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[54] **YARN BALLOON DAMPING DEVICE**
9 Claims, 2 Drawing Figs.

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[56] **References Cited**
UNITED STATES PATENTS

1,848,982	3/1932	Webb	242/128
2,242,053	5/1941	Chapman, Sr.	242/128
2,245,479	6/1941	Karle	242/150

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ABSTRACT: A device to prevent ballooning of yarn when it is being intermittently withdrawn from a stationary bobbin. An angular guide slightly brakes the yarn, so that during or at the end of a withdrawal cycle centrifugal forces will cause the yarn to whip against the inner surfaces of the conical and cylindrical sections of the balloon limiter substantially dampening any ballooning action by the yarn. The yarn is further braked by passing it across a plurality of pins mounted in a plurality of planes on a carrier.

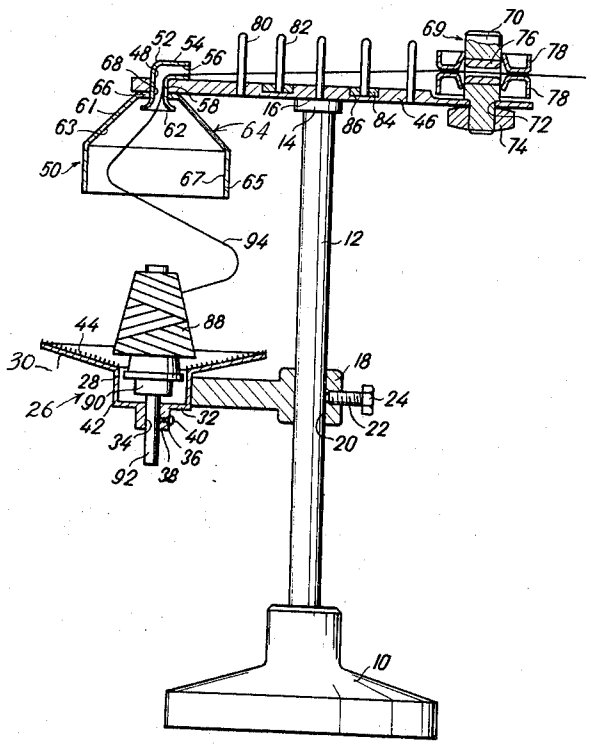
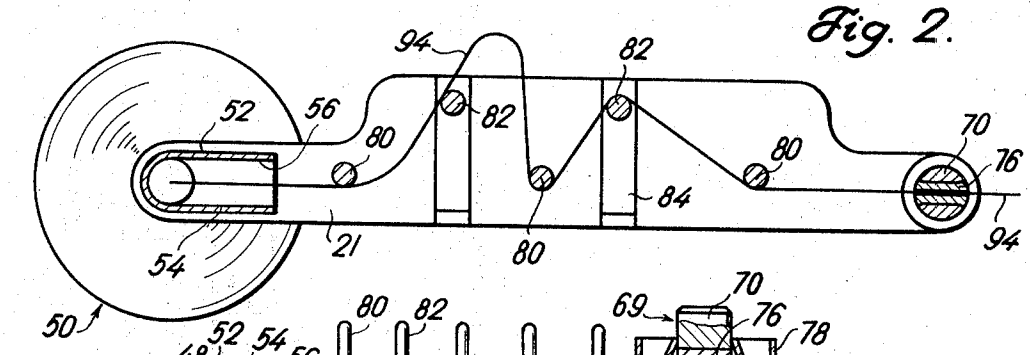


Fig. 2.



