

Feb. 17, 1970

TOEMON SAKAMOTO

3,495,631

APPARATUS FOR REGULATING WARP TENSION ON A LOOM

Filed Oct. 26, 1967

3 Sheets-Sheet 1

Fig. 1A

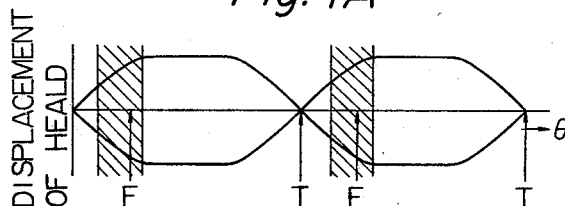


Fig. 1B

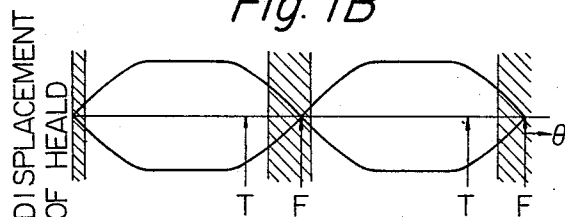
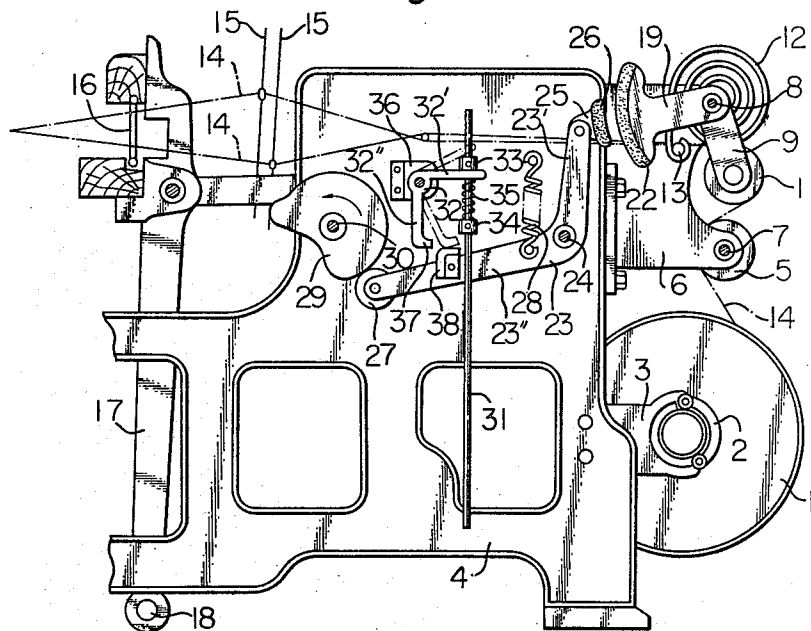


Fig. 2



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Fig. 3

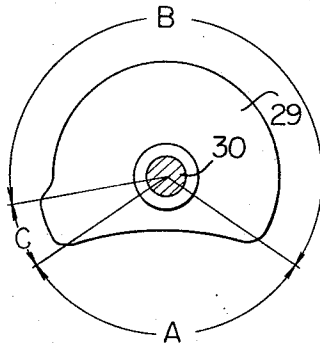
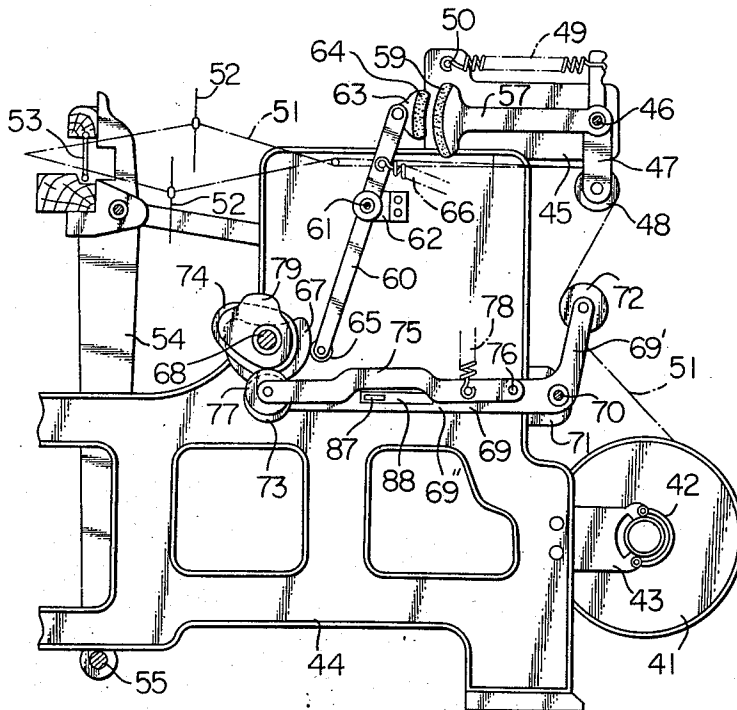


