April 10, 1928.

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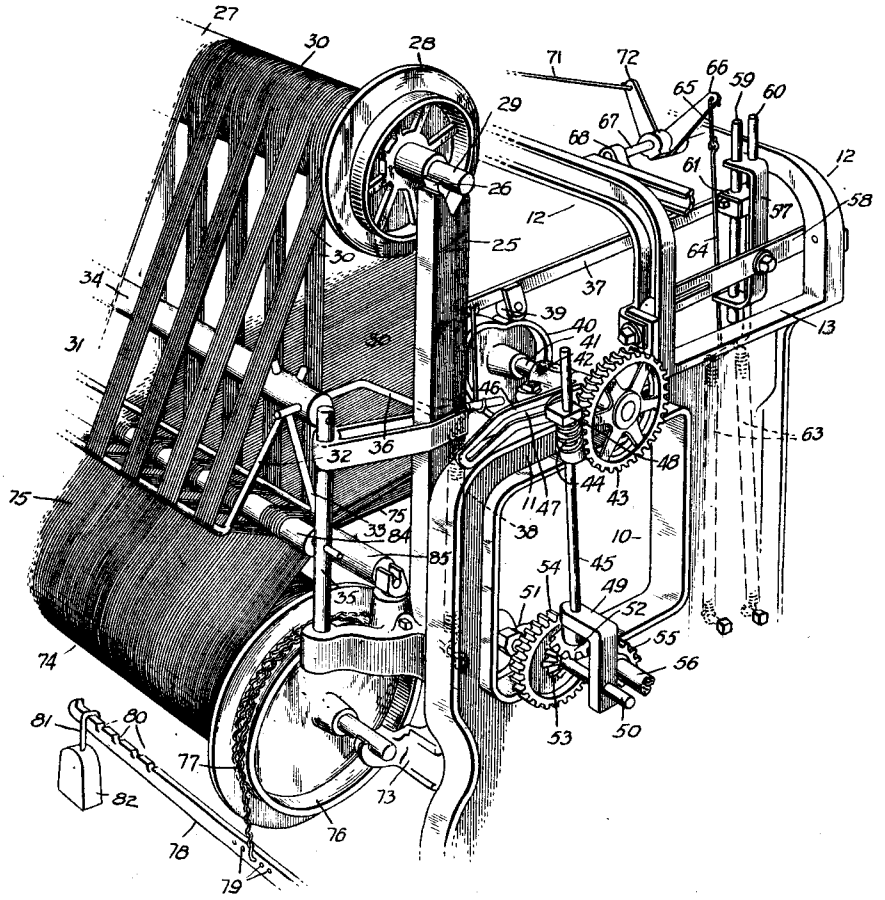
C. E. NEISLER, JR

ATTACHMENT FOR LOOMS

Filed Aug. 9, 1923

3 Sheets-Sheet 1

Fig. 1.