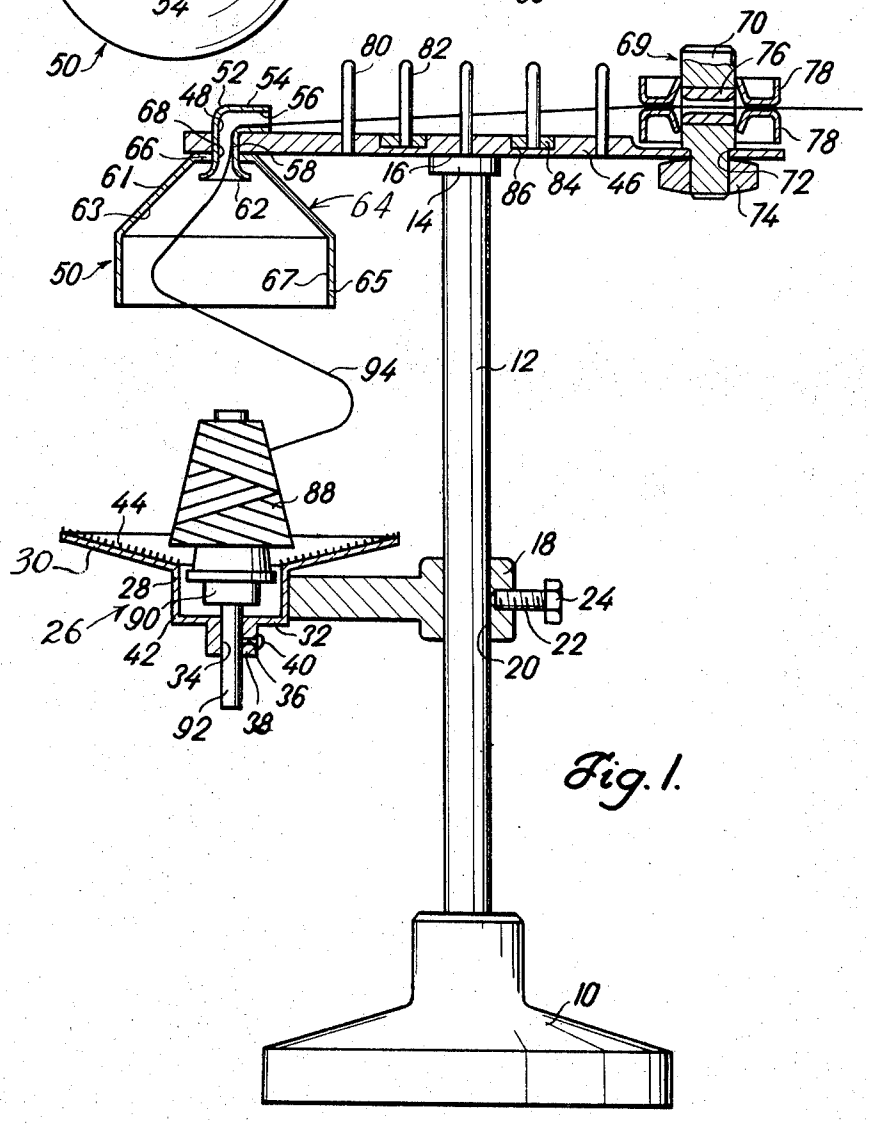


Fig. 1.

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YARN BALLOON DAMPING DEVICE

BACKGROUND OF THE INVENTION

This invention relates to balloon dampening devices, and more particularly to the dissipation of the inertial forces remaining in a yarn section which is being withdrawn from a stationary supply bobbin during and immediately following the termination of the withdrawal cycle.

There have been attempts made previous to the present invention to construct devices which will prevent ballooning of yarn during intermittent withdrawal from a stationary supply bobbin.

This problem arises during the production of fabrics utilizing designs where continuous use of yarn from a bobbin is not required. With the continual improvement in manufacturing techniques, the withdrawal speeds have also increased. At the end of a withdrawal cycle, suitable braking devices prevent the introduction of any further yarn into the weaving area, but there is still a considerable inertial force or tension between the braking device and the stationary bobbin. As a result additional yarn is carried off the bobbin and tends to balloon outwardly. This yarn may then become entangled in the machinery.

The prior art attempts to provide a solution for this problem have fallen into two general categories. The first category consists of devices which operate on the principal of a comblike compensator. The mutually offset teeth of the compensator are controlled either by means of a spring or weight in such a manner as to cause the moving yarn to constantly assume a particular configuration, this tends to dissipate the inertial forces developed in the yarn.