Fig. 4



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Fig. 5

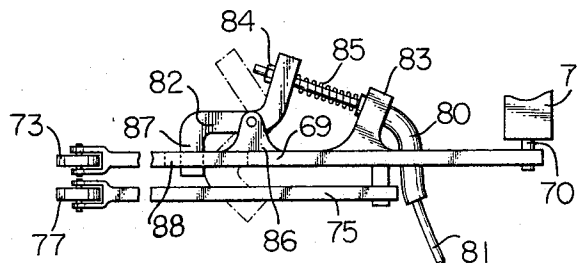


Fig. 6

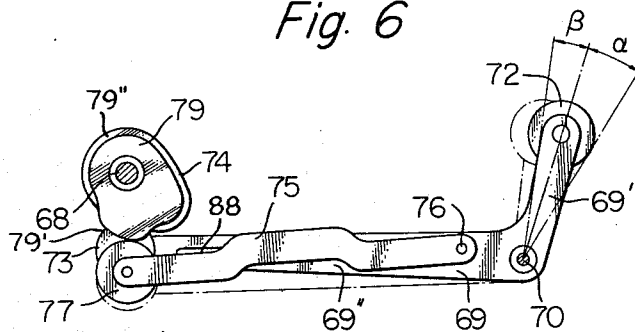
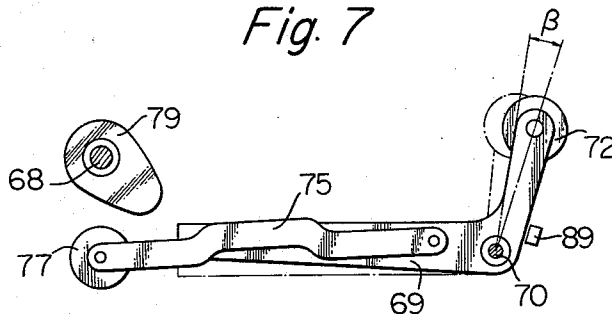


Fig. 7



1

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APPARATUS FOR REGULATING WARP TENSION ON A LOOM

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Filed Oct. 26, 1967, Ser. No. 678,380

Claims priority, application Japan, Oct. 27, 1966,

41/70,954; Feb. 6, 1967, 42/7,882

Int. Cl. D03d 49/14

U.S. Cl. 139—97

11 Claims

ABSTRACT OF THE DISCLOSURE

An improved apparatus for regulating warp tension on a loom at the time just before stopping the weaving operation and just after starting the operation of the loom. An easing roller and/or a tension roller guiding the supply of the warp is temporarily positioned at the predetermined regulating position to relax the strain of the warp yarn applied by the shedding motion.

The present invention relates to an improved apparatus for regulating warp tension on a loom, more particularly relates to an improved apparatus for maintaining warp tension constant throughout the weaving operation even at the time just before stopping and just after starting the loom by regulating the easing motion of an easing roller and/or a tension roller temporarily in accordance with the shedding motion of the warp, thereby preventing the formation of such defects of the woven fabric as thin or thick places. This easing motion relaxes strain on the warp yarn applied by the shedding action of the loom.