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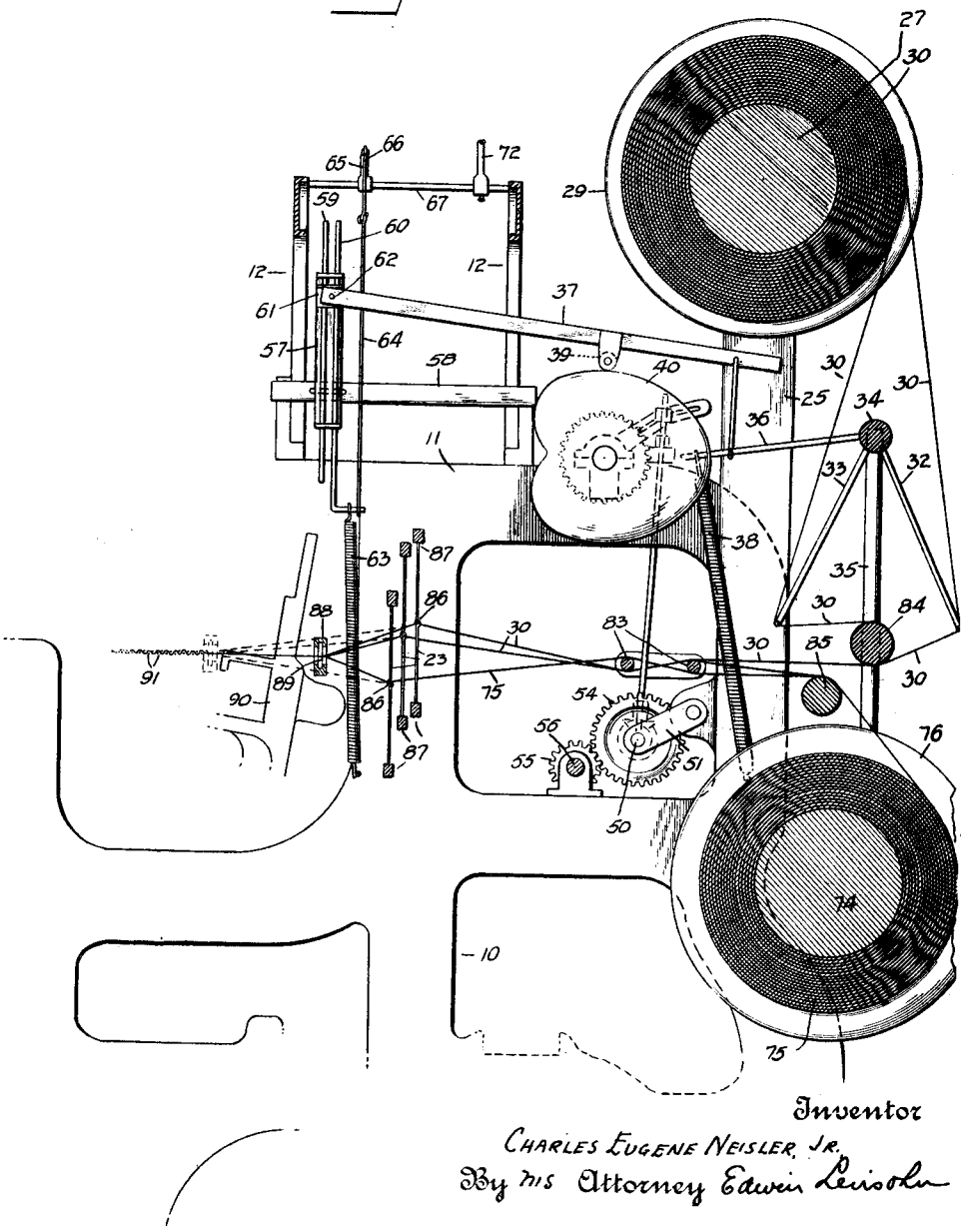
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ATTACHMENT FOR LOOMS

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3 Sheets-Sheet 2

Fig. 2.



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ATTACHMENT FOR LOOMS

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Fig. 3.

