, a frame slidable in said guides, a roll revolubly mounted in the frame, revolubly mounted pinions on said frame meshing with the guides and a spring connected at one end to the frame and operatively connected at the other end to said pinions whereby rotation of the pinions will alter the tension of the spring.

2. In a device of the class described, a roll, guides, a frame carrying the roll in the guides, a rack on each guide, a pinion meshing with each rack, and a shaft rigidly connecting the pinions journaled in the frame and means connected to the shaft offering increasing resistance to shaft rotation in one direction.

3. In a device of the class described, guides, a framework slidable therein, racks, a revoluble member in said framework cooperating with and receiving movement from the racks during frame movement, and a resilient member connected between the frame and said revoluble member.

4. In a device of the class described, guides, a frame slidable therein, a shaft journaled in the frame, rack and pinion connection between said shaft and the guides, and a spring on said shaft fixed at one end to the frame and at the opposite end to the shaft.

5. In a device of the class described, guides, a roll mounted between said guides for vertical movement, and resilient means movable with the roll arranged to regulate the rate of fall of the roll.

6. In a device of the class described, guides, a roll mounted for vertical movement in said guides, a frame carrying the roll, and resilient means mounted on the frame arranged to regulate the rate of fall of the frame and roll.

7. In a device of the class described, guides, a frame slidable therein, means insuring equal movement of opposite ends of the frame in the guides, and resilient means regulating the rate of movement of the frame in the guides.

8. In a device of the class described, guides, a frame slidable therein, racks mounted on the guides, a shaft journaled in the frame, pinions fixed to said shaft and engaging the racks, and resilient means connected between said shaft and the frame regulating frame movement in the guides.

9. In a device of the class described, guides, a frame movable therein, racks, a shaft in the frame operatively connected with the racks to receive movement therefrom during frame movement, and a spring on said shaft connected at one end to the frame and at the opposite end to the shaft, regulating the rate of frame movement.

10. In a device of the class described, guides, a frame slidable therein, a rack on each guide, a transverse shaft journaled in the frame and pinions rigidly connected to the ends of said shafts meshing with said racks, the pinion at one end of the shaft receiving motion from the rack during movement of the adjacent end of the frame and transmitting it through said shaft to the other pinion whereby the second pinion will travel on the rack and produce movement of the adjacent end of the frame.

In witness whereof we have hereunto set our hands.

JOHN LOWE.
JOHN J. LYTH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."