

Oct. 27, 1931.

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YARN TENSIONING DEVICE

1,828,918

Filed June 5, 1929

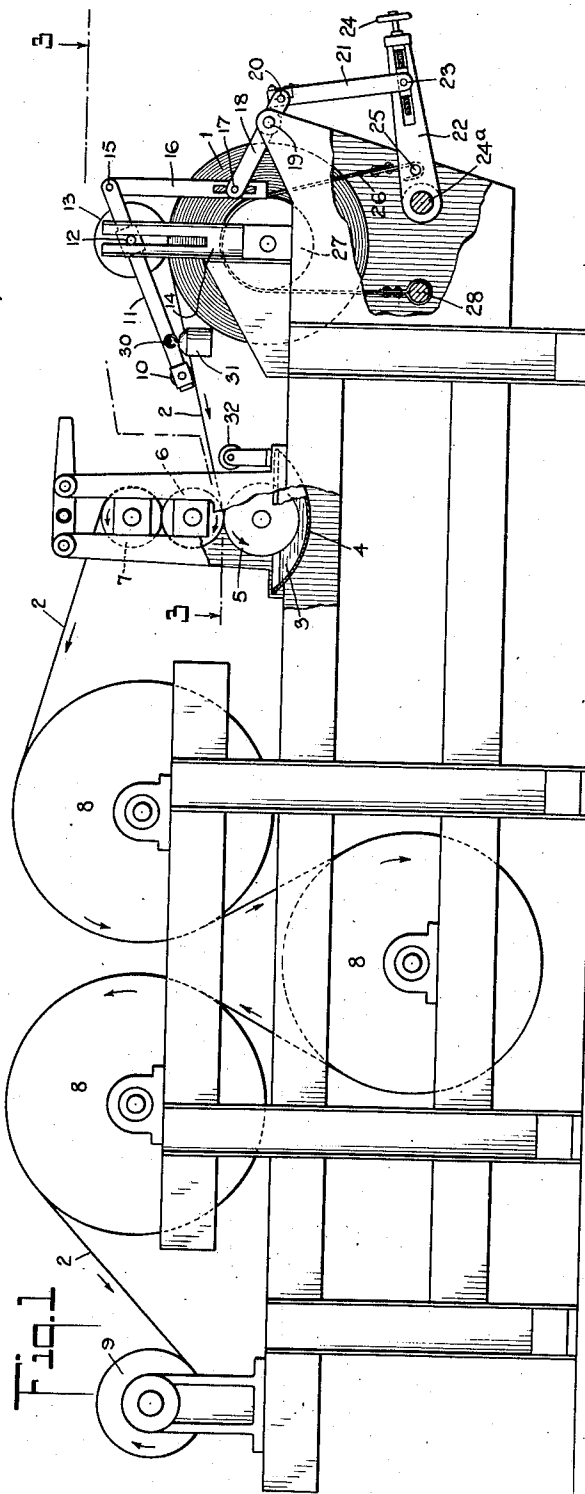
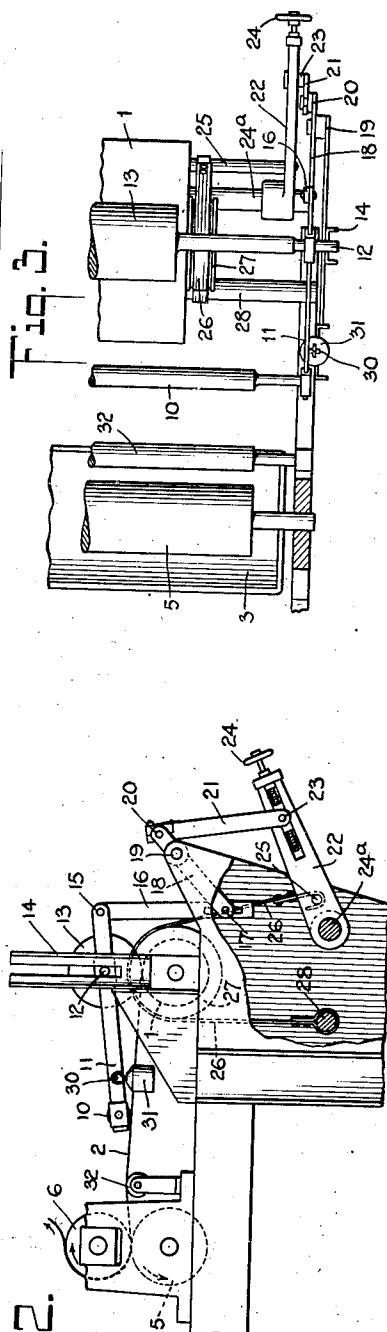


Fig. 2.