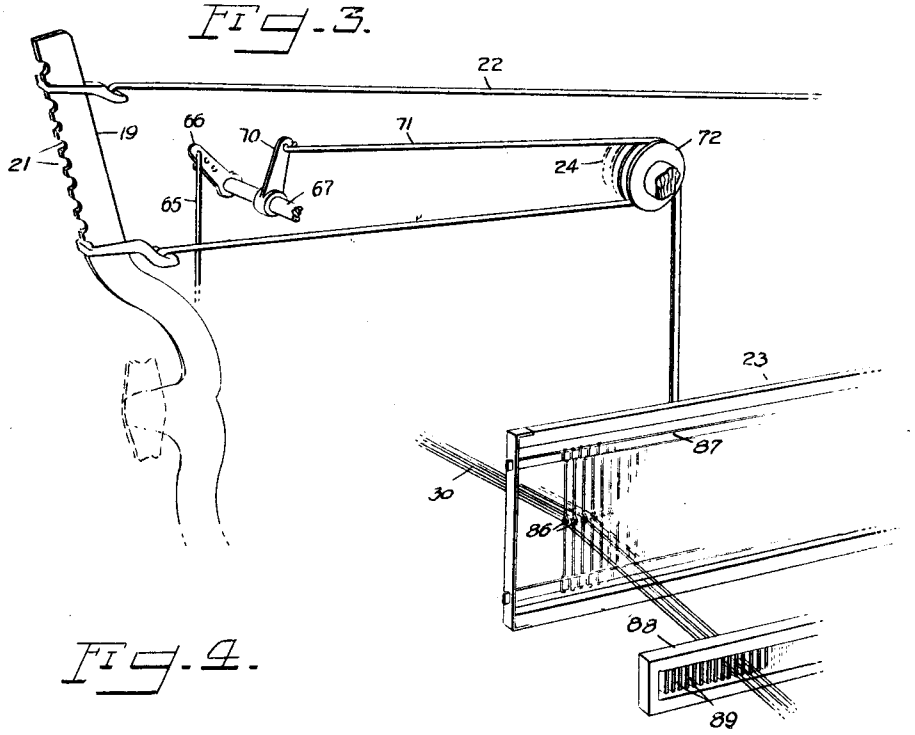
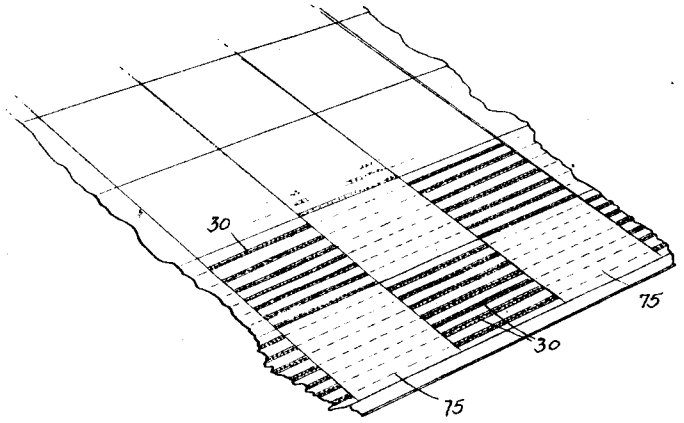


Fig. 4.



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Patented Apr. 10, 1928. 1,665,274

UNITED STATES PATENT OFFICE.

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ATTACHMENT FOR LOOMS.

Application filed August 9, 1923. Serial No. 656,615.

My invention relates generally to cotton looms with dobby attachment for weaving alternating tufted (or terry) blocks on a plain ground.

The textile produced on such a loom is known usually as tufted patch cloth and is used extensively for bed coverings, robes, etc., and comprises a loosely woven material having alternating blocks of terry on one side and a uniform appearance on the reverse side. To manufacture ordinary terry cloth, i. e., material having tufts throughout one surface thereof, two beams are used, one of which weaves the ground of the cloth and runs tight, while the other beam is run slack when the terry is made. The top beam is usually used to make the slack warp.

The purpose of the present invention is to provide the ordinary loom of the type hereinafter described with an attachment whereby it is made possible to weave alternating tufted (or terry) blocks with but one top beam and to weave such blocks as will have even and sharply defined edges.

A loom which will weave uniform tufts throughout each row of blocks requires mechanism which is very positive in the amount of warp yarn let off and one which is simple in construction and easily regulated.

To set up a loom for weaving alternating tufted blocks the top warp is split so as to arrange one-half of the ends on one side and the other half on the opposite side of a suitable slacking bar, which oscillates backward and forward to let off alternately on each side the required amount of yarn to weave the terry.

A device for carrying out the above purpose is illustratively exemplified in the accompanying drawings, in which, Figure 1 is a perspective view of a portion of the loom showing the dobby removed to disclose the mechanism for controlling the amount of yarn let off to weave the terry; Figure 2 is a substantially cross sectional view at one end of the loom showing the mechanism for controlling the harness etc.; Figure 3 is a diagrammatic perspective view of one unit of the harness and the mechanism for operating the same; and Figure 4 is a perspective of a fragment of the textile as it appears with alternating blocks of tufted or terry.

