(No Model.) 2 Sheets—Sheet 1.

W. EVANS.

SHEDDING MECHANISM FOR LOOMS.

No. 554,442. Patented Feb. 11, 1896.

Fig. 6. Fig. 7. Fig. 8.

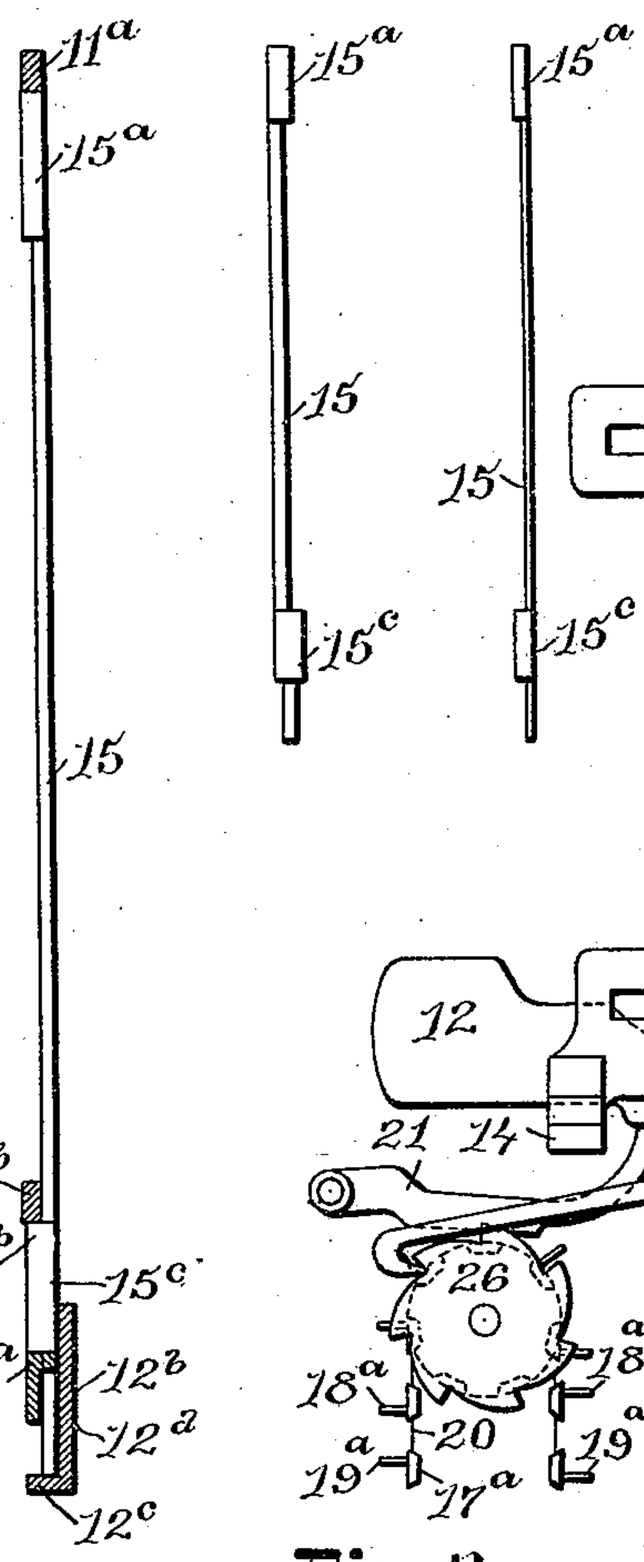


Fig. 1.

