Nov. 20, 1956 E. A. ROSS 2,771,098

PICKING MOTION FOR A LOOM

Filed Nov. 8, 1954 3 Sheets-Sheet 1

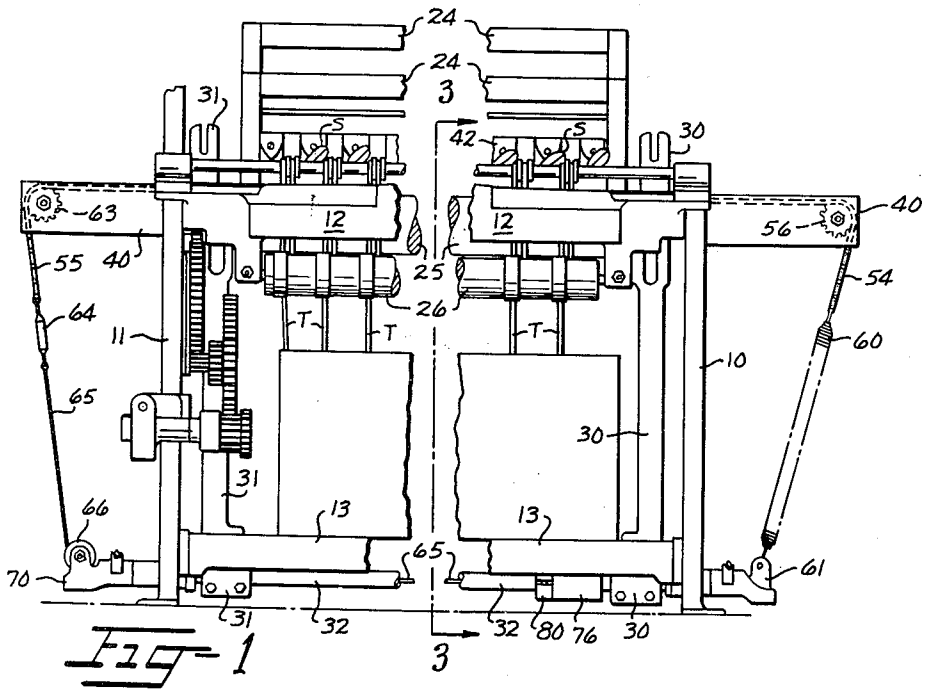

Fig-1

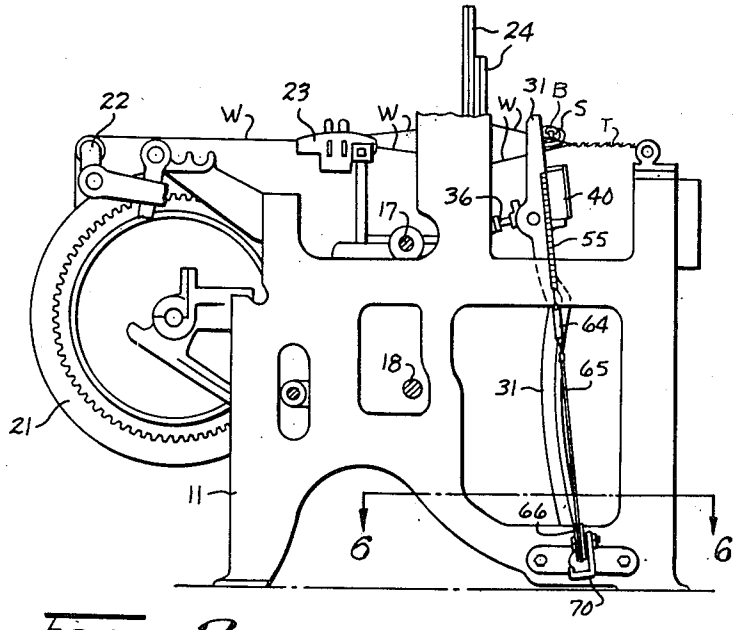

Fig-2

INVENTOR:
EDGAR A. ROSS.