Referring to the drawings and particularly to Figures 1 and 2, 10 designates the end frame portion of a loom, comprising an upright standard provided with a horizontal top bar 11. Attached at its ends to the horizontal bar 11, at each end of the machine and extending substantially the entire length thereof is an inverted U shaped beam or bridge 12, which comprises a stem portion attached to the bar 11, cross head 13 extending transversely thereof, and parallel U shaped members projecting from both ends of the cross head 13.

Attached to one end of the frame 10 and connected to the bridge 12 is a dobby attachment A, which will, in so far as the general operation of the invention is involved with it be briefly described. The present embodiment shown in Figure 1 is what is known as a multi-harness loom, and is intermediate between the plain or twill loom and the jacquard, in which a definite number of harnesses is used, within the scope of which the pattern must be repeated. This is done by the action of a pattern-chain 14, consisting of endless chains provided with parallel connecting bars 15. The bars 15 are perforated and support a series of pins 16. The chains 14 pass around a carrier-roll 17, which is intermittently rotated, the distance between each bar 15, by a ratchet motion, connected with a cam mechanism on the main shaft 18 of the loom, at each revolution of the shaft or blow of the lathe, and passing between this carrier roll and the harness-levers 19, the latter, which are pivoted in the middle thereof, are vibrated to the right and to the left by the pins 16, according to their interposition or non-interposition between the carrier roll and the fingers 20 which operate the levers 19. The upper and lower free ends of the levers 19 are provided with a series of notches 21 which receive the loops of cords 22 passing from the levers to the harnesses 23, around pulleys 24, and thus raise and depress these harnesses by the lateral motion of the levers 19.

Attached to the forward uprights of the

end frames 10 are two upright wooden members 25, which are parallel to each other and project substantially above the plane of the bridge 12. Mounted in suitable bearings 26 carried by the upper ends of the beams 25 is the upper or top beam 27. This beam comprises a cylindrical member having end flanges 28 and an axially projecting bearing shaft 29 disposed loosely in the bearings 26. As previously stated, the top beam is used to make the slack warp 30, which is shown split, one series of threads being disposed about one arm of a slacking bar 31 and the other series being threaded about the other arm of the bar. The forward arm 32 and rearward arm 33 of the slacking bar 31 are U-shaped wires having their ends attached to a beam 34 pivotally supported in a frame 35 so as to enable the beam 34 to rock.

Adjacent the end frame 10 the beam 34 of the slacking bar 31 is provided with an arm 36 which projects rearwardly and is linked adjacent its free end to a rider arm 37. The rider arm 37 and arm 36 are normally held in a downward direction by a coiled spring 38, one end of which is attached to the extreme end of the arm 36 and the lower or opposite end is secured to the end frame 10.

The rider arm 37 is provided with a follower or roller 39 which is yieldably held in rolling engagement with a heart shaped cam 40, the latter being keyed to a cam shaft 41 which is loosely mounted in a suitable bearing 42 attached to the horizontal top bar 11. Rotary movement is imparted to the cam shaft 41 by a pick or worm gear 43 attached to the shaft at the outside of the end frame 10, the worm gear 43 being driven by a worm 44.

The worm 44 is mounted upon an upright drive shaft 45 the upper end of which is adjustably supported in a bracket arm 46 which comprises an angular arm pivotally mounted about the cam shaft 41 and which is provided with a longitudinal slot 47 for adjustably receiving a bearing block 48 to support the upper free end of the drive shaft 45. The lower end of the shaft 45 is journaled in an L shaped bearing bracket 49 which is pivotally supported at the end of its longer upright arm upon a stud 50 projecting outwardly from bracket 51 attached to a boss on the end frame 10. The projecting end of the shaft 45 below the bearing in the shorter arm of the bracket 49 is provided with a miter gear 52 in mesh with a similar miter gear 53 loosely mounted on the stud 50. Integral with the miter 53 is a main drive spur gear 54 which is driven by a spur pinion gear 55 keyed to the power shaft 56 disposed longitudinally of the machine frame of the loom proper.