Another group of known devices have braking elements which are connected to adjustable guides, the guides being either spring biased or fixedly adjustable. These devices consist of a plurality of braking members, adjustable relative to each other, with the yarn being passed around fixed pins. This group also includes disc braking devices with means for controlling the discs, so that they exercise a braking effect upon the yarn.

The disadvantages of these devices is that they fail to assure a smooth braking effect in the case of intermittent withdrawal of the yarn. During this type of operation, there is an increased force in the yarn at the commencement of the withdrawal followed by an abrupt release of the brake. At the end of the cycle, due to the inertia of the braking elements, a slippage of yarn occurs, with the attendant ballooning effect. This lag becomes more pronounced, the greater the number of cycles.

SUMMARY OF THE INVENTION

Accordingly, it is among the principal objects of the present invention to provide an improved yarn balloon damping device which prevents the ballooning of yarn being withdrawn from a stationary bobbin after the termination of the withdrawal cycle.

Yet another object of the present invention is to provide a device of the character described which minimizes yarn slippage at the termination of a withdrawal cycle.

Yet a further object of the present invention is to provide a device of the character described which will prevent loop formation after the termination of a withdrawal cycle and all the other troubles connected therewith.

Still yet a further object of the present invention is to provide a device of the character described which will assure a smooth braking effect, while providing effective intermittent withdrawal operations.

Still yet another object of the present invention is to provide a yarn balloon damping device which will be simple to manufacture and assemble and yet be durable to a high degree of use.

The present invention contemplates the adjustable securement of a stationary bobbin to the post of a support means. Positioned over the bobbin and spaced therefrom is a balloon limiter which includes an angularly inclined tubular guide

member having a flared opening to receive the yarn being withdrawn from the bobbin. The yarn passes through a braking device where forces are applied for the intermittent withdrawal. Secured to the guide somewhat above the flared opening is a balloon limiter which consists of an inverted cup shaped member having a conical section extending downwardly and outwardly from the guide and a cylindrical section or skirt extending from the conical section.

As the yarn is drawn through the guide its direction is changed, creating a slight braking action. This causes the centrifugal forces within the yarn to develop a ballooning or oscillating effect, during which the yarn will come in contact with the inner surfaces of the conical and cylindrical sections of the balloon limiter. It is during this contact that these extraneous forces are dissipated and the yarn itself is quieted. The most pronounced effect occurs after the completion of the withdrawal cycle, when a cycle brake will prevent further movement of yarn into the operational area, but the inertial forces within the yarn will continue to cause its withdrawal from the stationary bobbin. The balloon limiter will immediately dissipate these forces causing the yarn to fall directly in the vicinity of the bobbin or on the pile pad adjacent therewith. It is also possible to have a plurality of fixed and adjustable pins between the guide and the braking member to further dissipate the inertial forces within this yarn. Finally, the braking member itself may be adjustably rotated thereby further subjecting the yarn to braking forces.

BRIEF DESCRIPTION OF THE DRAWING

Other objects and advantages will become apparent to those skilled in the art upon carefully consideration of the following detailed description, of the invention taken in conjunction with the accompanying drawing in which:

FIG. 1 is an elevational view, partly in section, showing yarn being withdrawn from a stationary bobbin and ballooning against the inner surfaces of the balloon limiter; and

FIG. 2 is a partial plan view of FIG. 1, showing the coaction of the yarn with the fixed and displaceable pins.

DETAILED DESCRIPTION

Referring in detail to the drawing, and in particular to FIG. 1, there is shown a support means which, for purposes of illustration, includes a base 10 carrying an upright post or bar 12, the post terminates at its upper end at a pedestal 14 having an upper surface 16.

An arm 18 is adjustably secured to the post for axial movement. For this purpose there is defined in the arm a bore 20 in which is received the post 12; the arm may also have defined therein a threaded bore 22 normal to the axis of the bore 20, receiving a screw 24 to bear against the post 12 and retain the arm in a desired position.

