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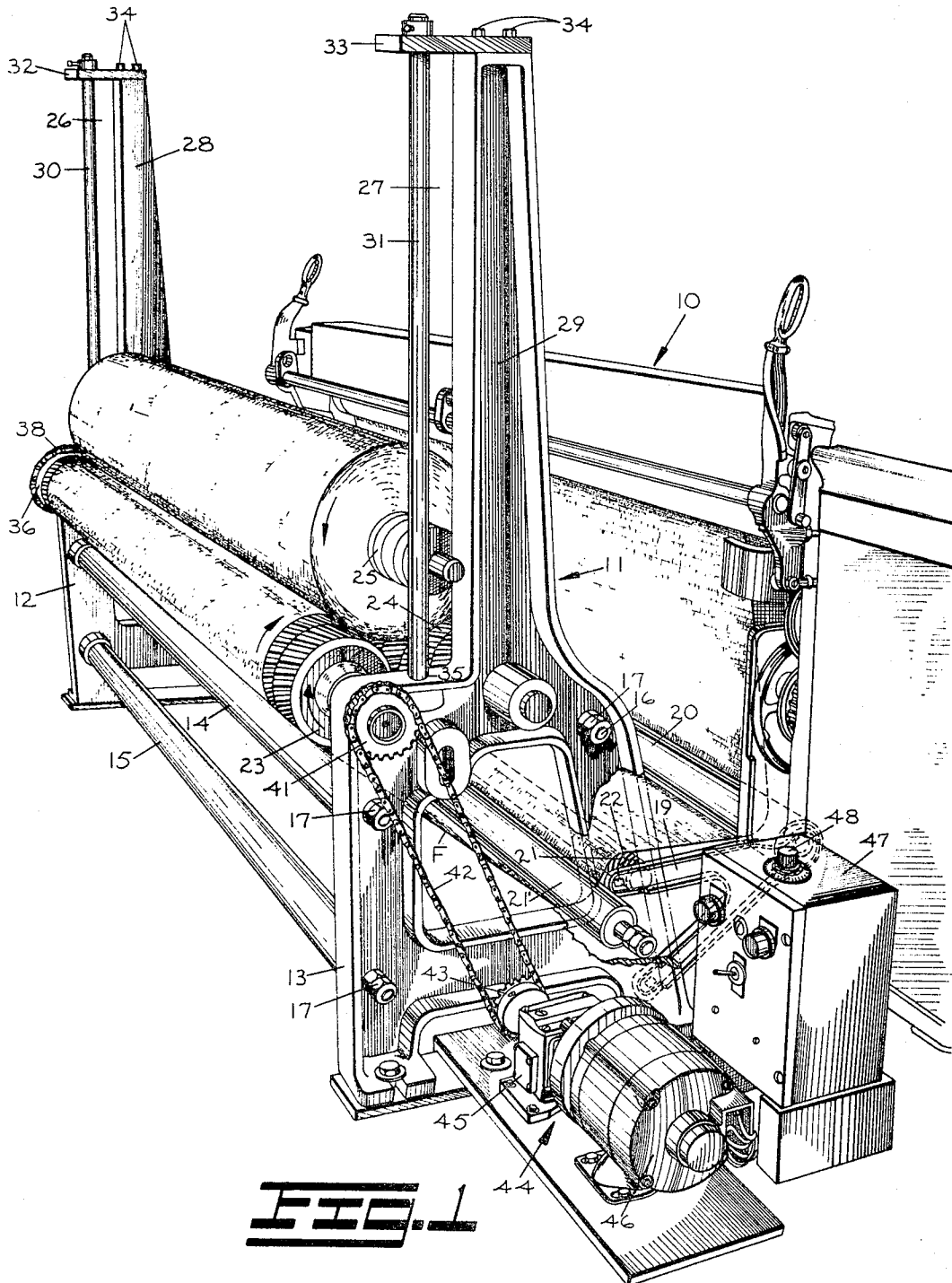
F. L. SPRAGUE