It is well-known that such defects as thin places or thick places are often formed on the woven fabric when the loom is stopped during the weaving operation, and it is difficult to prevent such troubles especially when weaving light weight fabrics by conventional techniques. The main cause of the above-described defects of fabrics is the driving speed of the loom just before stopping or just after starting is lower than that during the normal weaving operation and this lowered driving speed of the loom results in lower warp tension than that during the normal weaving operation. So, it can be clearly understood that such troubles can be effectively eliminated by regulating the easing motion of the easing roller, and/or the tension roller thereby maintaining the warp tension constant throughout the weaving operation.

The principal object of the present invention is to provide an improved apparatus for regulating the warp tension on a loom.

The other object of the present invention is to provide an improved apparatus for preventing the formation of such defects of woven fabrics as thin or thick place without manual work on a loom.

A further object of the present invention is to provide an improved apparatus for producing fabrics of excellent quality which can easily be disposed to any conventional loom with little modification and at low installation cost.

A still further object of the present invention is to provide an improved apparatus for producing fabrics of excellent quality with less manual work in the weaving operation at high production efficiency.

Other features and advantages of the present invention will be apparent from the ensuing description with reference to the accompanying drawings to which, however, the scope of the invention is in no way limited.

FIGS. 1A and 1B are respectively, graphical drawings illustrating timing diagrams of the shedding motion of a loom,

FIG. 2 is an explanatory schematic side view, partly omitted, of an embodiment of the present invention applied to an ordinary loom,

FIG. 3 is an explanatory drawing for showing the profile of the cam used in the apparatus shown in FIG. 2,

FIG. 4 is a fragmentary explanatory schematic side view of another embodiment of the present invention applied to an ordinary loom,

FIG. 5 is an enlarged plan view of a portion of the apparatus shown in FIG. 4,

FIG. 6 is an explanatory side view for showing the operation mechanism of the easing motion of the apparatus shown in FIG. 4,

FIG. 7 is an explanatory side view for showing the operation mechanism of another embodiment of the apparatus shown in FIG. 6.

Two different timing diagrams of the shedding motion of a loom are shown in FIGS. 1A and 1B, respectively, wherein the ordinate designates the displacement of heald, in other words the vertical displacement of warp, and the abscissa designates the crank cycle of the loom. In the drawing, the angular position designated by T represents the top center of the crank cycle while the angular position designated by F represents the front dead center of the crank cycle, and the regulation by the apparatus of the present invention must be performed during the period corresponding to the shaded region. As it is apparent from the drawings, shed of the warp is closed near the top center and is opened gradually near the front dead center in case of the example shown in FIG. 1A, while it is closed near the front dead center in case of the example shown in FIG. 1B.

Usually during the normal weaving operation, the easing motion operates in such a manner that it loads less tension on the warp when the shed is opening while it loads more tension on the warp when the shed is closing. It is therefore possible to obtain more warp tension by limiting the easing motion at the time when the shed is opening in case of the example shown in FIG. 1A, while it is possible to obtain less warp tension by limiting the easing motion at the time when the shed is closing, in case of the example shown in FIG. 1B.

The regulation of the easing motion is carried out by using the apparatus of the present invention in such a manner that the easing motion is left free during the normal driving condition but is limited just before stopping or just after starting the loom in case of the example shown in FIG. 1A, while on the contrary, the easing motion is limited during normal driving condition but put in free condition just before stopping or just after starting the loom in case of the example shown in FIG. 1B.

In the following description, reference will be made only to the example shown in FIG. 1A for the sake of explanation of the invention.

An embodiment of the apparatus of the present invention is shown in FIG. 2, wherein the mechanical arrangement of the conventional members of the loom shown is approximately the same as that of the conventional loom. A yarn beam 1 is rotatably supported by a beam clamp 2 of the beam bracket 3 secured to the back-side of the machine frame 4. A yarn guide roller 5 is rotatably disposed to an upper bracket 6 by a pin 7, and the upper bracket 6 is secured to the back-side of the upper portion of the machine frame 4 above the beam bracket 3. A pin 8 is disposed rotatably to the upper bracket 6 at the position above the yarn guide roller 5 so as to firmly support a tension roller arm 9, and a tension roller 11 is rotatably disposed to another end portion of the arm 9. A spiral spring 12 is also disposed on the pin 8 with one end secured to the pin 8 and the other end hooked to a projection 13 of the upper bracket 6 in such a manner that

the spring 12 is always loading the arm 9 in a counter-clockwise direction so as to press the tension roller 11 towards the sheet of warp.