The change motion apparatus for controlling the slackening of the warp yarn, comprises an upright guide rod bracket 57, which is adjustably supported in an arch bracket 58 projecting between and attached at its ends to lower ends of the parallel bridge beams 12. The upper and lower ends of the guide bracket 57 are bent outwardly and parallel to each other, the bent portions being provided with two openings to receive a pair of guide rods 59 and 60, one of which is stationary and functions solely as a guide, while the other rod 60 is loosely disposed in the bracket and carries the rider arm supporting bracket 61. This bracket comprises a block having a projecting pivot pin 62 about which the rider arm 37 oscillates. The rod 60 is provided with a hook shaped lower end to receive one end of a spring 63, the opposite end thereof being attached to the machine frame 10 adjacent the base, so as to cause the rod 60 to normally be held under a yielding downward pull. Adjacent the spring 63 and received by the hook-shaped end of the rod 60 is an upwardly projecting link rod 64 which is linked to a short link rod 65, having its upper end connected to a small jack 66. The jack 66 is fixed to a short shaft 67 mounted in suitable bearings 68 between the parallel loom arches 12. The shaft 67 carries a second jack 70 fixed thereto and connected to one end of a harness cord 71 which extends towards the opposite side of the loom and coils about the groove in a harness roller 72, mounted between the loom arches 69. This change motion is operated by the dobby attachment and the harness cord 71, after passing about the roller 72, is connected to one of the dobby jacks or harness levers 19, as shown in Figure 3.

Mounted in suitable bearings 73 in the end frame 10 of the loom and disposed beneath the top beam 27 is the bottom beam 74 which carries the warp threads 75 for weaving the ground of the cloth and which is run tight. The ends of the cylindrical beam are provided with flanged plates 76, and a chain 77 is wound up about each flange of the plates 76 and one end is attached to the adjacent inside face of the end frame 10, while the opposite projects downwardly and is linked to a lever arm 78, the latter being pivoted in the end frame 10 and provided with a series of openings 79 to detachably receive the free end of the tightening chain 77. The free end of the lever arm 78 is provided with a plurality of notches 80 along its upper edge, the notches being adapted to receive the bail 81 of a weight 82.

The warp threads 30 and 75 pass toward the back of the loom and are threaded in the usual manner, first, about a pair of parallel rods 83 to form a cross or lease, which serves to keep the threads in proper order and enables the weaver to readily detect the proper position of any broken thread he may have to repair. The warp threads 30 from the loose beam 27 are split to provide two sets of

ends and after passing over the slacking bar 31, the warp is collected again about a loosely mounted roller 84, the latter being supported between the two upright members 35 on a plane below the beam 34 of the slacking bar, which is also supported at the upper ends of the members 35. The threads or warp 75, unwinding from the lower beam 74, pass over a loosely mounted roller 85, carried by the end frame 10 slightly in advance of the roller 84, and then the threads 75 are interposed between the threads of the split warp or slack warp 30, and thereafter pass about the rods 83, as previously stated. From the rods 83, the threads extend rearwardly and are then threaded through the eyes 86 of a series of heddles 87, which form the loom harness. The warp threads after they have been threaded through the heddles 87, are passed through the reed 88, which is composed of narrow strips of metal or flattened wire 89, as shown in Figure 3. The reed is supported in the lower part of a frame and in the usual manner is capable of being moved a short distance to and fro, in a line parallel to the warp threads. On each side of the supports for the reed, the device is provided with two shuttle boxes, not shown, which are provided with a spindle having a picker or hammer 90. The shuttles operate between the pickers from one shuttle box to the other and carry the bobbins for making the weft 91.

It is to be noted that the threads of the split warp 30 are threaded through the eyes 86 of the heddle 87 in the loom harness which is controlled, i. e., lifted and lowered by the action of the jacks 66 and 67. Beyond the reed 88, the woven cloth is wound upon a cylindrical beam in the usual manner common to all looms of this type.

