Oct. 2, 1934. I. LEWIN ET AL 1,975,587

ADJUSTING DEVICE FOR LOOMS AND METHOD OF CONTROLLING WEFT THREADS

Filed July 30, 1932 2 Sheets-Sheet 1

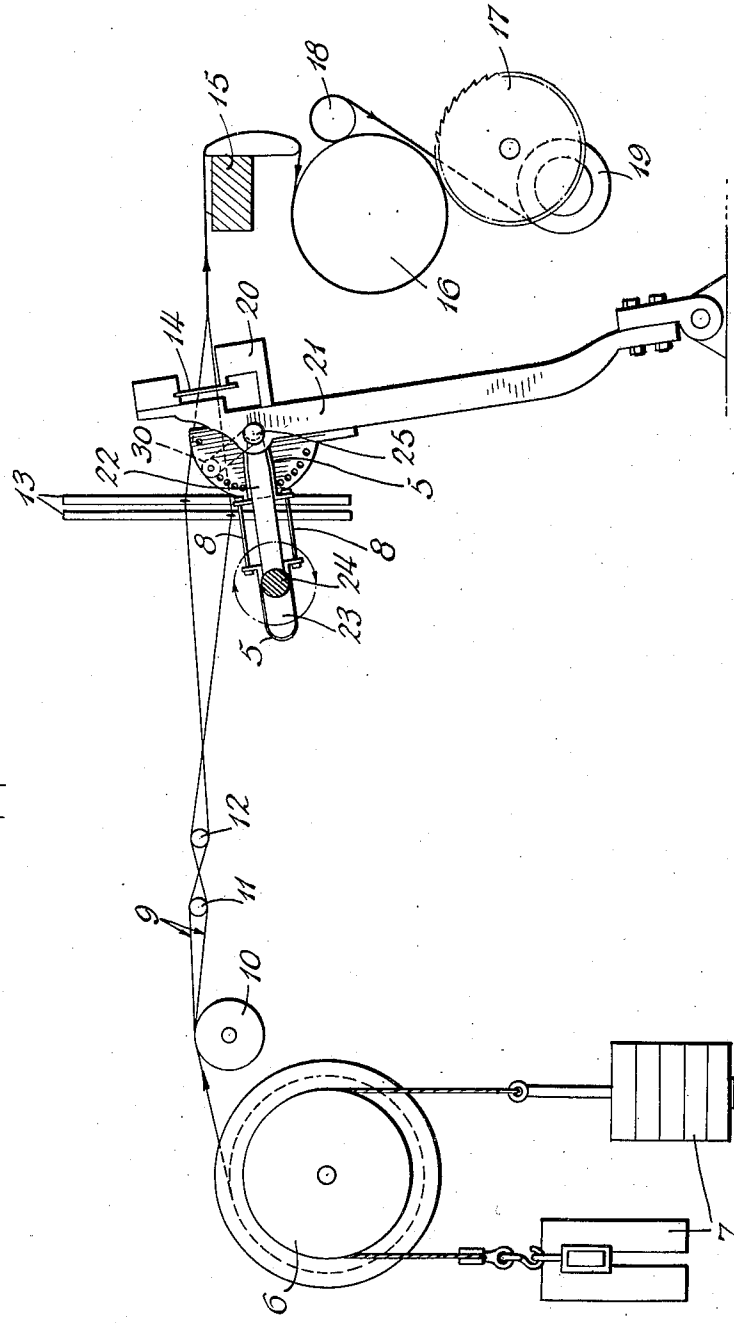


Fig. 1.

INVENTORS
IRVING LEWIN
CONRAD W. GEIER
BY
Oscar A. Geier
ATTORNEY

Oct. 2, 1934. I. LEWIN ET AL 1,975,587

ADJUSTING DEVICE FOR LOOMS AND METHOD OF CONTROLLING WEFT THREADS

Filed July 30, 1932 2 Sheets-Sheet 2

Fig. 2.