In the above-described mechanical arrangement, warp 14 is drawn out of the yarn beam 1 positively or negatively and conducted toward the shedding motion mechanism by way of the yarn guide roller 5 and the tension roller 11. Shedding motion of the warp 14 is carried out by providing up-and down movements to a plurality of healds 15 by any of the well-known methods. After each insertion of the weft, beating motion is performed by striking the reed 16 against the cloth-fell of the woven cloth by the swing motion of the sley sword 17 around the swing rail shaft 18. During the above-described weaving operation, the warp tension is maintained approximately constant by the easing motion in accordance with the movement of the warp during the shedding motion. As a member for loading the arm 9 a loading means such as a dead weight can be used instead of the spiral spring 12 used in the present example.

In the above-described mechanical arrangement, the apparatus of the present invention is disposed applied to the loom in a manner as hereinafter described.

A brake sector lever 19 provided with a frictional surface 22 is disposed firmly fixed to the pin 8 so as to swing around the central axis of the pin 8 together with the arm 9. An L-shaped lever 23 is pivotably disposed on the pin 24, which is secured to the machine frame 4, at its apex portion and two arms 23' and 23'' are rigidly connected at the apex portion. An end portion of the arm 23' is provided with a brake shoe 25 having a frictional surface 26 facing the frictional surface 22 of the lever 19, while an end portion of the arm 23'' is provided with a roll 27 rotatably disposed thereon.

A spring 28 is connected to the arm 23 in such a manner that it turns the lever 23 in a clockwise direction so as to press the roll 27 against a profile cam 29. The cam 29 is firmly mounted on the crank shaft 30 of the loom in a manner later described and the profile of the cam 29 is shown in detail in FIG. 3. The cam 29 consists of a concave portion A, a convex portion B and a projecting portion C intermediate the portion A and the portion B. This cam is firmly mounted on the crank shaft 30 of the loom in such a manner that the concave portion A faces the roll 27 at the beginning of the opening the shed while the projecting portion C comes into contact with the roll 27 just before the picking motion. The profile of the cam 29 should be designed in such a manner that the frictional surface 26 of the L-shaped lever 23 is pressed against the frictional surface 22 of the lever 19 so as to restrict the swing motion of the lever 19 around the central axis of the pin 8 when the roll 27 faces the concave portion A while the frictional surface 26 is not in contact with the frictional surface 22 when the roll 27 is contacting with the convex portion B and the camming portion C. A vertical rod 31 is slidably disposed relative to the upper arm 32' of the L-shaped supporting member 32 by a pair of collars 33 and 34, and a spring 35 between the collars 33 and 34 and the other end of the vertical rod 31 is connected to a starting handle (not shown) of the loom by a known link mechanism (not shown).

The L-shaped supporting member 32 is pivotably mounted on a supporting bracket 36 secured to the machine frame 4 at its apex portion between the upper arm 32' and the lower arm 32'', and the lower arm 32'' is provided with a pawl portion 37 at the lower end portion thereof for engaging with an engaging member 38 secured to the middle portion of the L-shaped lever 23. During the normal driving of the loom, in other words when the starting handle is at the ON position, the vertical rod 31 is placed in a lifted position, and the supporting member 32 is pivoted from the position shown in full lines to the position shown in dash-and-dot lines. Then the pawl portion 37 of the lower arm 32'' engages with

the engaging member 38 of the L-shaped lever 23 so as to limit the turning motion of the lever 23 in the clockwise direction against the pulling force provided by the spring 28 even when the concave portion A of the cam 29 comes into the contacting position with the roll 27. When the loom is stopped, in other words when the starting handle is moved to the OFF position, the vertical rod 31 is dropped, the supporting member 32 returns to the position shown in full lines so as to eliminate the limitation on the turning motion of the L-shaped lever 23. Consequently, restriction on the easing motion of the tension roller 11 in accordance with the rotation of the cam 29 by the apparatus of the present invention is performed.