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YARN TENSIONING DEVICE

Application filed June 5, 1929. Serial No. 368,564.

This invention relates to a device for treating yarns and relates more particularly to means for maintaining substantially uniform tension on yarn that is having a liquid applied thereto.

An object of my invention is to provide means for automatically maintaining substantially uniform tension on yarns that are being wound from one package to another. A further object of my invention is to maintain substantially uniform tension on warps that are being sized or otherwise treated. Further objects of my invention will appear from the following detailed description.

In the running of yarns from one package to another, it is of importance that the yarn that is being unwound should have a predetermined tension thereon. In accordance with my invention, I provide means for maintaining substantially uniform tension on yarn that is being passed from package to package. This means comprises two means, one of which is controlled by the yarn in its passage from package to package and which is operated by the slackening or tightening of the yarn to increase or decrease the tension of the warp as it leaves the package from which it is being unwound, while the other means is controlled by the size of the package from which the yarn is being unwound and operating to decrease the drag on said package as its size diminishes.

This invention is of general application and is applicable in all cases where yarn is being passed from one package to another. This yarn may be made of any fibres such as cotton, silk, wool, reconstituted cellulose or organic derivatives of cellulose such as organic esters of cellulose or cellulose ethers. Examples of organic esters of cellulose are cellulose acetate, cellulose formate, cellulose propionate and cellulose butyrate while examples of cellulose ethers are ethyl cellulose, methyl cellulose and benzyl cellulose.

The invention may be applied in those cases where only one or a plurality of ends of yarns are being passed from one package, such as a bobbin package, to another. However, the greatest advantages accrue when

this invention is applied in apparatus for applying liquids such as dye solutions, sizes, conditioning fluids and the like to yarn. This invention will therefore be described in connection with means for applying a size to a warp of yarns containing cellulose acetate.

Referring to the accompanying drawings, Figure 1 is a side elevation, partly in section, of a device for automatically controlling the tension of a warp in accordance with my invention.

Figure 2 is an elevation partly in section, of my invention showing the arrangement of parts when the warp becomes small, and

Figure 3 is a plan view of one end of the device looking from the line 3—3 on Figure 1 in the direction of the arrows, the other end not shown being exactly the same.

Referring to the drawings, 1 is a warp beam from which the warp yarns 2 to be sized are drawn. The size 3 to be applied to the warp is placed in the pan 4 and is applied to the warp 2 by means of the roller 5 (preferably of bronze) and the warp passes over this roller between it and the quetch roll 6 and then around the adjusting roll 7 to the drying drums 8, which are preferably heated internally by steam, and which dry the size that has been applied to the warp yarn, and thence to the winding beam 9 where they are wound as finished sized warp.

In order to maintain substantially uniform tension of the warp 2, and thus to prevent the same from becoming slack with consequent tendency of the individual ends thereof to roll on each other, I provide the automatic tensioning device. This device comprises a roller 10 of suitable material, say steel, and of suitable weight, say 20 lbs., which is mounted in suitable bearings on the end of the two levers 11 provided on each side. The levers 11 are fulcrumed on the ends of the spindle 12 of a roller 13 which rests on the warp beam 1 that is being unwound, and the ends of the spindle are mounted in the slots of guide frames 14. The roller 13 may be made of any suitable material, such as wood, and because of its mount-

ing in the vertical slots of the guide frames 14, it lowers when the warp beam 1 diminishes in size.

The levers 11 are pivoted at 15 to the links 16, the other ends of which are connected at 17 with the levers 18 pivoted at 19 and which in turn are connected by split joints 20 with the links 21. The links 21 are connected with the brake levers 22 at the joints 23. These joints 23 are movable laterally by means of the screws 24 so that their position may be varied to adjust the amount of tension, as will be hereinafter described.

The brake levers 22 are pivoted at 24a and are connected together by means of a bar 25. To this bar 25 are connected ends of the brake bands 26 which bands may be of leather, rubber or any other material. The brake bands 26 pass over the brake drums 27 and the other ends of the bands are hooked or otherwise secured to the bar 28. The brake drums 27 are connected to the spool or carriage for the warp beam 1, and by their action control the tension at which the warp 2 is being drawn from the beam.