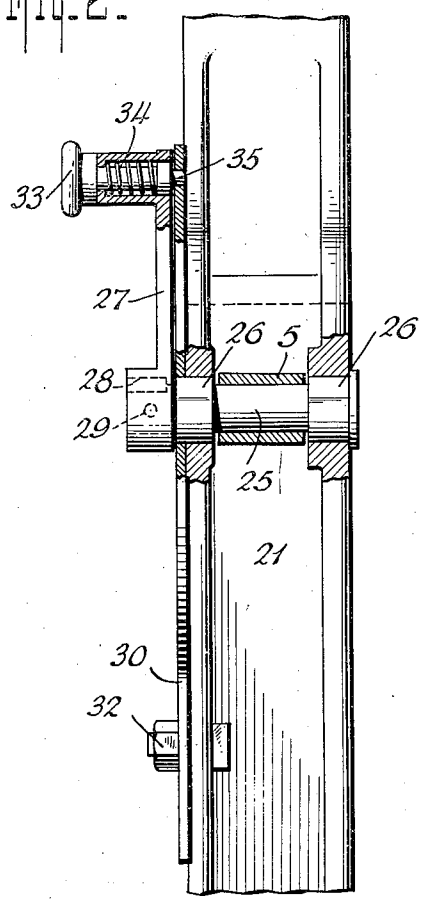


Fig. 3.

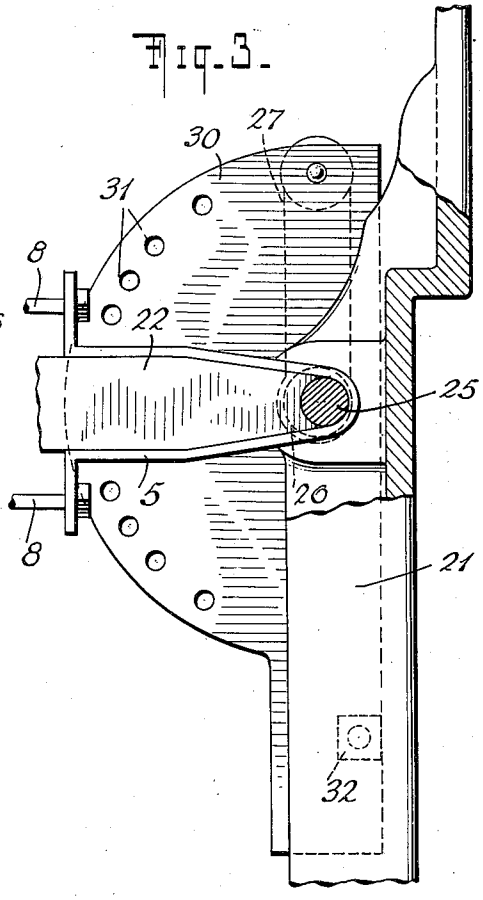
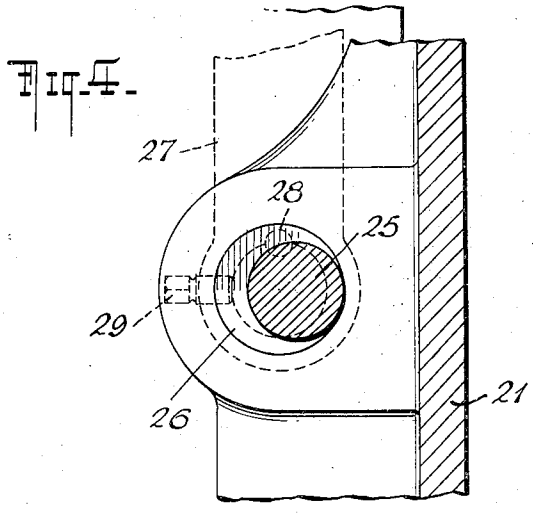


Fig. 4.



INVENTORS
IRVING LEWIN
CONRAD W. GEIER
BY
Oscar A. Geier
ATTORNEY

Patented Oct. 2, 1934 1,975,587

UNITED STATES PATENT OFFICE

1,975,587

ADJUSTING DEVICE FOR LOOMS AND METHOD OF CONTROLLING WEFT THREADS

Irving Lewin and Conrad Walter Geier, Hazleton, Pa., assignors to Duplan Silk Corporation, New York, N. Y., a corporation of Delaware

Application July 30, 1932, Serial No. 626,803

14 Claims. (Cl. 139—190)

This invention relates to improvements in looms and has particular reference to a reed adjusting or setting device therefor and the method of controlling the same when making a joining or adjustment of picks in the cloth.