In the above-described mechanical arrangement and combined operation of all elements of the apparatus of the present invention, the pawl portion 37 of the L-shaped supporting member 32 has a tendency to become disengaged from the engaging member 38 of the L-shaped lever 23 when the loom is stopped and the vertical rod 31 is dropped. This disengagement cannot be carried out smoothly if the loom is stopped when the roll 27 is facing the concave portion A of the cam 29, while it can be performed easily as the roll 27 comes in contact with the projecting cam portion C of the cam 29, and the turning motion of the L-shaped lever 23 is performed in accordance with the rotation of the cam 29.

It is well-known that the operation of the loom does not stop instantly after the loom is stopped but continues to rotate at a lower driving speed than the normal driving condition for a while by inertia. While the restriction on the easing motion by the apparatus of the present invention takes place soon after the stopping motion because the starting handle of the loom is brought to the OFF position instantly after the stopping motion and the vertical rod 31 is dropped instantly by the movement of the starting handle.

On the other hand, when the loom is restarted, in other words the starting handle is brought to the ON position so that the roll 27 is not contacting with the cam portion C of the cam 29, the vertical rod 31 is lifted but the turning motion of the member 32 cannot be completed because the pawl portion 37 touches the side portion of the member 38 and results in compression of the spring 35 only. Consequently, engagement between the pawl portion 37 and the engaging member 38 does not take place until the roll 27 comes in contact with the raising portion C of the cam 29. Consequently restriction on the easing motion by the apparatus of the present invention is not released instantly. It is necessary to mount the cam 29 on the crank shaft 30 in such a manner that the raising portion C of the cam 29 comes in contact with the roll 27 just before picking so as not to fail in the timing of the restriction on the easing motion.

While in the above description, all of the references were made only to the example shown in FIG. 1A, it is also possible to apply the above-described embodiment of the apparatus of the invention to the example shown in FIG. 1B. In this case the vertical rod 31 is kept at the dropped position during the normal driving of the loom and is lifted upward when the loom is stopped. The mechanical arrangement and operation are quite similar to those in the example shown in FIG. 1A.

Another embodiment of the present invention is shown in FIG. 4, wherein the degree of the easing motion of the easing roller is temporarily increased at the time just before stopping the loom and just after starting the loom so as to prevent the formation of such defects in the woven fabric as thin or thick places. The mechanical arrangement of the conventional elements of the loom is almost the same as that of the conventional loom. A yarn beam 41 is rotatably supported by a beam clamp 42 of the beam bracket 43 which is secured to the back-side of the machine frame 44. An upper bracket 45 is secured to

the back-side of the upper portion of the machine frame 44 above the beam bracket 43. A pin 46 is disposed rotatably to the upper bracket 45 so as to support a tension roller arm 47 firmly at its middle portion and a tension roller 48 is rotatably disposed on the lower end portion of the arm 47. A spring 49 is also disposed on the arm 47 with one end secured to the upper end portion of the arm 47 and the other end hooked to a projection 50 of the upper bracket 45 in such a manner that the spring 49 is always loading the arm 47 in a counter-clockwise direction so as to press the tension roller 48 toward the sheet of warp 51.

In the above-described mechanical arrangement, the sheet of warp 51 is drawn out of the yarn beam 41 positively or negatively and conducted toward the shedding motion mechanism by way of the tension roller 48. Shedding motion of the warp 51 is carried out by providing up-and-down movement to a plurality of healds 52 by any of well-known methods. After each insertion of the weft, beating motion is performed by striking the reed 53 against the cloth-fell of the woven cloth by the swing motion of the sley sword 54 around the swing rail shaft 55. During the above-described weaving operation, the warp tension is maintained approximately constant by the easing motion in accordance with the movement of the warp during the shedding motion. As a member for loading the arm 47, a loading means such as a dead weight can be used instead of the spring 49 used in the present example.