The operation of the mechanism for weaving the alternating tufted (terry) blocks is substantially as follows: With the loom set up as previously described the mechanism is then set in motion and the cam 40 is turning in a clock-wise direction. The rider arm 37, as it follows from a high point on the cam 40, permits the spring 38 to pull downwardly upon the arm 36, which enables the slacking bar arms 32 and 33 to swing towards the right. Simultaneously with the movement of the slacking bar towards the right, there will be an extra length of yarn let off on the left hand side of the slacking bar, so as to weave a terry with the warp that passes over the arm 33. The rider arm 37 having reached its maximum drop when the roller 39 moves around the low part of the cam 40, the arm then starts upwardly while the bracket 61 supporting the opposite end of the rider arm 37 drops down a distance, which is just sufficient to reverse the tension of the yarn on each side of the slacking bar 31. This step makes the yarn, on the right side of the slacking bar, slack with one pick of the loom so it will start the terry figure off sharp and will continue to weave terry until the cam 40 has made one-half of a complete revolution and the roller 39 is again at the high point of the cam 40. Subsequently, the bracket 61 rises to its original elevation, thereby slackening the yarn on the left side of the slacking bar 31, whereupon the alternate blocks of terry will start to be woven.

The quick motion attained on the high and low side of the cam 40 is effected to take up the stretch in the yarns caused by the difference in the tension of the said yarn on opposite sides of the slacking bar. It has been found that this stretch is normally from one-half to one inch, depending upon the tension and length of cloth to the top beam 27.

The change motion is operated from the dobby attachment. The harness cord 71, from one of the jacks 19 of the dobby, operates the jacks 66 and 67, the latter being connected by the link connection 64 and 65, so that when it is desired to cause the change motion to lift the heddle, the pegs or pins 16 are inserted in the dobby chain 14 and, when it is desired to let the heddle fall, the pins are left out, the action of the spring 63 being used to pull the guide rod 60 downwardly. It is clearly apparent that the same result may be obtained by employing a specially designed cam having a quick rise just beyond the low point thereof and a quick fall just over the high point, but the embodiment illustrated in the drawings is found to be the more desirable because it may be readily adjusted. By employing additional suitably shaped cams and the same change motion it is possible to weave a variety of designs. Furthermore, it will be clear that by winding the top beam with two differently colored yarns and then splitting the yarn to cause one color to feed over one side arm of the slacking bar and the other color to feed over the other arm, it is possible with the one top beam to throw alternately colored figures up in terry cloth with a minimum number of harnesses.

The mechanism of this invention is very positive in the amount of slack yarn which is let off, so that the latter is not subject to any variation caused by humidity or inefficient weavers. The pattern may be readily changed by substituting the pick gear 43 for another having a different number of teeth, or by changing the division of the ends of the warp 30, on opposite sides of the slacking bar, or further by changing the shapes of the cam 40, or a combination of any of the above changes without redrawing the warp in the harness or changing the harness motion.

In order that it may be clearly understood the manner in which the apparatus

just described may deliver a definite amount of slack warp and at the same time keeping in mind that the present invention comprises a device for weaving terry cloth without any attachments for the reed, lay or crank, as ordinarily used on a loom to weave the same material, the following is offered.

The top or colored warp is reeded so as to slightly crowd the yarn in the reed. This causes the reed to exert a little friction on the yarn. On the forward movement of the reed to beat up the filling, the friction causes the slack portion of the top warp to be carried forward and woven into the cloth. The friction exerted by the reed on this yarn is not enough to pull the slack yarn out of the cloth as the reed goes away from the cloth. Therefore, it is pointed out that this friction of the slack yarn along with the use of a wide shed keeps the slack yarn from dropping down in the way of the shuttle, also the head is so set that the shed does not close until the reed is approximately 1″ from the cloth. This gives the shuttle time to get out of the way before the slack yarn comes down into the shed.