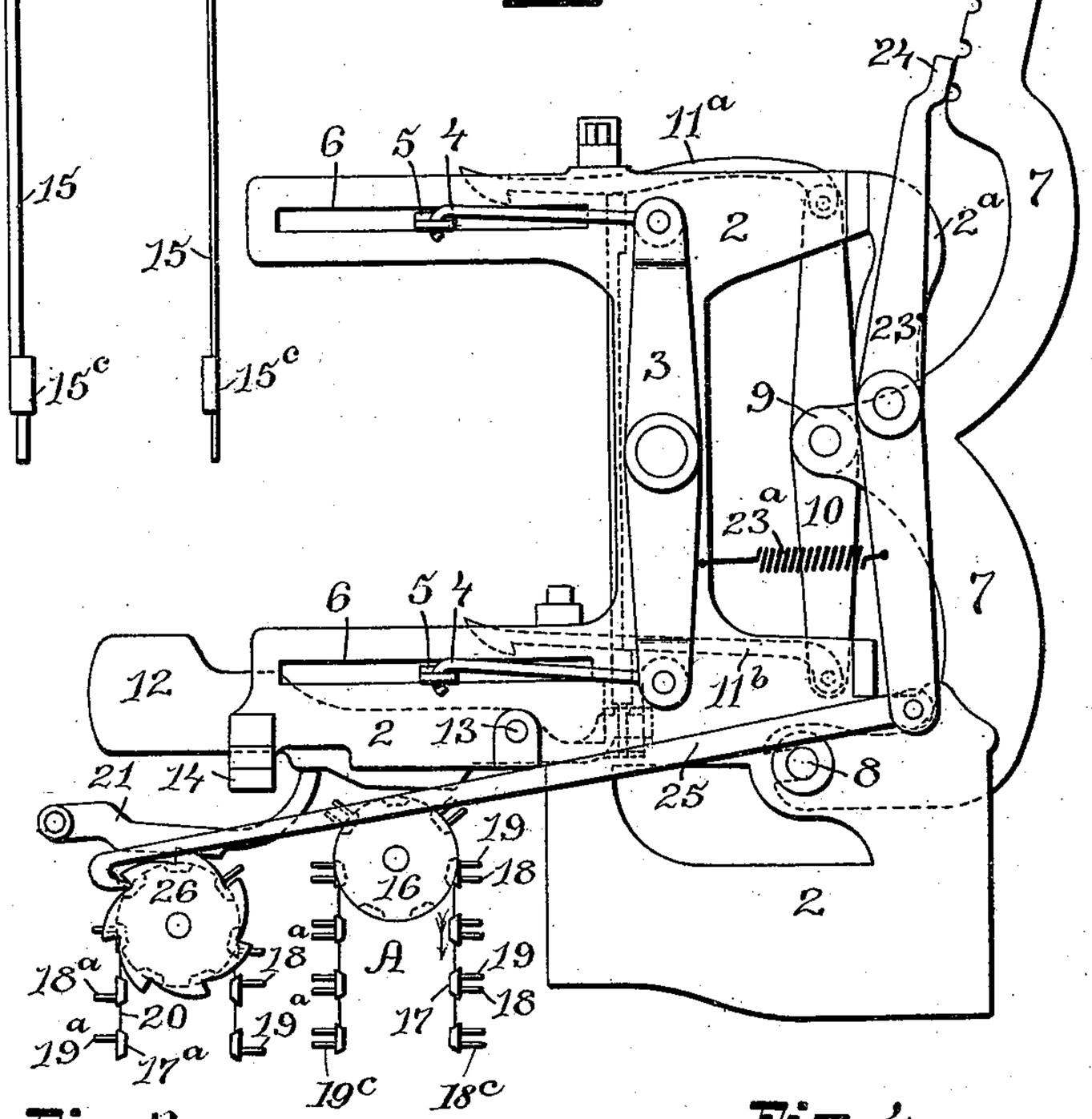


Fig. 2.

Fig. 3.

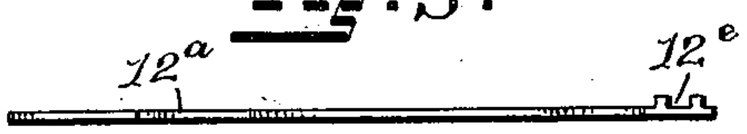


Fig. 4.