In the above-described mechanical arrangement, the apparatus of the present embodiment is disposed on the loom in a manner as hereinafter described.

A sector lever 57 provided with a frictional surface 59 is disposed firmly connected to the pin 46 so as to swing around the central axis of the pin 46 together with the arm 47. A lever 60 is pivotably disposed on the pin 61 at its middle portion, which is secured to the bracket 62 firmly mounted on the machine frame 44. The upper end portion of the lever 60 is provided with a brake shoe 63 having a frictional surface 64 facing the frictional surface 59 of the lever 57, while the bottom end portion of the lever 60 is provided with a roll 65 rotatably disposed thereon.

A spring 66 is connected to the lever 60 in such a manner that it turns the lever 60 in a clockwise direction so as to press the roll 65 against a brake cam 67. The brake cam 67 is firmly mounted on the crank shaft 68 of the loom and consists of an inwardly concave portion and an outwardly convex portion so as to bestow a so-called sector brake motion to the above-described sector brake mechanism.

An L-shaped lever 69 is pivotably disposed on the pin 70, which is secured to a supporting bracket 71 firmly fixed to the machine frame 44 at the position between the upper bracket 45 and the beam bracket 43 at its apex portion and two arms 69' and 69'' are rigidly connected at the apex portion. An end portion of the arm 69' is provided with an easing roller 72 rotatably disposed thereon, while an end portion of the arm 69'' is also provided with a roll 73 rotatably disposed thereon. An easing motion cam 74 is firmly mounted on the crank shaft 68 of the loom in coaxial condition with the brake cam 67 and the profile of the easing motion cam 74 should be so designed as to bestow a so-called easing motion to the easing roller 72 in accordance with the shedding motion of the warp 51. An auxiliary lever 75 is attached to the L-shaped lever 69 with the end portion adjacent to the apex portion thereof pivotably disposed on a pin 76 secured to the arm 69'' while the other end portion thereof is rotatably provided with a roll 77. A spring 78 is connected to the auxiliary lever 75 in such a manner that it turns the lever 75 in a clockwise direction so as to press the roll 77 against an auxiliary cam 79 firmly mounted on the crank shaft 68 in a coaxial condition with the brake cam 67 and the eas-

ing motion cam 74. The profile of the auxiliary cam 79 is approximately the same as that of the easing motion cam 74 with the exception that the lift of the portion 79' of the cam corresponding to the shaded portion of the crank cycle shown in FIGS. 1A and 1B is larger than that of the easing motion cam 74 while the lift of the other portion 79'' is smaller than that of the easing motion cam 74, thereby bestowing a swing motion to the auxiliary lever 75 independently from the swing motion of the L-shaped lever 69 given by the easing motion cam 74 during normal driving of the loom.

In FIG. 5, a flexible wire 81 is slidably disposed and connected to a Z-shaped supporting member 82 through a projection 83 of the L-shaped lever 69 by a flexible tube 80 a collar 84 and a spring 85 placed between the Z-shaped supporting member 82 and the projection 83, and the other end of the wire 81 is connected to a starting handle (not shown) of the loom by a known link mechanism (not shown). The Z-shaped supporting member 82 is pivotably mounted on a supporting bracket 86 secured to the L-shaped lever 69 at one apex portion of the Z-shaped supporting member 82 forms a pawl portion 87 inserted into a long aperture 88 formed laterally through the arm 69'' of the L-shaped lever 69. The middle stem portion of the auxiliary lever 75 corresponding to the long aperture 88 is upwardly curved as shown in FIG. 4, and is always maintained at the position above the long aperture 88 as shown in the drawing with the exception that the auxiliary lever 75 is swung downward by the contact of the roll 77 with the portion 79' of the auxiliary cam 79. During the normal driving of the loom, in other words when the starting handle is maintained at the ON position, the Z-shaped supporting member 82 is kept at the position shown in full lines by the pulling force of the flexible wire 81. When the loom is stopped, in other words when the starting handle is moved to the OFF position, the pulling force of the flexible wire 81 is eliminated and the Z-shaped supporting member 82 is pivoted from the position shown in full lines to the position shown in dash-and-dot lines by the repulsion force of the spring 85.