It might also be made clear that the reason there are the same places or distorted weft ends in the ground is that there are the same number of picks in both the ground and figured squares, the only difference being that part of the warp is piled up. This piled terry effect does not have any tendency to distort the ground threads appreciably.

Having now described my invention what I claim and desire to secure by Letters Patent is:

1. In a loom of the character described, the combination with a top slack warp beam, of a slacking bar to receive sets of ends of the warp alternately on opposite sides thereof, and means co-operating with said slacking bar to let off a positive amount of slack yarn.

2. In a loom of the character described, the combination with a top slack warp beam, of a slacking bar to receive sets of ends of the slack warp alternately on opposite sides thereof, means for oscillating the slacking bar, and means for reversing the tension of the yarn on each side of the slacking bar as the latter moves to its extreme outward positions.

3. In a loom attachment for weaving alternating blocks of terry, the combination with a top beam adapted to discharge a slack split warp, of a slacking bar for receiving one-half the ends of the split warp on one side and one-half on the other side thereof, means for oscillating the slacking bar to let off yarn on one side and then the other to enable the loom to weave the terry with the yarn that passes over the side of the bar, that is, moving with the yarn, and means cooperatiing with the first named means to release the tension on the yarn being passed over the slacking bar on the side thereof moving oppositely to the yarn, whereby the yarn will be immediately released to weave the first row of terry.

4. In a loom attachment for weaving alternating blocks of terry, the combination with a loose top beam having split yarn discharging therefrom to weave the terry, of a bottom beam run tight and carrying the yarn to weave the plain ground, a slacking bar to receive the ends of said split yarn, one-half of said ends being arranged on one side and the other one-half thereof being arranged on the opposite side of said bar, means for yieldably causing the slacking bar to rock in one direction, means for lifting the slacking bar against the tension of the first means, and means for simultaneously releasing the tension of the one-half of the yarn disposed on the side of the slacking bar moving in an opposite direction to that of the yarn when the latter side has reached its maximum outward position.

5. An attachment for a loom, as claimed in claim 4, in which the slacking bar comprises a loosely mounted beam having two radially disposed inverted U-shaped arms, the beam and closed portions of said arms being arranged substantially parallel to the axis of the top beam, substantially as described.

6. An attachment for a loom, as claimed in claim 4, in which the slacking bar comprises a loosely mounted beam having two radially disposed arms arranged at an acute angle from each other, and a radially disposed lever arm projecting from the beam, said lever arm being connected to the means for yieldingly holding the slacking bar in one direction and to the said means for lifting the bar in the opposite direction, substantially as described.

7. In an attachment for weaving alternating blocks of terry, the combination of a slacking bar comprising radially arranged arms to receive the upper warp, and means for oscillating the slacking bar to let off definite lengths of yarn to weave the terry.

8. An attachment for a loom as claimed in claim 4, in which the means for yieldably holding the slacking bar in one direction comprises a spring attached at one end to a lever arm carried by the slacking bar and at the opposite end to a stationary part of the loom, substantially as described.

9. An attachment for a loom, as claimed in claim 4, in which the means for lifting the slacking bar comprises a heart-shaped cam, means for rotating the cam, a rider arm having a roller in rolling contact therewith, and connecting means between the free end of the rider arm and slacking bar.

10. In an attachment for weaving alternating blocks of terry, the combination with a slacking bar for letting off yarn to weave the terry, of means for causing the said bar to oscillate comprising a rotating heart cam, a rider arm held in yieldable rolling contact with said cam, link connection between the free end of the arm and the slacking bar, and means for reversing the tension of the yarn being let off for weaving the terry.

11. An attachment for looms, as claimed in claim 10, in which the means for reversing the tension of the yarn being let off to weave the terry comprises a bracket pivotally supporting the opposite end of the rider arm, a loosely supported upright rod to which said bracket is attached, means for yieldably exerting a downward pull upon said rod, and a guide rod carried by the loom and adapted to guide the said bracket in its vertical movements to change the pivotal elevation of the said rider arm, substantially as described.