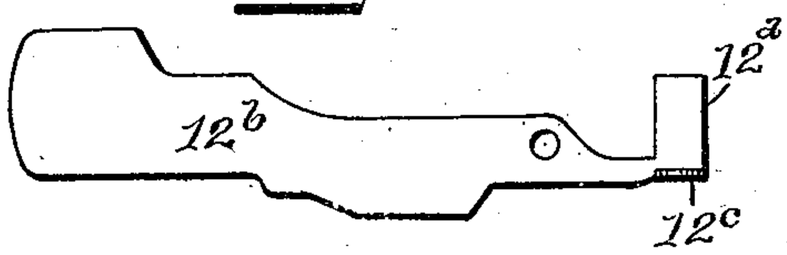
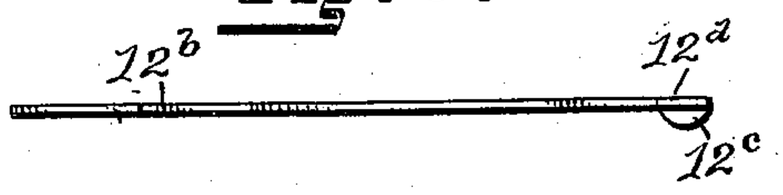


Fig. 5.



WITNESSES:

W. F. Bligh.

Chas. H. Luther Jr.

INVENTOR:

William Evans,

by Joseph A. Miller & Co.,

Attys.

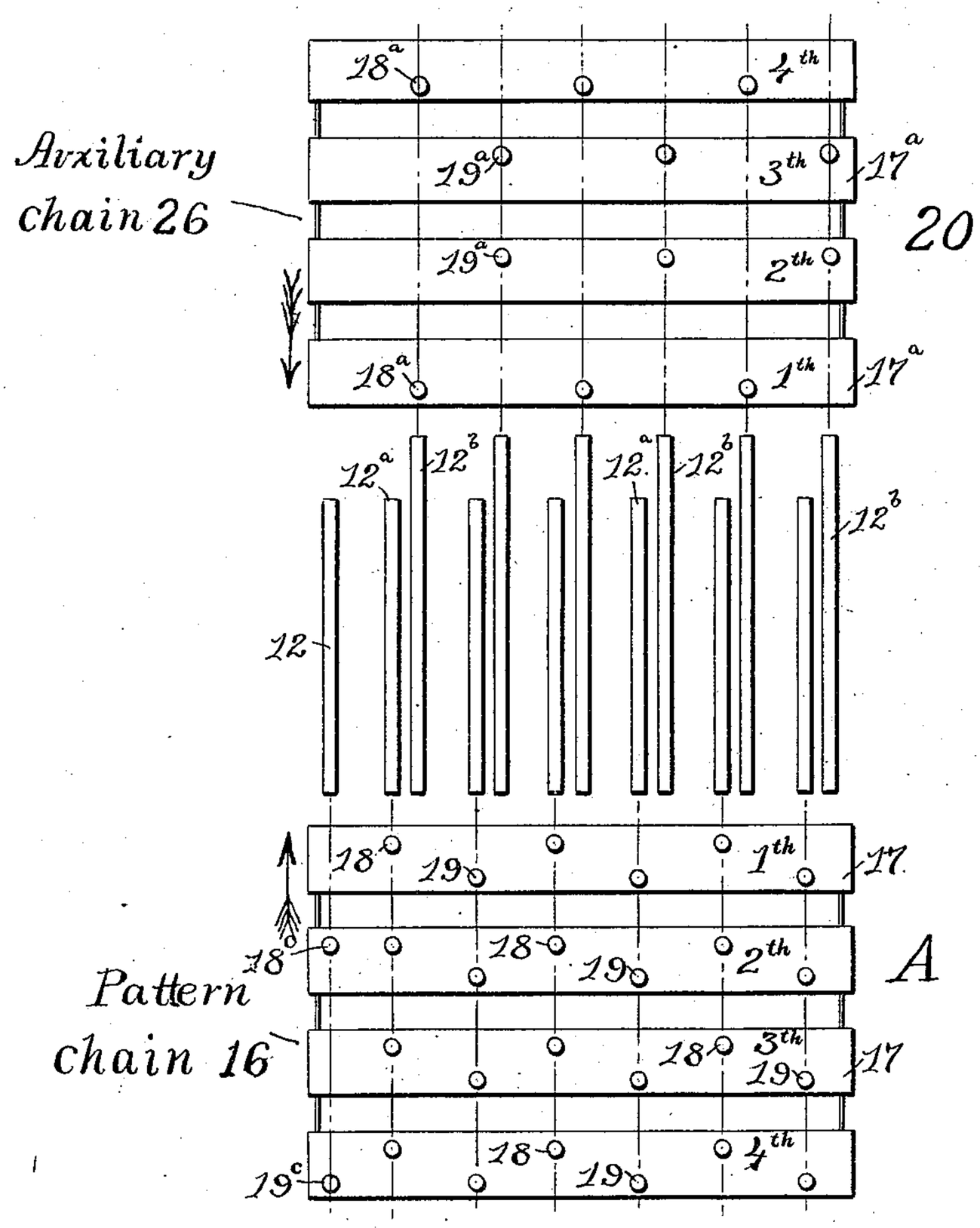
(No Model.) 2 Sheets—Sheet 2.