BY Eaton & Bell

ATTORNEYS.

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Fig. 3

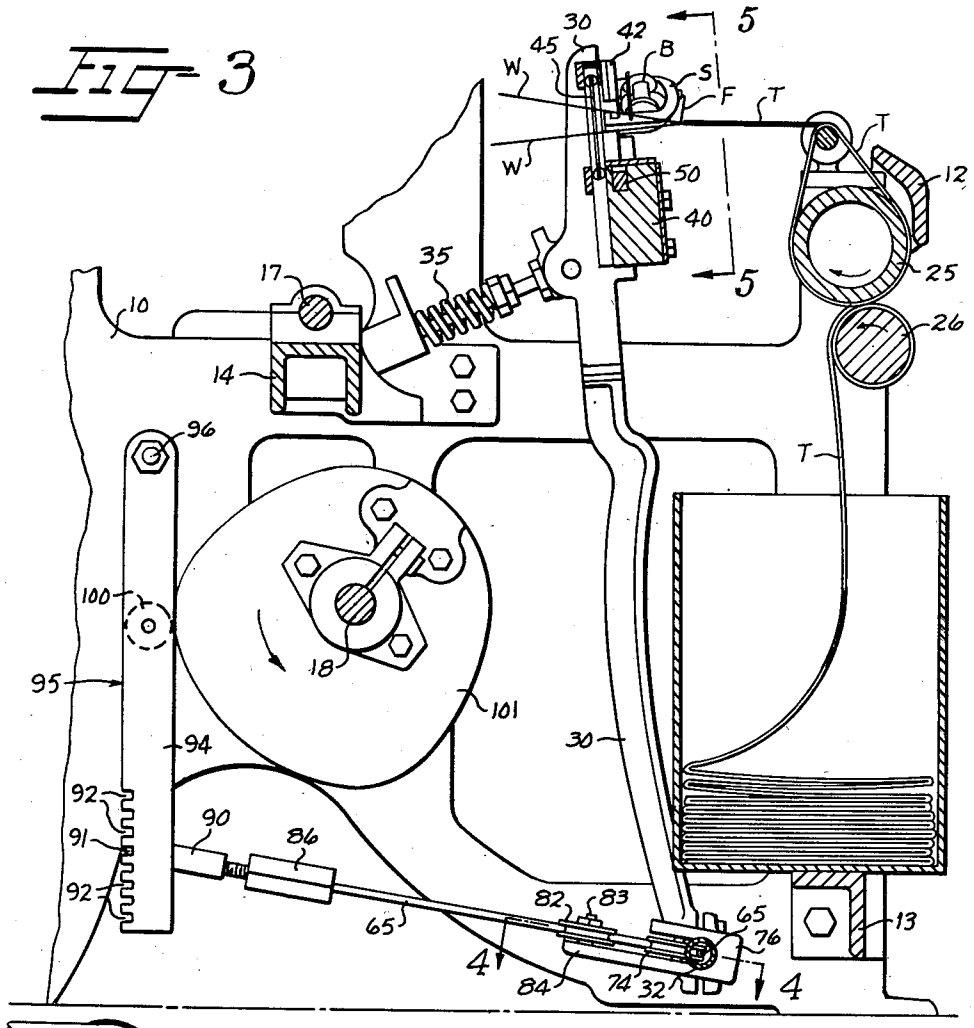
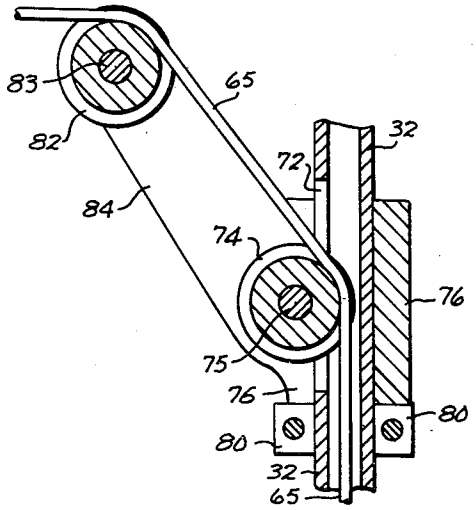


Fig. 4



EDGAR A. ROSS,
INVENTOR.