3,433,430

FABRIC WINDUP MECHANISM

Original Filed July 8, 1965

Sheet 1 of 2



INVENTOR.  
FREDERICK L. SPRAGUE

BY  
*Albert A. Mahamel*

ATTORNEY

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**FIG. 2**

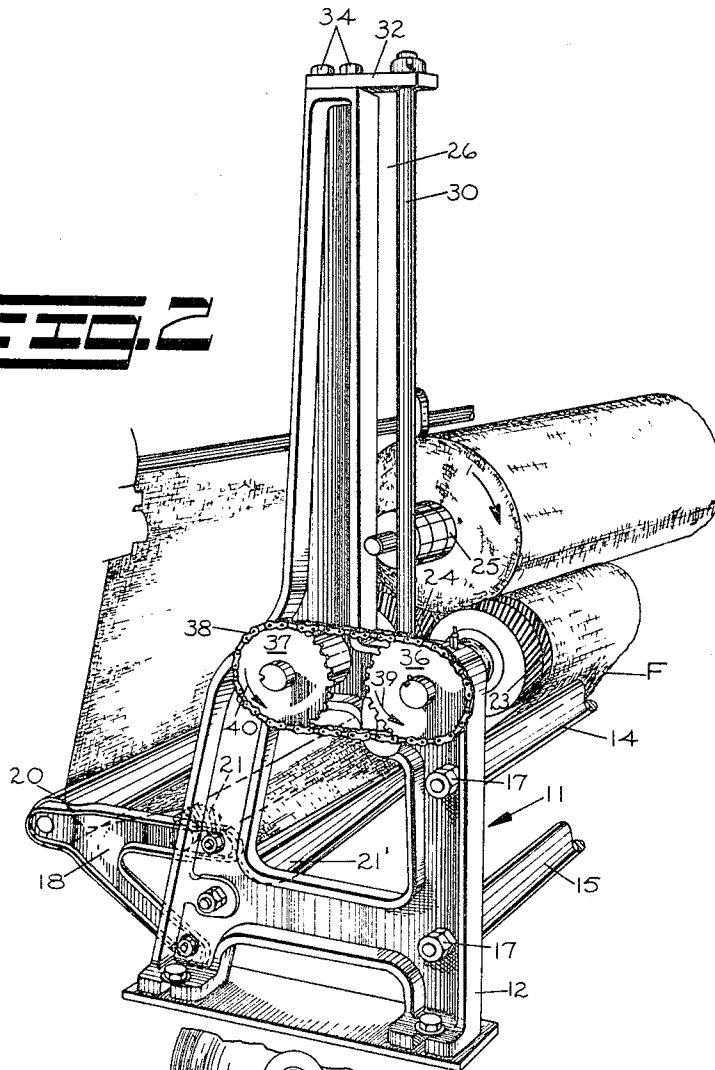
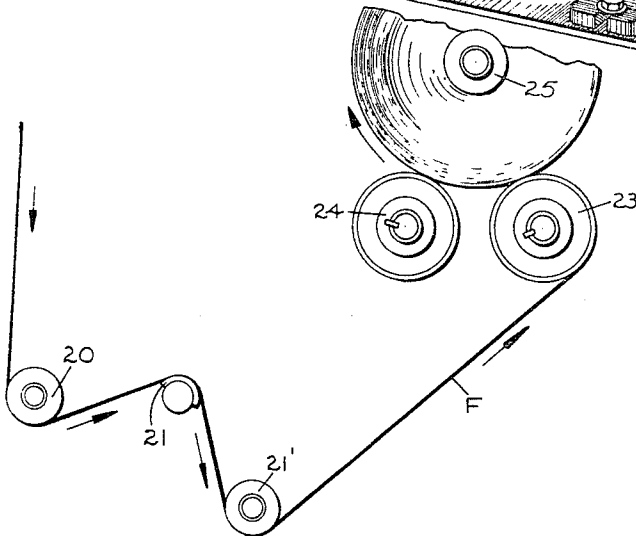


**FIG. 3**



INVENTOR.  
FREDERICK L. SPRAGUE

BY  
*Albert G. Mahassel*

ATTORNEY

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3,433,430

## FABRIC WINDUP MECHANISM

Frederick L. Sprague, Hopedale, Mass., assignor, by mesne assignments, to John Donald Marshall and Horace L. Bomar, as Trustees of The Carolina Patent Development Trust

Continuation of application Ser. No. 470,525, July 8, 1965. This application May 17, 1968, Ser. No. 731,678 U.S. Cl. 242-66 1 Claim

Int. Cl. B65h 17/08; D03d 49/06, 49/20

### ABSTRACT OF THE DISCLOSURE

Apparatus independent of a loom for driving fabric winding rolls at variable speeds to maintain automatically, predetermined even fabric tension. A motor drive control unit utilizes changes in motor loading to continuously sense and control the motor speed, down to and including stalling, to maintain a preset fabric tension level.