W. EVANS.

SHEDDING MECHANISM FOR LOOMS.

No. 554,442. Patented Feb. 11, 1896.

Fig. 9.



WITNESSES:

Henry J. Miller

Chas. H. Luther Jr

INVENTOR:

William Evans,

by Joseph A. Miller & Co.,
Atty's.

UNITED STATES PATENT OFFICE.

WILLIAM EVANS, OF FALL RIVER, MASSACHUSETTS.

SHEDDING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 554,442, dated February 11, 1896.

Application filed January 18, 1895. Serial No. 535,308. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM EVANS, of Fall River, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Shedding Mechanism for Looms; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to improvements in the class of looms in which a pattern-chain controls the operation of the harness-operating mechanism.

The invention consists in the peculiar and novel construction of the indicator-fingers and the needle by means of which the jack-hooks are operated.

The invention further consists, in connection with the indicator-fingers, of a controlling mechanism by which the pattern is changed at predetermined intervals, as will be more fully set forth hereinafter.

In the usual construction of the harness-operating mechanism, known as the "dobby," having two rows of pegs on one bar of the pattern-chain, one set of indicator-fingers is operated from one row of pegs and the other set from the other row of pegs on the same bar. The first set of indicator-fingers operates the lower jack-hook and the second set operates the upper jack-hook. The lifting-knives move alternately at each successive pick of the loom, and when the jack-hooks engage with them the corresponding harness is raised and lowered. One row of pegs on the bar of the pattern-chain determines which harness and warp-thread shall be raised for a certain pick of the shuttle, and the other row of pegs on the same bar determines the raising of the warp-threads for the next succeeding pick of the shuttle. One bar of the pattern-chain, therefore, represents two picks in the woven fabric, and the pattern-chain must have a sufficient number of bars to control the springing of the warp for the pattern of the whole length of the fabric.

In the weaving of a variety of fabrics, such as handkerchiefs, towels, and similar goods, the length of pattern-chain required is objectionable on account of its cost, of labor in pegging and the power and mechanism required to carry and operate it.

The object of my invention is to so construct the dobby attachment of a loom that fabrics, such as towels or handkerchiefs, in which stripes or borders of one peculiar pattern or weave are followed or preceded by a field of another pattern or weave can be produced with a short length of pattern-chain.

In a loom provided with a dobby constructed after my invention the pattern for the main portion of the fabric is represented by one of the two rows of pegs on each of the bars of the pattern-chain, and the pattern for the cross-borders is represented by the other row of pegs on the same bar.

Instead of using each bar of the pattern-chain to control the warp of two successive picks, as is the usual method employed heretofore, in the pattern-chain used in carrying out my invention each bar controls the springing of the warp for one pick only, and yet by use of a controlling mechanism, more fully described hereinafter, a short pattern-chain, or for some weaves a cylinder provided with a pattern-surface, will be sufficient to weave fabrics of any desired length in which two kinds of patterns of weaves are used at predetermined intervals. The controlling mechanism may be arranged to control the harness-operating mechanism in the old construction of the dobby where two adjacent indicator-fingers operate the one the lower and the other the upper jack-hooks, but I have herein shown and described the same in connection with my improved form of indicator-fingers and jack-needle.