In looms of standard construction, the lay and reed thereof, which operate to beat the filling threads into position at the fell of the cloth, are confined to a certain unchangeable range of motion. Therefore, when the filling of a shuttle becomes exhausted or should a weft breakage occur and a pick-out of one or more weft threads is necessitated thereby, it has been the common practice to disturb the contact between the cloth, take-up roll and warp tension in order to try and prevent imperfections in the cloth. This is attempted by the operator, after the loom has been stopped, by manually adjusting the lay, and consequently the reed, to the forward extremity of its fixed range of movement and then letting the cloth backward in the direction of the let-off to position the fell of the cloth so that it will coincide with said extreme forward movement of the reed. Notwithstanding the expertness of the operator, this operation has been found to result in uncertainty in the adjustment or setting of the cloth and warp due to slippage and change of tension of the warp threads and cloth with respect to the take-up and let-off mechanisms, and the inexactness of the adjustment of the fell of the cloth relative to the extreme forward position of the reed. For example, when attempting to make an adjustment of the cloth or warp, the weaver must very carefully bring the reed to its forward limit in order to see where the fell of the cloth should be, and must then, with equal care, let the cloth back to meet the reed. In either operation, any inaccuracy in these minute adjustments, both of which are extremely difficult to make, may result in the last inserted pick being moved out of place and crowded against adjacent picks so that a "heavy mark" or imperfection in the cloth will be produced, or should the operator fail to let the cloth back quite far enough, the filling threads will be too loose and an imperfection known as a "light mark" will be created.

The necessity of making adjustments of the cloth in order to avoid imperfections therein also occurs after a loom has remained idle for any length of time, such as overnight. Due to climatic conditions and/or the tension applied to the warp, the latter oftentimes stretches or shrinks, according to the characteristics of the yarn in the warp, during any prolonged inactivity of the loom and it thereupon becomes essential that the operator, before again starting the loom, very carefully move the lay toward its extreme forward position so as to bring the reed up to the fell of the cloth to determine whether such stretch or shrinkage has occurred. When this has been accomplished and it has been found that the warp or cloth has stretched or shrunk the latter is adjusted relative to the reed, either forward or backward as the case may be, until the fell coincides with the extreme forward position of said reed.

Thus, in all instances of adjustments relative to the normal fell of the cloth which are made to avoid imperfections in the woven material, it has been, insofar as known, the universal practice to move the cloth to shift the altered fell thereof relative to the reed with the attendant disadvantages above pointed out. This movement of the cloth brings about a very disturbed condition of the warp, whether it be silk, wool, cotton, rayon, or any other fibre, or whether it be any of the above-mentioned fibres which have been prepared with a greater or lesser number of turns per inch necessitated by some particular effect which the manufacturer is desirous of obtaining in the finished fabric.

To avoid such disadvantages, it is proposed, in accordance with the present invention, to maintain undisturbed the position, contact and tension between the cloth, take-up roll and warp and thereby preserve the identical relationship between the warp and cloth on the one hand and the take-up and feeding-off devices on the other hand. To the end that this may be accomplished, use is made of a mechanism by which the reed may be adjusted to various positions, either forwardly or backwardly relative to the fell of the cloth, to thereby shift the extreme forward and backward range of the reed, this being preferably done without altering the length or arc of movement thereof. The amount of adjustment of the reed is dependent upon the number of picks lost or removed, or the extent of the stretch or shrinkage of the warp or cloth, and by the use of such a mechanism, the throw of the reed with respect to the fell of the cloth is altered without affecting or changing the position or tension of the warp.