In the above-described mechanical arrangement and the combined operation of all elements of the apparatus of the present invention, the starting handle is removed to its OFF position from its ON position when the loom is stopped during driving. Then the Z-shaped supporting member 82 is pivoted to the position shown in dash-and-dot lines as already-described so as to insert its pawl portion 87 into the position below the curved portion of the auxiliary lever 75. This insertion of the pawl portion 87 will be performed smoothly if it takes place when the roll 77 is contacting with the portion 79'' of the auxiliary cam 79 and the auxiliary lever 75 is put in the lifted position, while this insertion will be restricted by the presence of the auxiliary lever 75 in its dropped position, resulting in only the compression of the spring 85 if the insertion takes place when the roll 77 is contacting with the portion 79' of the auxiliary cam 79.

As a result, the smooth insertion of the pawl portion 87 must be prolonged for the time when the roll 77 comes into contact with the portion 79'' of the auxiliary cam 79.

Even after the loom is stopped and the starting handle is removed to its OFF position, the crank shaft 68 of the loom does not cease its rotation for some time because of inertia force, and the L-shaped lever 69 and the auxiliary lever 75 are bestowed independent swing motions by the inertia rotation of the easing motion cam 74 and the auxiliary cam 79 respectively. In this case, the auxiliary lever 75 is bestowed a larger swing motion than the L-shaped lever 69 as already-described when the roll 77 comes in contact with the portion 79' of the auxiliary cam 79, and the lever 75 pushes down the pawl portion 87 of the Z-shaped member 82, thereby the L-shaped lever 69 is swung downward together with the auxiliary lever 75 to an extent larger than the swing motion bestowed by

the easing motion cam 74 during the normal driving condition as shown in dash-and-dot lines in FIG. 6.

In FIG. 6, the easing motion of the easing roller 72 is limited within the region designated by α during normal driving of the loom by the easing motion cam 74, while it is increased by the region designated by β towards the front side of the loom in accordance with the increased swing motion of the L-shaped lever 69 by the auxiliary cam 79 during inertial driving of the loom.

Further preferable and effective regulation of the warp tension can be provided by setting the braking action of the sector brake mechanism bestowed by the brake cam 67 synchronously with the easing motion bestowed by the auxiliary cam 79 and applying a restriction by the sector brake mechanism upon the easing motion of the easing roller 48 when the easing motion of the easing roller 72 is increased as above-described.

In case the embodiment shown in FIG. 4 is applied to the example shown in FIG. 1B, the easing motion cam 74 and the roll 73 can be eliminated and a stopper 89 for limiting the swung motion of the lever 69 is disposed on the loom as shown in FIG. 7 so as not to perform the easing motion during the normal driving of the loom. Consequently, only the swing motion α is eliminated and swing motion β is bestowed to the lever 69.

While in case of the above-described embodiments, the movement of the L-shaped supporting member 32 and the Z-shaped supporting member 82 is actuated in accordance with the on-and-off movement of the starting handle by a suitable mechanical transmitting means, it is possible to transmit the movement by a suitable electric means such as an electromagnet on the loom which actuates members 32 and 82 in accordance with electric signals transmitted from the starting handle by the electric means.

While the invention has been described in conjunction with certain embodiment thereof, it is to be understood that various modifications and changes may be made without departing from the spirit and scope of the invention.

What is claimed is:

1. An improved apparatus for regulating warp tension on a loom comprising: an easing motion mechanism including means for easing and relaxing the strain of a warp yarn; restricting means for restricting the easing motion of said easing motion mechanism; changing means for alternately changing said restricting means from a working condition wherein said easing motion mechanism may be effectively restricted to a non-working condition wherein said easing motion is rendered ineffective; actuating means for actuating said restricting means when said restriction means is in said working condition; and settable means for transmitting actuating signals to said changing means in accordance with on-and-off conditions of said loom said settable means comprising means settable to put said restricting means in said working condition just before stopping and just after restarting of the loom.