BY Eaton & Bell

ATTORNEYS.

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Fig-5

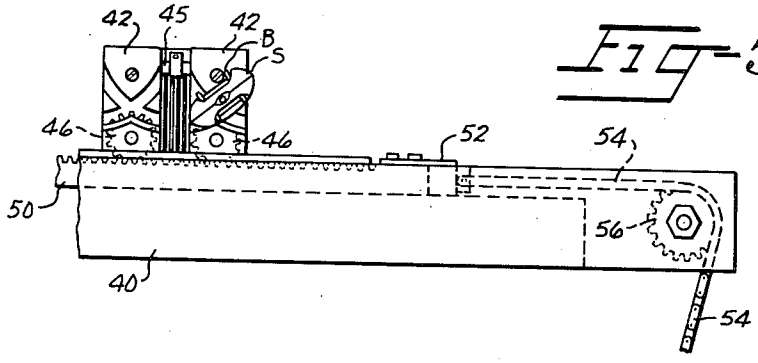
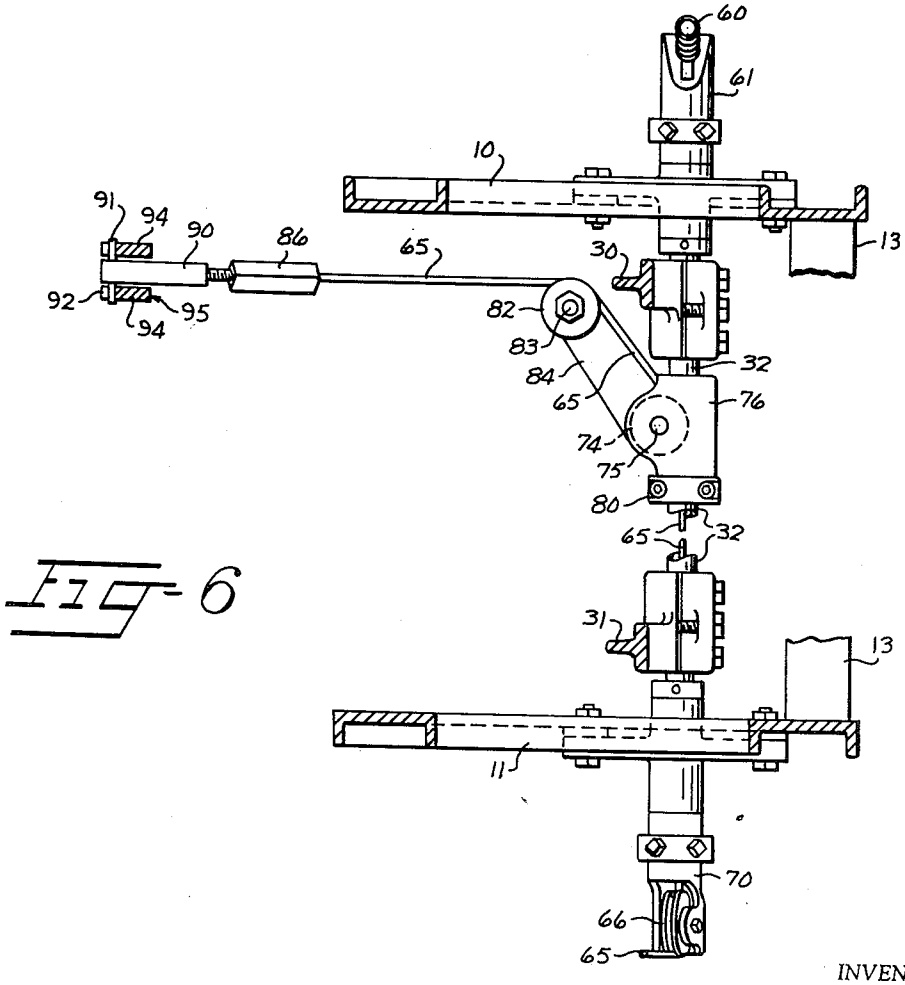


Fig-6



INVENTOR:
EDGAR A. ROSS.