Figure 1 is a side view of a dobby provided with my improvements. Fig. 2 is a side view, and Fig. 3 a top view, of one of the pair of indicator-fingers. Fig. 4 is a side view, and Fig. 5 a top view, of the other of the pair of indicator-fingers. Fig. 6 is an edge view, on an enlarged scale, of a needle for operating the jack-hooks, showing the upper and lower hooks and the two parts of the indicator-fingers in section. Fig. 7 is a face view, and Fig. 8 an edge view, of the needle on the scale of Fig. 1. Fig. 9 is a diagrammatic representation of the indicator-fingers, the pattern-chain, the auxiliary chain, and their relative

relation to each other, showing also the indicator-finger on one side through which the mechanism for operating the auxiliary chain is set in motion.

To illustrate the invention as clearly as possible and avoid confusion, the dobby part of the loom only is shown. The connections with the loom, the driving mechanism and the supporting-frames for the pattern-surface chains are not shown in the drawings. All these will be well understood by those skilled in the art and can be readily supplied.

Similar numbers and letters of reference designate corresponding parts throughout.

Referring to Fig. 1, 2 2 indicate the end frames of the dobby, or harness-operating mechanism, usually secured to or forming part of one of the end frames of the loom. The vibrator-arm 3 is secured to a shaft supported in the end frames 2 2. The ends of this vibrator-arm 3 are connected by the rods 4 with the lifter-knives 5 and these slide in the slotted ways 6.

The harness-lever 7 is the first one near the frame. The other harness-levers required to weave the patterns are not shown, but all are pivotally secured on the shaft 8, the ends of which are supported in the end frames 2 2. To the bracket 9, forming part of the harness-lever 7, is pivoted the connector-arm 10, and to each end of the same are pivotally connected the jack-hook 11^a to the upper end and the jack-hook 11^b to the lower end. The indicator-fingers are pivoted on the shaft 13, supported in the end frames 2 2, and rest on the bar 14, extending from one end frame to the other in the usual manner.

So far as now described the construction is the usual construction of the dobby harness-operating mechanism.

On referring to Fig. 6 it will be seen that the needle 15 supports jack 11^a on the upper end 15^a and the jack 11^b on the shoulder 15^b at its lower end, and that the needle is supported by the indicator-finger 12^a by a shoulder formed by the enlargement 15^c of the needle and by the lateral projection 12^c of the indicator-finger 12^b. The indicator-finger 12^a is provided on one side with two projections, (shown in Fig. 3,) so as to form the groove or space 12^e, and the indicator-finger 12^b is provided with the projection 12^c, (shown in Fig. 5,) and also with the upward-projecting flat piece 12^d. The lower end of the needle 15 passes through the space 12^e between the finger 12^a and the flat projection 12^d on the finger 12^b. By this construction either of the fingers 12^a or 12^b may lift the jack-hooks independent of the other, but both the short ends of the indicator-fingers 12^a and 12^b must be depressed before the needle can descend and permit the jack-hooks to engage with the lifting-knives. It is obvious that the longer ends of the indicator-fingers from the pivotal connection at 13 must be heavy enough to more than counterbalance the weight of the jack-hooks and needle combined.

I will now more particularly describe the object of this improved construction and the mode of operating the same.