2. An improved apparatus for regulating warp tension according to claim 1, wherein said restricting means comprises, a braking member on said easing motion mechanism, an L-shaped lever pivotally mounted at an apex portion thereof, a braking member connected to one end of said L-shaped lever in a face-to-face relationship with said braking member of said easing motion mechanism, a roller rotatably mounted on the other end of said L-shaped lever to engage with said actuating means, and an engaging member connected to said L-shaped lever to engage with said changing means when said loom is in an off condition.

3. An improved apparatus for regulating warp tension according to claim 1, including a starting handle operable to place said loom in an on and off condition, and wherein said changing means comprises an L-shaped member pivotally mounted and having one end connected to said settable means for transmitting and the other end

engaged with said restricting means when said starting handle is operated to place said loom in the off condition.

4. An improved apparatus for regulating warp tension according to claim 1, in which said loom comprises a driven crankshaft, and wherein said means for actuating comprises a cam connected to said crankshaft of said loom cooperative with said restricting means and having a profile consisting of a convex portion, a concave portion and a projecting portion intermediate the first mentioned two portions.

5. An improved apparatus for regulating warp tension according to claim 3, wherein said settable means for transmitting comprises a member having one end portion connected to said changing means and another end thereof connected to said starting handle of said loom.

6. An improved apparatus for regulating warp tension on a loom comprising: an easing motion mechanism including means for easing and relaxing the strain of a warp yarn; restricting means for restricting the easing motion of said easing motion mechanism; changing means for alternately changing said restricting means from a working condition wherein said easing motion mechanism may be effectively restricted to a non-working condition wherein said easing motion mechanism is rendered ineffective; actuating means for actuating said restricting means when said restricting means is in said working condition; and settable means for transmitting actuating signals to said changing means in accordance with on-and-off conditions of said loom, said settable means comprising means settable to put said restricting means in said non-working condition just before stopping and just after restarting of the loom.

7. An improved apparatus for regulating warp tension according to claim 6, wherein said restricting means comprises, an L-shaped lever mounted at an apex portion thereof, a braking member on said easing motion means, a braking member connected to one end of said L-shaped lever in a face-to-face relationship with said braking member of said easing motion means, a roller rotatably mounted to the other end of said L-shaped lever to engage with said actuating means, and an engaging member connected to a portion of said L-shaped lever to engage with said changing means when said loom is in the on condition.

8. An improved apparatus for regulating warp tension according to claim 6, including a starting handle operable to place said loom in an on and off condition and wherein said changing means comprises an L-shaped member pivotally mounted and having one end connected to said settable means for transmitting and the other end engaged with said restricting means when said starting handle is placed in the on condition.

9. An improved apparatus for regulating warp tension according to claim 6, in which said loom comprises a crank shaft, and wherein said means for actuating comprises a cam fixed to said crank shaft of said loom for engaging said restricting means and having a profile consisting of a convex portion, a concave portion and a projecting portion intermediate the first mentioned two portions.

10. An improved apparatus for regulating warp tension according to claim 8 wherein said settable means for transmitting comprises a member having one end portion connected to said changing means and another end connected to said starting handle of said loom.

11. An improved apparatus for regulating warp tension on a loom comprising, a starting handle for starting and stopping said loom, a pivotally mounted L-shaped lever, a stop limiting pivotal motion of said L-shaped lever during normal driving of said loom, and an auxiliary means engaged with said L-shaped lever comprising a driven cam for imparting a swing motion to said L-shaped lever only at a time just before stopping and just after starting of the loom, a roller rotatably mounted on

an end of said L-shaped lever, said cam driven from a crank shaft of said loom, and positioned at a selected position whereon said cam imparts a swing motion to said L-shaped lever only just before stopping of said loom and just after restarting of the loom, said stop means comprising an engaging member secured to a portion of said L-shaped lever, and another engaging member mounted on said loom operable in connection with said starting handle of said loom, both engaging members engaging during the weaving operation of said loom.

10 139—115

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HENRY S. JAUDON, Primary Examiner

U.S. Cl. X.R.