BY Eaton & Bell

ATTORNEYS.

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PICKING MOTION FOR A LOOM

Edgar A. Ross, Anderson, S. C.

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4 Claims. (Cl. 139—138)

This invention relates to the conversion of a wide goods loom to a narrow fabrics loom and more especially to an improvement in the picking motion of a loom for use with the conventional narrow fabric loom or with a converted narrow fabric loom.

Heretofore, in order to weave narrow fabrics such as belting, Venetian blind tapes and the like it has been necessary to do so on a narrow fabrics loom. As those familiar with the art know, narrow fabric looms are a specialty item and very few companies manufacture this type loom and then only a small number of these looms each year, most of which are made on special order and, therefore, replacement parts are often difficult to acquire and are very expensive. Therefore, there has not been as much activity in the narrow fabric loom field in the last few years as there has been in the wide goods loom field and many improvements have been added to the wide goods loom which have not yet been adapted to the narrow fabrics loom. Some of these improvements being the improved let-off mechanisms for wide fabric looms as well as electrical stop motions, such as are actuated by drop wires.

It is therefore a primary object of this invention to provide an easy and inexpensive method of converting a regular wide fabric loom to the manufacture of narrow fabrics so as to take advantage of the conventional improvements made in wide fabric looms such as the improved let-off mechanisms, electrical stop motions and the like.

It is another object of this invention to provide an improved picking motion for the converted narrow fabric loom which may be used on a conventional narrow fabric loom and which provides an accurate positioning of the shuttles at either end of their arcuate strokes as well as providing a means for controlling and adjusting the length of travel of the shuttles in both directions and having no delicate timing mechanisms to get out of time.

It is another object of this invention to provide a converted narrow fabrics loom which is substantially the same length as the conventional wide fabric loom and therefor has a lesser number of shuttles therein than the conventional long narrow fabrics loom so that during down time production is not cut as greatly as is the case when a conventional narrow fabrics loom is down, for repairs or filling the bobbins of the shuttles thereof.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which—

Figure 1 is a front elevation of the improved narrow fabric loom with the central portion broken away;

Figure 2 is a side elevation of the loom shown in Figure 1 and looking at the left-hand side thereof;

Figure 3 is an enlarged transverse vertical sectional view taken substantially along the line 3—3 in Figure 1;

Figure 4 is an enlarged fragmentary horizontal sectional view taken substantially along the line 4—4 in Figure 3;

Figure 5 is a fragmentary elevation of one end of the lay of the loom and being taken substantially along the line 5—5 in Figure 3;

Figure 6 is an enlarged horizontal longitudinal sectional view taken substantially along line 6—6 in Figure 2.

Referring more specifically to the drawings, numerals 10 and 11 indicate respective right-hand and left-hand loom frame members which are spaced apart from each other and rigidly secured together by a conventional breast beam 12, a lower girt 13 and an upper girt 14. The loom is also provided with the conventional main crank shaft 17 and the conventional pick cam shaft 18 (Figure 3), both of which are driven in a conventional manner, well known to those familiar with the art.

The loom is also provided with the usual warp beam 21 from which a plurality of warp threads W are unwound and pass over the usual whip roll 22, through any suitable warp stop motion 23 such as the electrical stop motion shown and through the usual heddle harnesses 24 which raise and lower the warp threads passing therethrough to alternately form open and closed sheds therein. A filling thread is passed between the warp threads W each time an open shed is formed and after a beat-up stroke a cloth or tape T is formed and taken up by take-up rolls 25 and 26 (Figures 2 and 3). The loom is also provided with the usual swords 30 and 31, adjacent respective side frames 10 and 11, the lower ends of which are fixedly secured to a rock shaft 32 and the upper ends of which are oscillated by a pair of connecting arms or crank arms 35 and 36 opposite ends of which are connected to crank throws on the main crank shaft 17.