This application is a continuation of application Ser. No. 470,525 filed July 8, 1965 and now abandoned.

This invention relates to looms and, more particularly, to an improved mechanism for receiving, guiding, and winding up the fabric as it is formed by said looms.

It is a general object of the invention to provide a fabric windup mechanism which will guide and maintain the fabric being received thereby under a predetermined amount of tension.

It is a further object to provide a fabric windup mechanism which will function independently of a loom and which can be remotely disposed from the latter thereby permitting a substantial increase in the amount of fabric that can be taken up on a core or cloth roll.

A still further object is that of being capable of maintaining an even predetermined tension upon the fabric through the mechanism's driving means without added switches or separate sensing means such as are utilized in windup mechanisms of the prior art.

A further object is that of providing a fabric windup mechanism having a means for effecting a packing action on the fabric as it is received onto the core or cloth roll thereby increasing the amount of fabric yardage receivable onto said core and providing a firm and tightly wrapped package thereon.

A still further object of the present invention is to provide a windup mechanism having a driving means which, in addition to maintaining an even tension on the fabric during normal loom operation, will effect a cessation of the driving and driven members which advance the fabric to the takeup roll should a progressive increase in fabric tension be sensed by said driving means.

Further objects and advantages of the invention will become apparent from the following more detailed disclosure.

The conventional means of taking up and temporarily storing fabric as it is formed on a loom is that of winding the fabric upon a core or cloth roll which is usually supported by and at the lower front portion of a loom.

The multiplicity of components which make up the present day higher speed looms have placed the cloth roll in close proximity with many of these components thereby limiting the amount of fabric that can be wound upon such a roll. This condition along with the increased demands in fabric production have made it economically desirable to wind up the fabric as it comes from the loom by a separate and remotely disposed mechanism.

A separate windup mechanism offers the advantages of being able to wind up a roll of fabric having substantially more yardage than rolls formed by the conven-

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tional method and being so disposed as to permit inspection of the fabric as it comes from the loom and prior to its winding on the cloth roll.

The windup mechanism according to the instant invention provides the aforementioned advantages and utilizes an electrical motor drive system having a cooperating control unit whereby the fabric as it comes from the loom is guided and drawn under a predetermined amount of tension.

The control unit includes a means for varying the speed of the motor shaft and being interconnected with a combined fabric driving and tension sensing roll, the mechanism utilizes changes in motor loading to continuously sense and control the motor speed to maintain a preset fabric tension level. Additionally, the drive means includes a phase shifting function which permits the drive to run continuously at any speed down to and including stalling without creating any excessive heating up of the drive motor. The latter feature is particularly advantageous in the event of a loom stop, for any progressive increase in fabric tension will cause a cessation of the driving elements and when the loom is ready to resume normal operation, the increased fabric tension will be relieved and the wind up will automatically commence taking up the fabric.

The mechanism according to the invention will be described in detail by reference to a specific embodiment thereof illustrated in the accompanying figures of drawing, wherein:

FIG. 1 is a perspective view showing a portion of the front of a loom and the fabric windup mechanism according to the invention positioned in close proximity therewith;

FIG. 2 is a view similar to that of FIG. 1 but showing the windup mechanism as seen looking from the opposite end thereof; and

FIG. 3 is a diagrammatic view showing the guiding means for advancing the woven fabric from the loom to the cloth roll.