While various means for adjusting the reed may be employed in carrying out the invention, the present preferred embodiment of such means consists in using an eccentric pin which joins the crank connector to the lay sword so that the latter, which forms a part of the lay and

supports the reed will respond to any alteration of said pin and thereby effect a corresponding change in the position of said reed. However, it is to be understood that the inventive concept is not to be construed as limited to the specific mechanism shown herein since the same result can be obtained through the use of other instrumentalities such as screws, wedges, cams, or other well-known adjusting means, or by an adjustment of the reed relative to the lay.

The inventive idea involved is therefore capable of receiving a variety of mechanical expressions, one of which, for purposes of illustration, is shown in the accompanying drawings wherein:—

Figure 1 is a diagrammatic view of a loom, illustrating the lay thereof provided with the adjusting device of the present invention.

Figure 2 is an edge elevation, partly in section, of a portion of the lay sword carrying the adjusting device.

Figure 3 is a side elevation, partly in section, of the device shown in Figure 2, and

Figure 4 is an enlarged section taken through the lay sword and illustrating the eccentric which forms a part of the adjusting device.

The loom illustrated in Figure 1 comprises a warp beam 6 carrying the weights 7. The warp 9 passes over a whip roll 10 and between lease rods 11 and 12. After being led through the harness shafts 13 and the reed 14, the warp 9 passes over a breast beam 15, a take-up roll 16 which is rotated by a pick wheel 17, and a press roll 18, and is finally wound on a cloth roll 19. The weft-beating-up device comprises the reed 14, the lay 20 and the lay sword 21 moved by the crank connector 22, the crank 23 and the crank shaft 24. The crank connector 22 is connected with a pin 25 by means of one of the clamps 5 connected with another clamp by tie-rods 8. As shown in Figures 2, 3 and 4, the pin 25 comprises two eccentrically located end portions 26 rotatably supported in the lay sword 21. A lever 27 is connected with the pin 25, 26 by means of a pin 28 and a screw 29. An indicating plate 30 provided with openings 31 is rigidly connected with the lay sword 21 by means of a screw 32. The lever 27 is provided with a knob 33 comprising a coil spring 34 which normally presses the pin 35 forming a part of the knob 33 into one of the openings 31. In order to remove the pin 35 from an opening 31, the knob 33 is pulled outwardly, thus compressing the spring 34.

The distance between the openings 31 and the distance between the axis of rotation of the pin 25 and the axis of rotation of its eccentric end portions 26 have a certain relationship to the thickness of a pick. The distance between two adjacent openings 31 is such that as soon as the lever 27 is moved from one opening to the next one, and the pin 25, 26 is rotated by said lever, the distance between the lay sword 21 and the members 22, 23 or 24 is increased or diminished by a pick or the thickness of a predetermined fraction thereof.

While the loom is in motion, the pin 35 is situated in one of the openings 31 so that the lever 27 is held at both ends. If a situation arises such as previously referred to, as for instance, when the filling of the shuttle breaks and a total of four picks, for example, are lost with an attendant alteration in the normal fell of the cloth following the last picks or pick-out operation, the position of the lay sword 21 will have to be shifted to such an extent that the lay 20, and consequently the reed 14, is moved four-sixtieths of an inch, provided that the gears are set to pull sixty teeth per inch and each forward action of the lay causes the cloth to move forward one-sixtieth of an inch. This is accomplished after the loom has been stopped without touching the cloth and without changing by hand the position of the lay sword 21, by removing the pin 35 from its position in an opening 31 and moving it to another opening which is situated at such distance from the first-mentioned one that the reed 14 carried by the lay 20 is moved four-sixtieths of an inch forward. The plate 30 may be provided with a scale, not shown in the drawings, which indicates the number of picks or the fraction of a pick corresponding to the distance between two openings 31.

Since the crank connector 22 remains stationary during the adjustment, a rotation of the lever 27 to the left from the position shown in Figure 3 will cause the axis of the pin 25 to move with respect to the axis of the pin end portions 26, thus pushing forward the lay sword 21 and a reverse adjustment of said lever will cause said sword to move backwards. The result of the adjustment which consists in moving the lay 20 forward a distance equal to, for instance, four-sixtieths of an inch, will be the same as if the cloth were pulled four-sixtieths of an inch backwards, and the extreme forward movement of the reed, upon again starting the loom, will be advanced to the new fell resulting from the lost picks or pick-out. However, the magnitude or extent of the range of movement of the reed will, for all practical purposes, remain the same. When making adjustments to compensate for stretching of the warp or cloth, as previously referred to, the change in the position of the reed may be either forward or backward, depending upon the nature of the fabric being woven and the direction in which the stretch or shrinkage occurs, and in the case of a backward adjustment the operation of the lever 27, as above described, is reversed.