It might be stated that, ordinarily, this type of loom is used for the weaving of wide fabrics and the usual lay is connected to the upper ends of the swords 30 and 31 to support a raceway for a conventional shuttle that is thrown from one end of the loom to the other by picker sticks which are a part of the conventional wide fabric loom.

This invention resides in replacing the usual lay with a novel lay 40, removing the picker sticks, shuttle and shuttle boxes and supporting a plurality of conventional narrow fabric shuttles S (Figures 1, 3 and 5) for rocking movement between adjacent spaced shuttle guides 42 mounted on and spaced transversely along the lay 40. The shuttle guides 42 have a plurality of relatively narrow reeds 45 fixedly secured therebetween for spacing the warp yarns W passing therebetween. The shuttle guides 42 also support rotatable pinions 46 (Figure 5), the upper peripheries of which engage the conventional matching teeth in the shuttle S, not shown, to cause the shuttle S to move from one shuttle guide 42 to the next adjacent shuttle guide and across the reed 45 therebetween as the pinions 46 are oscillated, in a manner to be later described.

The shuttle S is provided with the usual bobbin B which feeds a filling thread F across the width of the warp threads W to form a woven narrow fabric tape T each time the reed 45 moves to beat-up position and the shuttle S passes between the warp threads W each time the lay 40 moves to its rearmost position and the heddle harness 24 forms an open shed to allow the shuttle S to pass therebetween. The lower peripheries of each of the pinions 46 engage the teeth in a longitudinally extending rack 50 which is mounted for longitudinal sliding movement in the lay 40 (Figure 5).

The rack 50 is slid in alternate directions longitudinally of the lay 40 by a novel picking motion which includes a pair of chain-holding blocks 52, only one of which is shown in the drawings (Figure 5), at opposite ends of the rack 50 to which one end of chains 54 and 55 are suitably secured (Figure 1). The chain 54 extends partially around a sprocket wheel 56 rotatably mounted adjacent the ends of the lay 40 and downwardly to

where the end thereof is suitably secured to the upper end of a tension spring 60 (Figure 1) and the lower end of the tension spring 60 is suitably secured to a spring perch 61 fixedly secured to one end of the rock shaft 32.

The chain 55 extends from the block 52 at the opposite end of the rack 50 (Figures 1 and 2) partially around a suitable sprocket wheel 63 and downwardly to where the other end thereof is suitably secured to the upper end of an adjusting link 64. The lower end of the adjusting link 64 has one end of a flexible link or cable 65 suitably secured thereto which passes downwardly and partially around a grooved roller 66 rotatably mounted on an end cable support bracket 70 suitably secured to the end of the rock shaft 32 opposite the end to which the spring perch 61 is secured. It might be stated that the rock shaft on a conventional wide fabric loom is usually solid in cross-section and the rock shaft provided for this improved narrow fabric loom and forming a part of the improved picking motion is hollow or tubular in cross section.

The cable 65 extends from the roller 66 into the hollow rock shaft 32 and across the loom (Figures 4 and 6) to adjacent the sword 30 where a slot 72 is provided therein and through which the cable 65 extends. The cable 65 is guided through the slot 72 by a grooved roller 74 the inner periphery of which is in alinement with the center of the hollow rock shaft 32. The cable 65 passes partially around the roller 74 which is rotatably mounted on a stud 75 fixedly secured in a medial cable support bracket 76 which is loosely mounted on the rock shaft 32.