Now referring to the figures of drawing, the loom shown in FIG. 1 which is generally indicated by numeral 10 is of conventional design and is not completely illustrated for it is believed enough of the loom has been shown to serve as a basis for a detailed description of the windup mechanism that is adapted to function in cooperation therewith. This windup mechanism is illustrated in FIGS. 1 and 2 as being positioned in close proximity with the front of a loom and it should be understood that under actual weaving conditions this mechanism would be more remotely disposed. For instance, some weaving mills prefer to install their wind-up mechanisms below the weave room thereby providing a more efficient means for handling the cloth. Additionally, the span of fabric from the loom to the windup mechanisms permits the fabric to be inspected before actual windup and any manufacturing defects in the fabric which may occur can be corrected before any substantial amount of such fabric is formed.

The instant invention is indicated generally in FIGS. 1 and 2 by numeral 11 and includes a pair of aligned frame members 12 and 13 disposed in spaced relation. Tie rods 14, 15 and 16 extend between the frame members and are fixedly attached to the latter by means of hex nuts 17 that assemble on the threaded ends of said tie rods which extend through aligned apertures (not shown) in said frame members.

The front of this windup mechanism will hereinafter be referred to as that portion in FIG. 1 most remote from the front of the loom 10 and the back as that portion adjacent the front of said loom.

A pair of guide roll brackets 18 and 19 are fixedly at-

tached to the back lower portion of the frame members 12 and 13, respectively, and extending rearwardly therefrom they support the ends of a freely rotatable guide roll 20.

Forwardly of guide roll 20 and in general horizontal alignment therewith the guide roll brackets support a spreader bar 21 which extends the distance between the frame members 12 and 13. This spreader bar is provided with the usual angularly disposed grooves 22 (FIG. 1) which when the fabric is caused to move thereacross, have a tendency to urge said fabric outwardly toward each end of said spreader bar thereby providing a means for maintaining a stable width and wrinkle free roll of fabric.

A second horizontally disposed and freely rotatable guide roll 21' extends between and is supported at its ends by the frame members. This guide roll is positioned forwardly of and below the plane of the spreader bar and serves to guide the fabric as it moves from said spreader bar toward the cloth roll on which it is adapted to be wound.

At the front of the windup mechanism and immediately above the tie rod 14, the frame members 12 and 13 support for rotary movement a horizontally disposed driven roll 23 or what may be termed a fabric advancing and tension sensing roll. This driven roll is caused to rotate by means of an electric motor drive system having a means for controlling the speed of the motor shaft and will be more fully described hereinafter.

A second driven roll 24 is supported for rotary movement by the frame members and is positioned in close proximity with and immediately in back of the driven roll 23 so that the axis of one roll extends in parallel relation to the other.

A takeup roll or so-called cloth roll 25 is adapted to be supported by the adjacent upper surfaces of the driven rolls 23 and 24 and the ends of said cloth roll are adapted to be guided for vertical movement in track elements 26 and 27 which form a part of the frame members 12 and 13, respectively. These track elements are defined by integrally formed and upwardly directed extensions of the frame members which are identified in FIG. 1 by numerals 28 and 29.

Vertically disposed bar members 30 and 31 are fixedly positioned forwardly of the extensions 28 and 29 a sufficient distance to form the track elements 26 and 27 therebetween. Horizontally disposed plate-like members 32 and 33 are attached to the upper surface of the extensions 28 and 29, respectively, by means of cap screws 34 and extending forwardly from said extension, they serve as a means for positioning the upper ends of the bar members 30 and 31. The lower ends of these bar members are suitably attached to the frame members such as being seated in an appropriate hole as at 35 in FIG. 1.

The ends of the driven rolls 23 and 24 as shown in FIG. 2 extend outwardly beyond their supporting journal points in the frame member 12. This end of roll 23 is provided with a sprocket 36 and in alignment therewith, the end of roll 24 is provided with a sprocket 37. An endless driving chain 38 passes about and interconnects each of these sprockets and causes roll 24 to rotate in the direction of the indicating arrow 40 depicted in FIG. 2 when roll 23 is caused to be driven in a manner now to be described.

That end of roll 23 opposite the end provided with sprocket 36 extends outwardly beyond its journal point in frame member 13 and is provided on this end with a sprocket member 41.

An endless driving belt 42 passes about sprocket member 41 and interconnects the latter with a driving sprocket 43 which forms a part of an adjustable tension electric motor drive system generally indicated in FIG. 1 by numeral 44. This electric motor drive system is of the type such as that furnished by the Vee-Arc Corporation which is located at 50 Milk Street in Westboro, Mass.