Referring to Fig. 1 it will be seen that the sprocket-wheel 16 is placed below the indicator-fingers 12 and that the primary pattern-chain A on which the transverse bars 17 are secured is supported and operated by the sprocket-wheel 16. On the bars 17 are secured two lines of pegs, each forming a pattern-surface. The row of pegs 18 on the forward edge of the bar corresponds with the harnesses required to be operated to weave one pick of a pattern—the cross-stripe, for instance—and the row of pegs 19 on the rear edge of the bar corresponds with the harnesses required to be operated to weave one pick of the other pattern—the field or body, for instance. These pegs are placed so that they register always with a certain one of the parts of the indicator-fingers throughout the series—that is to say, the pegs may register with either of the parts 12^a or 12^b. This is clearly shown in Fig. 9, wherein the pegs 18 and 19 are so placed that they will operate the parts 12^a of each pair of indicator-fingers, the pegs of each row being arranged in the alternation shown. Now, in this condition the pegs cannot operate the needle 15 because it requires both of the short ends of the parts 12^a and 12^b to be depressed to permit the needle 15 to descend and permit the jack-hooks to engage with the lifting-knives 5. If, now, by any suitable mechanical means the weighted end of one of the two-part indicator-fingers—in the present instance the part 12^b—be raised so as to depress the short end connected with the needle 15, then when the pattern-peg registering with the other half passes under the same it will operate the needle to connect the jack-hooks with the lifter-knives and the proper harness will be operated. The preferred means which I have designed for thus operating the half of the indicator-fingers consists in the auxiliary or indicator chain 20, on which the transverse bars 17^a are secured. On each of these bars 17^a one row of pattern-pegs only is secured. The pegs 18^a and 19^a are placed near one or the other edge of the bars 17^a, the same as are the pegs 18 and 19 on the bars 17, so that the coacting pegs will operate the respective halves of the indicator-fingers at the same time, the pegs 18^a corresponding to the pattern of the pegs 18 on the primary pattern-chain A; but they are laterally placed so that while the pegs 18 on the primary pattern-chain register, say, with the half 12^a the pegs 18^a register with or operate the other half, 12^b, of the indicator-fingers, and the levers 21, pivotally secured at one end and bearing on the half 12^b of the indicator-fingers, being raised when the pegs 18^a pass under the same, will raise the weighted outer end of the half 12^b of the indicator-fingers and thereby permit the pattern-pegs 18 to operate the other half, 12^a, to connect the jack-hooks with the lifter-knives 5 and operate the desired harnesses. The row of pegs

18ª operates to unlock one of a pair of the indicator-fingers and the row of pegs 18 operates the other one of the pair of indicator-fingers, the pegs 19ª performing the corresponding office for the pegs 19, because the needle is supported by two adjacent indicator-fingers forming the pair and cannot be lowered to engage the jack-hook if only one is used or the jack-hooks if, as is shown in the drawings, two are used, until the weighted outer ends of both indicator-fingers are raised and the inner ends of both are lowered with the needle. When now the row of pegs 18ª has raised the outer ends of one of the pairs of indicator-fingers corresponding with the pattern, then the row of pegs 18 can operate the other one of the pair of indicator-fingers and thus lower the needle and the jack-hook or jack-hooks so as to connect the harness required to be operated to weave the pattern corresponding with the row of pegs 18. The row of pegs 19ª performs the corresponding office for the rows of pegs 19 on the pattern-chain.

The first indicator-finger 12, which is the one nearest the end frame, and the first harness-lever 7 are preferably used to operate the auxiliary or controlling pattern-chain 20, but they are not in any wise altered and both may be used to control the operation of a harness when the auxiliary or controlling pattern is not required, or when the auxiliary or controlling pattern-chain is operated by some other moving part. In the preferred construction, as shown in Fig. 1, the end frame 2 is provided with the arm 2ª, near the lower end of which is pivoted the lever 23, the upper end 24 of which lever is bent inward so as to bear on the harness-lever 7. To the lower end of the lever 23 is pivotally secured the ratchet-bar 25, the hook on the front end of which engages with the ratchet-wheel 26. The spring 23ª is secured at one end to the frame 2 and at the other end to the lever 23.

To enable others versed in the art to more fully understand my invention, I will now describe the operation of the same more fully.

Let the line of pegs 18 on the bars 17 of the primary pattern-chain A represent the weave of the cross-stripe of a towel, and the line of pegs 19 on the same bar 17 of the primary pattern-chain A represent the weave of the field, and also that a line of pegs 18ª on the auxiliary pattern-chain 20 is under the lever 21 and has raised the longer end of the indicator-fingers 12ᵇ, then, the loom being in operation weaving the pattern of the cross-stripe, the row of pegs 18 on each bar of the pattern-chain can operate the indicator-fingers 12ª and through them the jacks and harnesses, and as each bar 17 with its two rows of pegs raises the corresponding indicator-fingers and thereby operates the corresponding harnesses, the weave of the stripe represented by the row of pegs 18 would be woven continuously, the pattern-chain repeating the same weave continuously.