The roller supporting bracket 76 is prevented from right-to-left movement (Figures 1 and 6) along the rock shaft 32 by a split collar 80 fixedly secured around the rock shaft 32. The cable 67 extends from the roller 74 and partially around a grooved roller 82 rotatably mounted on a stud 83 fixedly secured in an outwardly extending arm 84 of the medial cable support bracket 76. The cable 65 extends from the roller 82 to an adjusting link 86 (Figures 3 and 6) where the reduced end thereof is fixedly mounted therein and the adjusting link 86 is threadably embedded in a shuttle stroke adjusting block 90 having a transversely extending pin 91 therein. The pin 91 is adapted to be adjustably secured between teeth or openings 92 in the lower end of the bifurcated legs 94 of a lever arm broadly referred to at 95. The upper end of the lever arm 95 is oscillatably mounted as at 96 to the right-hand side frame 10 of the loom and a suitable cam follower in the form of a roller 100 is rotatably mounted between the bifurcated legs 94 of the lever 95 to engage the outer periphery of a novel pick cam wheel 101 fixedly secured to the pick shaft 18.

In operation, with the roller 100 on the high point of the cam wheel 101, as shown in Figure 3, and with the cam pick shaft 18 turning in the direction indicated by the arrow in Figure 3, the roller will move down the inclined surface of the cam wheel 101 to the low point thereof, at which time the tension spring 60 will, through the cable 65, the chains 54 and 55 and the rack 50 keep the roller 100 and the lever 95 following the contour of the pick cam 101 to thus keep the roller 100 in engagement with the outer periphery of the pick cam 101 and cause the rack 50 in the lay 40 to be moved from left to right in Figure 1. As the rack 50 is moved from left to right the pinion 46 in engagement therewith will be rotated in a counterclockwise direction and cause the shuttles S to be oscillated by the pinions 46 in a clockwise direction to pass across the reeds 45, as an open shed is formed in the warp threads W by the heddle harnesses 24, to thus extend a filling thread F across the warp threads W.

Rotation of the pick cam 101 will move the roller 100 from the low position on the pick cam 101 up the inclined surface to the high point thereof while the lower end of the lever 95 will be oscillated in a clockwise direction to thus pull on the cable 65 against the tension

spring 60 and move the longitudinally slidable rack 50 from right to left in Figure 1 to thus cause the pinions 46 to be moved in a clockwise direction and to thus move the shuttles S across the reeds 45 in the opposite direction from that to which they are moved by the roller 100 engaging the low point of the cam 101.

It is thus seen that with continued rotation of the cam wheel 101 the rack 50 will continue to alternately slide in the lay, first in one direction and then in the opposite direction, to thus cause the shuttle S to move from one shuttle guide 42 to the other shuttle guide 42 moving across the reed 45 alternately, first in one direction and then in the opposite direction to leave a filling yarn F between the warp thread W each time the shuttle S passes in front of the reeds 45.

In the event that it is found the shuttles S are not moving far enough in their arcuate travel in either direction, adjustment may be made by loosening or tightening either of the adjusting links 64 or 86 as desired. It is obvious that if the connecting link 64 or the connecting link 86 are either one or both tightened the effect would be that of shortening the cable 65 to thus move the rack 50 in the lay 40 from right to left in Figures 1 and 5 to thus cause the shuttles S to move higher in the shuttle guides 42 each time they are oscillated in a counterclockwise direction and to travel a lesser distance upon their next arcuate clockwise swing. If it is desired to have the shuttles move higher in the shuttle guides 42 over to the right in their clockwise arcuate swing it is merely necessary to loosen either of the connections 64 or 86 or both connections the desired amount to thus in effect lengthen the length of the cable 65 and allow the rack 50 to move from left to right in Figures 1 and 5 relative to the lay 40.

If it is found that the swing of the shuttles S in both directions is too short to clear the warp threads W when the shuttle S is at rest in the shuttle guides 42 then it is merely necessary that the pin 91 (Figure 3) be moved to a lower position between the teeth 92 on the lever 95. In effect, this lengthens the lever 95 to allow the cable 65 and rack 50 to travel a greater distance each time the roller moves from the low point to the high point of the pick cam 101 to thus make the shuttle travel a greater distance in both directions upon each arcuate swing. It follows, therefore, that moving the pin 91 upwardly to occupy a position closer to the pick cam 101 will have the opposite effect and cause each arcuate swing, in both directions, of the shuttle S to be shortened.