Secured to the arm by any means, such as welding, is a plate 26. The plate includes a well section 28 and upwardly extending angular shoulder 30. The well section has a base wall 32 with a bore 34 passing therethrough. A threaded bore 36 meets the bore 34 in the same fashion as bores 20, 22, the bore 36 being carried in a detent 38 attached to the lower side of the base wall 32. An adjusting screw 40 cooperates with the bore 36 for the purpose hereinafter appearing. The base wall 32 has an upwardly extending cylindrical side wall forming the well section 28 to which is secured the shoulder 30. A pile pad 44 is secured to the upper surface of the shoulder 30.

Resting upon the pedestal 14 is a carrier means which may consist of a slab 46. One end of the slab extends over the plate 26 mounted therein a damping member which has a bore 48 in substantial axial alignment with the bore 34. The damping member 50 includes a guide 52 which may be tubular in shape and angled, defining a top section 54 with an inner surface 56 and a bottom section 58 with an inner surface 60. At the lower part of the bottom section there is a flared entering opening 62.

A balloon limiter 64 which is also part of the damping member, is secured to the bottom section 58 of the guide 52 and has a top wall 66 with an opening of 68 therein pin-gauging the bottom section 58. The flare portion of the bottom section prevents withdrawal of the balloon limiter. Extending outwardly from the top wall 66 is a conical section 61 having an inner surface 63. Depending downwardly from the conical section is a cylindrical section or skirt 65 having an inner surface 67. The entire appearance of the balloon limiter suggests an inverted cup. The angular configuration of the top section 54 with respect to the bottom section 58 of the guide insures permanent positioning of the damping member within the bore 48. However, the guide may be rotatably adjusted in the bore 48.

The other end of the slab carries a braking member 69. The braking member may include a pivotal element 70 received within bore 72 of the slab and may be rotatably adjustable therewith and secured in place by a nut 74 coacting with threaded elements on the pivotal element 70. The element may carry an eyelet 76 through which the yarn passes as well as disc braking members 78.

Fixed pins 80 are permanently secured to the slab along the length thereof in substantial axial alignment with the braking member 69 and the damping member 50. The slab may also carry displaceable pins 82 mounted on guide ribs 84 which move within channels 86 disposed in the carrier 46.

To use the device of the invention, a stationary supply bobbin 88 which includes a bobbin holder 90 and a pin 92, is placed in position in the plate 26. The pin 92 is received within the bore 34 and is secured thereto by means of the screw 40. The yarn 94 is then passed upwardly from the bobbin through the guide 50 and around the permanent and displaceable pins 80, 82, passing though the eyelet 76 of the braking member 68 and thence to the operational area and the source of the withdrawal forces (not shown) and the cycle brake (not shown).

Prior to operation the cycle brake prevents withdrawal of the yarn. When it is desired to utilize the yarn from this particular unit, the brake is disengaged and forces are exerted on the yarn 94 to pull it from the bobbin 88. During operation a slight braking effect is developed as the yarn passes through the guide 52. The change in direction and the contacting of the surfaces 56 and 60 cause the yarn which is below the guide to balloon slightly and come into contact occasionally with the inner surfaces 63, 67 of the balloon limiter. This tends to dampen the centrifugal forces. Further damping and braking is created by the passage of the yarn across the permanent and displaceable pins. The change of direction tends to dissipate the energy being developed within the yarn.

At the termination of the withdrawal cycle the cycle brake is closed and the action of the outside forces is ended. However, there will still be inertial forces within the yarn that will tend to carry it off the bobbin supply. The guide member 52, creating the slight braking force will cause the yarn to whip against the inner surfaces of the balloon limiter, rapidly dissipating the energy within the yarn and causing it to stop oscillating and drop back to the bobbin 88 or in the general direction of the pile pad 44 surrounding the bobbin supply. Thus, large amounts of yarn will not be withdrawn from the bobbin after completion of the withdrawal operation but instead will remain either on the bobbin or close thereto. This eliminates possible entanglement of the yarn with other elements of the machinery, which would cause operational delays and breakdowns.