Various arrangements may be made to change the pattern of the weave, the simplest of which arrangements is adapted to weaving handkerchiefs, and consists in making up the primary pattern-chain A to contain as many bars 17, each provided with the two rows of pegs 18 19, as there are picks required to weave the border, and for the field a multiple of the number of picks in the border. One of the bars 17 is provided with one extra peg registered to operate the first indicator-finger 12.

Referring to Fig. 9 of the drawings, it will be seen that two of the bars 17 are provided each with one extra peg on the left-hand end of the bars, the peg 19ᶜ on a line with the row of pegs 19 and the peg 18ᶜ on a line with the row of pegs 18, and it will also be seen that the pegs 18ᶜ and 19ᶜ register with the first indicator-finger 12, that the pegs 18ª and 19ª register with the indicator-fingers 12ᵇ, and the pegs 18 and 19 register with the indicator-fingers 12ª. Assuming now that the chain with the bars 17 is moving toward the indicator-fingers and under the same, that the chain with the bars 17ª is also moving toward and under the indicator-fingers, and that the first of the bars 17ª will lift the weighted ends of three of the indicator-fingers 12ᵇ, then, under these conditions, when the first of the bars 17 passes under the indicator-fingers it will operate the three indicator-fingers 12ª, which form, with the three indicator-fingers 12ᵇ, the pairs required to be operated to permit the needles to descend and engage the jack-hooks and thereby operate the harnesses. The bar 17ª remains under the jack-hooks, and the three indicator-fingers 12ᵇ raised by the pegs on this bar remain in the raised position until the auxiliary chain having the bars 17ª is operated to bring the next bar under the indicator-fingers. The pick for which the harnesses were operated by means of the first bar 17 being completed, the pattern-chain is operated to bring the second bar 17 under the indicator-fingers, the pegs 18 will again operate the same three fingers 12ª, and the pattern will be repeated; but on the second bar 17 is the peg 18ᶜ, which registers with the indicator-finger 12 and through the auxiliary harness-lever operates the pawl by which the auxiliary chain is rotated, and therefore for the next succeeding pick the second bar 17ª is brought under the indicator-fingers, and three other fingers 12ᵇ are operated upon by the pegs 19ª, so that at this pick the pegs on the third bar 17 will operate the indicator-fingers 12ª and through the same the corresponding harnesses. At the next pick the fourth bar 17 of the pattern-chain is brought under the indicator-fingers, while the second bar 17ª remains in position because the same pattern is to be continued. The fourth bar 17 can only operate the harnesses by means of the pegs 19, because the pegs 19ª on the second bar 17ª have unlocked only one each of three pairs of fingers and only the other one of these three pairs can be operated to connect the harnesses, therefore,

the pattern will be repeated at the pick corresponding with the fourth bar 17. On this bar is, however, the extra peg 19c, which operates the finger 12 because it registers with the same. The third bar 17a is now brought, by means of the ratchet-bar 25, under the indicator-fingers, and as it is provided with the pegs 19a, the same as the second bar 17, it operates the same indicator-fingers 12b preparatory to continuing the same pattern.

The pattern-chain may be constructed so as to be provided with only one of the extra pegs 18c or 19c and be made up of only such a number of bars 17 as will be equal to the number of picks in the border, and the auxiliary chain with one bar 17a pegged to operate the indicator-fingers and harness required to weave the border, and such a number of bars 17a as are required to repeat the pattern-chain as often as is required to weave the field.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a loom-harness-operating mechanism, the combination with a pair of indicator-fingers, the jack-hooks, a single connection, supported by a pair of indicator-fingers, for operating the jack-hooks, mechanism for operating the harnesses, and a pattern-surface constructed to operate one of the pair of indicator-fingers, of an auxiliary pattern-surface, and mechanism, substantially as described, for operating the same, constructed to operate the other of the pair of indicator-fingers, as described.