It is thus seen that I have provided an easily adapted method for converting a wide goods loom to a narrow fabric loom and an improved picking motion for narrow fabric looms which gives a narrow fabric loom all the advantages of a wide goods loom while providing the same with a great many advantages over a conventional narrow fabrics loom and an improved picking motion for arcuately moving the shuttles S from one shuttle guide 42 to the other and as adjustment means for varying the travel of the shuttle in either direction as well as adjustment means for varying the length of travel of the shuttle in both directions.

In the drawings and specification there has been set forth a preferred embodiment of the invention and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. In a loom having a frame, a lay, a reed, a driven cam shaft, a plurality of oscillatable shuttles, a rack movable longitudinally of said lay, gear means engaging said rack for transmitting movement to said shuttles and swords supporting said lay, shuttles and reed; the combination of a tubular rock shaft journaled in the lower portion of said frame and supporting said swords, first and second sprocket wheels journaled on opposite ends of said

lay, first and second sprocket chains connected to opposite ends of said rack and passing over and partially around the respective first and second sprocket wheels, a tension spring connected at one end to the end of the first chain remote from the rack and having its other end connected to one end of said rock shaft, a first pulley in the other end of said rock shaft, a bracket loosely mounted on said rock shaft and spaced substantially from said first pulley, said rock shaft having a slot therein adjacent said bracket, second and third spaced pulleys journaled in said bracket, the second pulley projecting through said slot, a cam fixed on said cam shaft, a lever pivotally suspended on said frame adjacent said cam, follower means on said lever engaging said cam, and a pliable element having one end connected to the second chain and extending downwardly, partially around the first pulley, longitudinally in said rock shaft, through said slot in engagement with said second and third pulleys and being connected at its other end to the lower portion of said lever.

2. A structure according to claim 1 having a connector interposed between the pliable element and said lever, and means to adjust said connector longitudinally of said lever to vary the length of stroke of said rack.

3. A structure according to claim 1 including means for adjusting the effective overall length of said pliable element to thereby adjust the range of movement of said rack relative to the lay.

4. In a loom for weaving narrow fabrics having a lay, longitudinally spaced shuttle guides fixedly supported on said lay, shuttles reciprocally mounted in said guides, gears journaled in said shuttle guides and gear racks on said shuttles engageable by said gears; the combination of an elongated rack movable longitudinally in said lay and engaging the lower portion of the peripheries of said gears, resilient means connected to one end of said

elongated rack for moving said elongated rack longitudinally of said lay in one direction, cam actuated means connected to the other end of said elongated rack for moving said elongated rack in the opposite direction comprising a driven pick cam shaft, a pick cam fixed on said pick cam shaft, a lever oscillatably mounted adjacent its upper end on said loom, follower means on said lever engageable with said pick cam, a connector engaging the lower end of said lever, a first length-adjusting link connected to said connector, a cable connected to said first length-adjusting link, a hollow rock shaft, a first pulley support bracket loosely mounted on a medial portion of said rock shaft, a first grooved pulley on said bracket, a second grooved pulley on said bracket, said rock shaft having a slot in the side thereof adjacent said bracket, said second grooved pulley extending through said slot and substantially to the center of said hollow rock shaft, a split collar surrounding said rock shaft adjacent said pulley support bracket, a second pulley support bracket fixed on one end of said hollow rock shaft, a grooved pulley supported by said second pulley support bracket, said cable passing partially around the grooved pulleys on said first pulley support bracket, through the hollow rock shaft and partially around the grooved pulley on said second pulley support bracket, a second length-adjusting link connected to the end of said cable remote from the first length-adjusting link, and a pliable element having one end connected to said second adjusting link and having its other end connected to the end of said rack remote from said resilient means.

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