What is claimed is:—

1. An adjusting device for looms, comprising a lay sword, a lay carried by said lay sword, a rotatable pin comprising at least two portions which are eccentric with respect to each other, one of said portions being carried by said lay sword; a crank connector, and means for connecting said crank connector with the other one of said portions.

2. An adjusting device for looms, comprising a lay sword, a lay carried by said lay sword, a pin comprising at least two portions which are eccentric with respect to each other, one of said portions being carried by said lay sword, a crank connector, means for connecting said crank connector with the other one of said portions, and means for rotating said pin.

3. An adjusting device for looms, comprising a lay sword, a lay carried by said lay sword, a pin comprising at least two portions which are eccentric with respect to each other, one of said portions being carried by said lay sword; a crank connector, means for connecting said crank connector with the other one of said portion, a hand lever connected with said pin, and an indicating device cooperating with said hand lever and carried by said lay sword.

4. An adjusting device for looms, comprising a lay sword, a lay carried by said lay sword, a pin

comprising a middle portion and two end portions which are eccentric with respect to said middle portion, said end portions being rotatably mounted in said lay sword; a crank connector, means for connecting said crank connector with the middle portion of said pin, an indicating plate provided with openings and carried by said lay sword, a lever connected with said pin, and a member carried by said lever and capable of being inserted into each one of said openings.

5. In a device for making a joining in cloth being woven, a weft beating-up device movable through a range the forward limit of which is the normal fell of the cloth, a driving means for said device and an eccentric connection between said driving means and device adjustable to alter said forward limit to more than two positions, any one of which will coincide with a variation in the position of said fell.

6. In a device for making a joining in cloth being woven, a weft beating-up device movable through a range the forward limit of which is the normal fell of the cloth, driving means for said device and an eccentric connection between said driving means and device adjustable to alter said forward limit to more than two positions, any one of which will coincide with a variation in the position of said fell, and means to maintain said connection in its adjusted positions during operation of said device.

7. In a device for making a joining in cloth being woven, a weft beating-up device movable through a range the forward limit of which is the normal fell of the cloth, a driving means connected to said device and an adjusting member having a rotative movement about the point of connection between said driving means and device and operable, through said connection, to alter said forward limit to any one of a plurality of new positions coinciding with a variation in the position of said fell.

8. In combination with a loom of the type provided with a warp beam at one side thereof with a warp adapted to be unrolled therefrom, a woven cloth or fabric take-up roll at the other side to receive a fabric after it has been woven from said warp, a plurality of heddles receiving said warp, means for actuating said heddles upwardly and downwardly to form sheds, a lay provided with shuttle boxes at each side thereof, shuttles to be received in said boxes and to traverse the shed to lay a filling or weft thread in position therewithin substantially to the rear of the woven fabric, said lay also including a weft beating-up device for moving said filler thread after it has been placed in a shed by the shuttle to proper position in the fabric already woven at the fell thereof, said lay being provided with a driving connection to cause it to reciprocate forwardly and rearwardly to actuate said weft-beating-up device; means for controlling the beating-up action of said device so that it will properly beat up the weft threads with an altered position of the fell, which alteration has been caused by lost picks, pickouts, stretching and shrinkage of the warp, said means including an adjusting element for changing the range of movement of said device whereby its extreme forward position will be at the altered fell of the woven fabric, manual means for controlling the adjustment of said element positioned upon the lay in a position readily accessible to the operator of the loom and indicating means enabling exact visual control of the adjustment of said element.