12. An attachment for looms, as claimed in claim 10, including a loom harness, and means for connecting one unit of said harness with the means for reversing the tension of warp yarn at one or the other sides of the slacking bar, whereby the release of the tension of the yarn will cause it to be slack with one pick of the harness so as to start the terry off by a well defined row of looped warp threads, substantially as described.

13. In a loom, the combination of an attachment for weaving alternating blocks of terry, a heart cam adapted to rotate in a clockwise direction, a rider arm in rolling contact with said cam, means for yieldably holding the arm against the cam, a slidably mounted bracket pivotally supporting one end of the rider arm, means for yieldably holding the said bracket in a downward direction, and a slacking bar adapted to be oscillated by movement of the rider arm over the cam, rotary movement thereof being adapted to first cause the arm to fall to let off yarn on one side of the slacking bar and then causing the arm to rise and simultaneously therewith the bracket drops under tension of its yieldable means to reverse the tension of the yarn on each side of the slacking bar, said movement causing the yarn of the now slack side to be slack with one pick of the loom whereby the latter will start the terry figure off sharply defined and will continue to weave terry until the cam has reached its high point of lifting the rider arm whereupon the bracket returns to its initial upper position to quickly reverse the tension of the yarn again, substantially as described.

14. An attachment for looms, as claimed in claim 10, in combination with a dobby attachment, of a connecting means from the dobby for elevating and lowering the harness when the tension of the yarn is reversed to enable the yarn on one side of the slacking bar to be slack with the pick of said harness so as to cause the said yarn to pile up to make a well defined terry in the first line thereof.

15. An attachment for looms, as claimed in claim 10, including driving means for said cam, comprising a pick gear rotatable with the cam, a bracket arm pivotally disposed about the axis of said cam, an adjustable bearing carried by said arm, a drive shaft bearing at one end in said bearing, a worm in mesh with said pick gear and fixed to the drive shaft, a pivotally disposed bracket to receive the opposite end of said drive shaft, and means for imparting rotary movement to said shaft when the latter is disposed at any angle in the same vertical plane.

16. In a loom for weaving alternating blocks of terry, the combination of an arrangement for the warp, which consists of a loose upper beam from which the yarn passes in split arrangement, a slacking bar to receive one-half of the ends of the warp on one side, the other one-half on the other side, means for moving the slacking bar backwardly and forwardly to let off the required amount of yarn to weave the terry, a bottom beam for holding the tight warp to weave the ground, means for causing the bottom beam to run tight, the tight warp being adapted to lie parallel to the warp from the upper beam, and a reed adapted to move parallel to the warp and in contact with the threads whereby the threads which are slack will pile up when the reed moves in one direction to cause the line of terry effect.

17. In an attachment for weaving alternating blocks of terry, the combination of a heart cam for operating a slacking bar, a rider arm oscillated by the movement of the cam, yieldable means for holding the arm in contact with the cam, and a vertically reciprocating pivot for said rider arm including a spring for normally pulling the pivot in a downwardly direction, whereby, when the cam lowers the arm to its maximum position, the yieldable means is ineffective and the spring pulls the pivotal end of the arm to a lower level, the tension on the yarn moving in the same direction as the slacking bar, being simultaneously reversed to immediately enable a full terry to be woven.

18. An attachment for weaving alternating blocks of terry, as claimed in claim 10, in which the means for reversing the tension of the yarn passing from the slacking bar is supported by means of an upright member, and a transversely arranged piece to which the upright member is adjustably

secured, the transverse piece being attached to the loom proper, substantially as described.

19. In an attachment for looms, the combination of a slacking bar, and means for reversing the tension on the warp passing thereover subsequently to the movement of the said bar from one direction to the other.

20. A loom attachment, as claimed in claim 19, including a rotating cam for oscillating the said slacking bar, substantially as described.

In testimony whereof, CHARLES EUGENE NEISLER, JR. has signed his name to this specification, this first day of August, 1923.

CHARLES EUGENE NEISLER, JR.