In case heavy warps are to be handled, it is often desirable to supplement the weight of the roll 10 and for this purpose studs 30 are provided on the levers 11 from which studs the weights 31 may be suspended.

In order to feed the warp 2 from a position higher than the top of the sizing roll 5, and thus prevent the size from running down to the warp beam 1 when its diameter has been decreased as shown in Figure 2, a supplementary guide roll 32 is provided. This roll 32 is also useful for preventing the warps 1 from touching the top of the pan 4, when the warp is sized by causing the same to pass through the size bath 3 under the roll 5.

In order to reduce friction, I prefer to employ ball bearings for the spindles of the various rolls.

In operation, the warp 2 passes from the warp beam 1 over the rotating roller 5 which applies the size from the bath 3 thereto, around the guide rolls 6 and 7, thence around the drying drums 8 where the size is dried, and thence to the beam 9 where they are wound. The floating roll 10 rests on the warp and its position governs the amount of tension applied to the warp beam 1. In case there should be a slack in the warp 2, the roll 10 drops, raising the links 16, which raise the left-hand side of the levers 18 and thus causing the links 21 and the brake levers 22 to lower thus applying more pressure to the brake bands 26 on the drums 27 and so increasing the tension on the warp beam 1. In this manner, the cause for the slackening of the warp 2 is remedied. Conversely if the warp 2 tends to rise because of too much tension, the roll 10 and the system of levers

will cause release of tension, and it will thus be seen that substantially uniform tension will be automatically maintained.

As the diameter of the warp beam 1 becomes smaller due to the depletion of the warp, less braking effect should be produced on the brake drum 27 in order to maintain the same tension on the warp. This is obtained in the following manner. As the diameter of the warp 1 becomes less, the roller 13 resting thereon lowers, and lowers the levers 11, links 16 and the left-hand side of the levers 18, thus raising the links 21 and the brake lever 22 and so applying less pressure to the brake bands 26 on the drums 27.

The position of the device when the warp beam is almost exhausted is shown in Figure 2.

With warps having different numbers of ends and/or yarns of different weights the amount of tension required will vary. To permit variation of the tension, the screws 24 are provided, which permit the setting of the connection of the links 21 and the brake levers 22 in any required position, and graduations are preferably provided so that these positions may be standardized for warps of different sizes.

The split joints 20 are provided for disconnecting the levers 18 and links 21 to permit the ready replacing of the warp beams and their carriages.

It will be thus seen that by my device, means are provided for maintaining uniform tension of the warp regardless of the size of the warp beam and any periodic variations. By my device, rolling of the ends of the warp is prevented, and because of the uniform tension on the warp, a uniform amount of size is applied to the same.

It is to be understood that the foregoing detailed description is given merely by way of illustration, and that many variations may be made therein without departing from the spirit of my invention.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. In apparatus for treating yarn, means for unwinding yarn from a package and means for maintaining uniform tension of the yarn in transit comprising means for imposing a tension upon the yarn, a floating support for said tension imposing means, and a braking device operating upon said package, said braking device being operatively connected to said tension imposing means.

2. In apparatus for treating yarn, means for unwinding yarn from a package and means for maintaining uniform tension of the yarn in transit comprising means for imposing a tension upon the yarn, a floating support for said tension imposing means and

a braking device operating upon said package, said braking device being operatively connected to said tension imposing means.

3. In apparatus for treating yarn, means
5 for unwinding yarn from a package and means for maintaining uniform tension of the yarn in transit comprising a roller for imposing tension upon the yarn, a floating support for said roller, and a braking device
10 operating on said package, said roller being operatively connected to said braking device.

4. In apparatus for treating yarn, means
15 for unwinding yarn from a package and means for maintaining uniform tension of the yarn in transit comprising a roller for imposing tension upon the yarn, a floating support for said roller and a braking device
20 operating said package, said roller and said support being operatively connected to said braking device.

5. In apparatus for treating yarn, means
25 for unwinding yarn from a package and means for maintaining uniform tension of the yarn in transit comprising a roller for imposing tension on the yarn, a second roller mounted for movement with said package and a braking device operating on said package, said rollers being operatively connected
30 to said braking device.

6. In apparatus for treating yarn, means
35 for unwinding yarn from a package and means for maintaining uniform tension of the yarn in transit comprising a roller for imposing tension upon the yarn, a second roller mounted for movement with said package and a braking device operating on said package, said rollers being operatively connected to each other and to said braking
40 device.

In testimony whereof, I have hereunto subscribed my name.

ARTHUR BALTHASAR.

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