The drive system includes a gear box reducer 45 on which the driving pulley 43 is mounted and is adapted to

be driven by a 1/2 H.P. electric motor 46 having a capacity of 1725 r.p.m.

The speed of the motor shaft is controllable selectively by means of a control box 47 having a single knob 48 for increasing or decreasing said speed.

In operation, the fabric as it is formed on a loom is expelled from the front portion thereof in a manner well known to those conversant in the weaving art. The fabric which is identified by the letter F is caused to follow a predetermined path and is best followed by the diagrammatic view of FIG. 3. The cloth moves in the direction of the indicating arrows in this figure of drawing and passes first across and in contact with the lower surface of the guide roll 20. Moving forwardly the cloth then passes over the upper surface of the spreader bar 21 and thence angularly downward to move beneath and in contact with the under surface of the guide roll 21'. After leaving the guide roll 21' the cloth moves forwardly and angularly upwardly toward the front of the mechanism where it is adapted to pass about the forward side of the driven roll 23. Both rolls 23 and 24 are covered with a rubber-like material which induces frictional contact between the roll and the fabric in contact therewith.

The cloth after passing about the forward surface of the roll 23 is caused to be found upon the cloth roll 25. Rolls 23 and 24 are both rotating in an anti-clockwise direction as shown by the indicating arrows 39 and 40 in FIG. 2 and the frictional contact between these rolls and the fabric on the cloth roll 25 causes the latter to rotate in a clockwise direction as viewed in said FIG. 2.

The sprocket 37 on the end of roll 24 has one tooth less than the sprocket 36 on the end of roll 23 and being in driving relation this arrangement causes roll 24 to rotate at a slightly greater speed than roll 23. The speed differential between these two rolls is effective in creating a packing condition on the fabric whereby a much firmer and more tightly wound roll of cloth is formed than has been heretofore possible.

As the fabric on the cloth roll increases in diameter, the ends of said roll move upwardly in the track elements 26 and 27 to compensate for this continual increase in size of the fabric roll.

The driving means heretofore described is preset to rotate the driven rolls at a speed to maintain the fabric being advanced to the cloth roll under a predetermined amount of tension.

Changes in motor loading are utilized to continuously sense and control motor speed to maintain a preset fabric tension level. In other words slight increases or decreases in fabric tension will cause the motor to increase or decrease its r.p.m. to maintain the fabric within the limits of the desired tension.

Should the loom stop for any number of known reasons such as filling breaks, warp yarn breakage, improperly boxed shuttle, etc., the mechanism will continue to run and a progressive increase in fabric tension will cause a cessation of the driven rolls which advance the fabric.

This control means in the driving system is a phase shifting function which permits the drive to run continuously at any speed down to and including stall without a heating up condition being created within the motor.

When the cause of a loom stop has been corrected and normal weaving resumed, the driving system will commence to function automatically when the accumulated fabric tension has been reduced a sufficient amount to come within the preset limits it is capable of controlling.

While one embodiment of the invention has been disclosed, it is to be understood that the inventive concept may be carried out in a number of ways.

I claim:

1. A fabric windup mechanism for a loom adapted to receive woven fabric from said loom under a predetermined amount of selectively adjustable tension which comprises:

(a) a pair of aligned frame members,

(b) a takeup roll,

(c) a guide means forming a part of said frame mem-

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- bers for receiving the ends of said takeup roll and guiding the same as the wound fabric increases in diameter on said roll,
- (d) first and second juxtapositioned and horizontally disposed driven rolls carried by said frame members for supporting and rotating said takeup roll,
- (e) said first driven roll being adapted for advancing the woven fabric from said loom under tension,
- (f) an electrical motor drive means for rotating said driven rolls,
- (g) positive driving connection between said motor drive means and said first driven roll, and
- (h) an independent motor drive control unit for providing power to said motor drive means, said control unit being influenced by changes in fabric tension upon said first driven roll as transmitted through said positive driving connection and said motor drive

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means to effect reductions in speed down to a cessation of the latter upon indication of progressive increases in fabric tension and to effect increases in speed thereof upon indication of progressive decreases in fabric tension.

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WILLIAM S. BURDEN, *Primary Examiner*.

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