9. In combination with a loom of the type having a warp beam from which a warp is unrolled during the weaving of the fabric, a cloth take-up roll upon which cloth or fabric is rolled after having been woven from said warp, and means to place filling or weft threads in said warp to form said fabric, said means including a weft beating-up device which serves to place each weft or filling thread in proper position in the woven fabric at the fell thereof, said loom being provided with means to unroll said warp and roll said woven fabric a predetermined distance for the placement of each filling thread so that such filling or weft threads will be uniformly spaced in the woven fabric; means to control the beating-up action of said device after an alteration in the position of the fell of the cloth due to lost picks, pickouts, stretching and shrinkage of the warp, said means including an adjusting element for altering the foremost limit or the beating-up position of said device to the altered fell position, manually actuated means positioned so that they may be conveniently operated by the loom operator upon stoppage of the loom to cause said element to change said foremost limit by a determined number of picks to the changed position of the fell due to said lost picks, pickouts, stretching and shrinkage, and indicator means to enable said operator to determine the exact adjustment made.

10. In combination with a loom of the type provided with a warp beam at one side carrying a warp being rolled therefrom, a fabric take-up roll at the other side receiving woven fabric rolled up thereupon, an intermediate arrangement for weaving weft or filler threads in said warp, provided with a device to place or beat-up said filler threads in position at the fell of the woven fabric, and means actuating said warp and said woven fabric so that upon placement of each filler or weft thread in position, they will be moved forward a distance corresponding to the spacing of one pick from the warp beam to the woven fabric take-up roll; means for controlling the beating-up action of said device so that it will properly beat up the weft threads into proper position at the fell of the fabric and with uniform spacing upon alteration of the position of the fell, said means including a rotatable adjusting element for changing the foremost position or limit of the range of movement of said device without changing the extent of the range, whereby its extreme forward position will be at the altered fell of the woven fabric, a lever means to control said adjustment, a handle for manual actuation at one end of the said lever means to move said lever means, an indicator and a scale associated with the last-mentioned end of said lever means, and means for fixing said lever means in any desired adjusted position enabling exact adjustment of said extreme forward position by a determined number of picks.

11. In a device for making a joining in cloth being woven after pick-outs, a weft beating-up device movable through a range the forward limit of which is the normal fell of the cloth, means for moving said device, an adjustable connection between said moving means and device, and measuring means to adjust the forward limit by the spacing of an exact number of picks corresponding to said pick-outs, whereby the forward limit of the device will coincide with the altered fell position.

12. In combination with a loom of the type

provided with a weft beating-up device for moving filler or weft threads to proper position in the fabric already woven at the fell thereof, and with means to actuate said weft-beating-up device; means for controlling the beating-up action of said device so that it will properly beat up the weft threads with an altered position of the fell, which alteration has been caused by lost picks, pickouts, stretching and shrinkage of the warp, said means including an adjusting connection for changing the range of movement of said device whereby its extreme forward position will be at the altered fell of the woven fabric, and measuring means for controlling the adjustment of said element positioned upon the lay in a position readily accessible to the operator of the loom.

13. In combination with a loom of the type having a weft beating-up device to place each weft or filling thread in proper position in the woven fabric at the fell thereof, means to control the beating-up action of said device after an alteration in the position of the fell of the cloth due to lost picks, pickouts, stretching and shrinkage of the warp, said means including an adjusting element for altering the foremost limit or the beating-up position of said device to the altered fell position, measuring means to change said foremost limit by a determined number of picks to the changed position of the fell due to said lost picks, pickouts, stretching and shrinkage, and indicator means to enable said operator to determine the exact adjustment made.

14. In combination with a loom of the type provided with a device to place or beat-up said filler threads in position at the fell of the woven fabric; means for controlling the beating-up action of said device so that it will properly beat up the weft threads into proper position at the fell of the fabric and with uniform spacing upon alteration of the position of the fell, said means including an adjusting element for changing the foremost position or limit of the range of movement of said device without changing the extent of the range, whereby its extreme forward position will be at the altered fell of the woven fabric, and an indicator and a scale associated with said adjusting element enabling exact adjustment of said extreme forward position by a determined number of picks.

IRVING LEWIN.
CONRAD WALTER GEIER.