2. In a loom-harness-operating mechanism, the combination with a pair of indicator-fingers, the jack-hooks, connections between each pair of indicator-fingers and the jack-hooks, and mechanism for operating the harnesses, of an auxiliary pattern-chain the bars of which are provided each with one row of pegs spaced for one pattern and registering with one of the pair of indicator-fingers, and a pattern-chain having a series of bars each provided with two rows of pegs, each row spaced for a separate pattern and registering with the other of the pair of indicator-fingers; the whole constructed to operate one of the pair of indicator-fingers by the auxiliary pattern-chain and the other one of the pair of indicator-fingers by the pattern-chain having two rows of pegs on each bar to operate the harnesses to weave the pattern desired, as described.

3. In a loom-harness-operating mechanism, the combination with a pair of indicator-fingers, the jack-hooks, the connections between the jack-hooks and the pair of indicator-fingers, the harness-levers, mechanism for operating the harnesses, a pattern-chain for operating one of the pair of indicator-fingers, and an auxiliary pattern-chain for operating the other of the pair of indicator-fingers, of an auxiliary harness-lever, an auxiliary indicating-finger, mechanism for connecting and operating the harness-lever, and connections between the auxiliary harness-lever and the auxiliary pattern-chain all located on one end of the harness-operating mechanism and constructed to automatically change or repeat the pattern of the weave, as described.

4. In a loom-harness-operating mechanism, the combination with the jack-hooks and a pair of indicator-fingers, of a needle having an enlargement at its upper end to support the upper jack-hook, a projection near its lower end forming a support for the lower jack-hook and a shoulder for supporting the needle on one of the indicator-fingers, and an extension of the lower end of the needle bearing on a lateral projection on the other of the pair of indicator-fingers, as described.

5. In a loom-harness-operating mechanism, the combination with the jack-hooks 11a and 11b of the needle 15, of the indicator-finger 12a provided with the groove 12e, and the indicator-finger 12b provided with the projections 12c and 12d, as described.

6. In a loom-harness-operating mechanism, the combination with the jack-hooks and connections with the harness-levers, of a needle for each pair of jack-hooks, a pair of indicator-fingers for each needle, and projections on each indicator-finger forming supports for the needles, constructed so that each indicator-finger can support and lift the needle and jack-hooks and both must be operated to lower the jack-hooks for engagement with the lifter-knives, as described.

7. In a loom-harness-operating mechanism, the combination with the jack-hooks and connections with the harness-levers, of needles constructed to support the jack-hooks, a series of pairs of indicator-fingers each pair forming the support for a needle, an auxiliary pattern-chain, provided with the bars 17a and having the rows of pegs 18a and 19a, one row on each bar, constructed to operate one of each pair of indicator-fingers, and a pattern-surface, provided with the bars 17 and having the two rows 18 and 19 pegged for two different patterns on each bar, constructed to operate the other one of the pairs of indicator-fingers to control the operation of the harnesses and the weave, as described.

8. In a loom-harness-operating mechanism, the combination with the jack-hooks, the needles for supporting two jack-hooks, the pairs of indicator-fingers 12a and 12b, the pattern-chain A, the auxiliary pattern-chain 20, and the levers 21, of the auxiliary indicator-finger 12, the auxiliary harness-lever 7, and mechanism, substantially as described, for operating the auxiliary pattern-chain 20, as and for the purpose described.

9. In a loom-harness-operating mechanism, in combination, a pattern-chain having a series of bars on each of which two lines of pegs are placed spaced to control two separate patterns of weave, an auxiliary pattern-chain,

having a series of bars each provided with only one line of pegs spaced to correspond with one or the other of the patterns of the weave, and a pair of indicator-fingers one of which is operated by the main pattern-chain and the other by the auxiliary pattern-chain, as described.

In witness whereof I have hereunto set my hand.

WILLIAM EVANS.

Witnesses:
JOSEPH A. MILLER,
JOSEPH A. MILLER, Jr.