The permanent and displaceable pins further aid to dissipate the energy at the termination of the withdrawal cycle by the action of the yarn against the posts where the energy is expended. FIG. 2 shows the yarn, having a significant amount of energy, extending beyond the first displaceable post after passing the first permanent post following its exit from the damping member. Due to the damping effect within the damping member, this yarn would drop back toward the bobbin after termination of the withdrawal cycle, and once again would snuggly contact the post.

Further braking action may be exerted from the yarn by increasing the forces within the braking discs and or by angularly rotating the pivot 70 so that the eyelet 76 is no longer in alignment with the guide 52 but is positioned at an angle thereto.

It should be understood that the invention is not to be limited to the precise details of structure shown and set forth in the specification, for obvious modifications will occur to those skilled in the art to which the present invention relates.

We claim:

1. An improved yarn balloon damping device to prevent formation of loops upon withdrawal of yarn from a stationary bobbin secured to a support means, the improvement comprising: a balloon damping member, means for supporting the damping member axially aligned with said bobbin, positioned substantially thereabove, and adjustably spaced therefrom, carrier means resting on said support means, said damping member being secured to said carrier means and including guide means to apply a braking action to the yarn upon withdrawal of the yarn from the bobbin which causes the yarn to be acted upon by centrifugal forces, and a balloon limiter secured to the entrance of said guide means and having walls extending downwardly therefrom which are adapted to engage the ballooning yarn and thereby cause a dissipation of the inertial forces therein.

2. The improved yarn balloon damping device according to claim 1, the balloon damping member including a conical section extending downwardly and outwardly from said guide means.

3. The improved yarn balloon damping device according to claim 2, wherein said balloon limiter further includes a cylindrical section extending downwardly from the conical section, said balloon limiter forming an inverted cup in configuration.

4. The improved yarn balloon damping device according to claim 3, wherein said guide means include an angular tubular member which is rotatably mounted in said carrier means and which has a flared opening.

5. An improved yarn balloon damping device to prevent formation of loops upon withdrawal of yarn from a stationary bobbin secured to a support means, the improvement comprising: a balloon damping member axially aligned with said bobbin, positioned thereover, and spaced therefrom, carrier means resting on said support means, said damping member being secured to said carrier means and including guide means to apply a braking action to the yarn upon withdrawal of the yarn from the bobbin which causes the yarn to be acted upon by centrifugal forces, and a balloon limiter secured to the entrance of said guide means and having walls extending downwardly therefrom which are adapted to engage the ballooning yarn and thereby cause a dissipation of the inertial forces therein, said carrier means having at least one pair of upright pins mounted thereon, the yarn passing between said pair of pins while being in frictional contact therewith, said pair of pins causing further dissipation of inertial forces within the yarn.

6. The improved yarn balloon damping device according to claim 5, wherein said carrier supports a plurality of pins mounted in different planes thereon.

7. The improved yarn balloon damping device according to claim 5, wherein at least one of said pins is movably mounted on said carrier for varying its normal position with respect to the yarn.

8. An improved yarn balloon damping device to prevent formation of loops upon withdrawal of yarn from a stationary bobbin secured to a support means, the improvement comprising: a balloon damping member axially aligned with said bobbin, positioned thereover, and spaced therefrom, carrier means resting on said support means, said damping member being secured to said carrier means and including guide means to apply a braking action to the yarn upon withdrawal of the yarn from the bobbin which causes the yarn to be acted upon by centrifugal forces, and a balloon limiter secured to the entrance of said guide means and having walls extending downwardly therefrom which are adapted to engage the bal-

looning yarn and thereby cause a dissipation of the inertial forces therein, further braking means supported by said carrier means, the yarn passing through said further braking means after exiting from said guide means, said further braking means including a pin with a transverse passage therein through which the yarn passes, said pin being rotatably adjustable with respect to said carrier means to vary the angle of passage therethrough.

9. The improved yarn balloon damping device according to claim 8, wherein said further braking means includes adjustable disc brake means for varying the frictional forces acting on the yarn as it passes through the said means.