

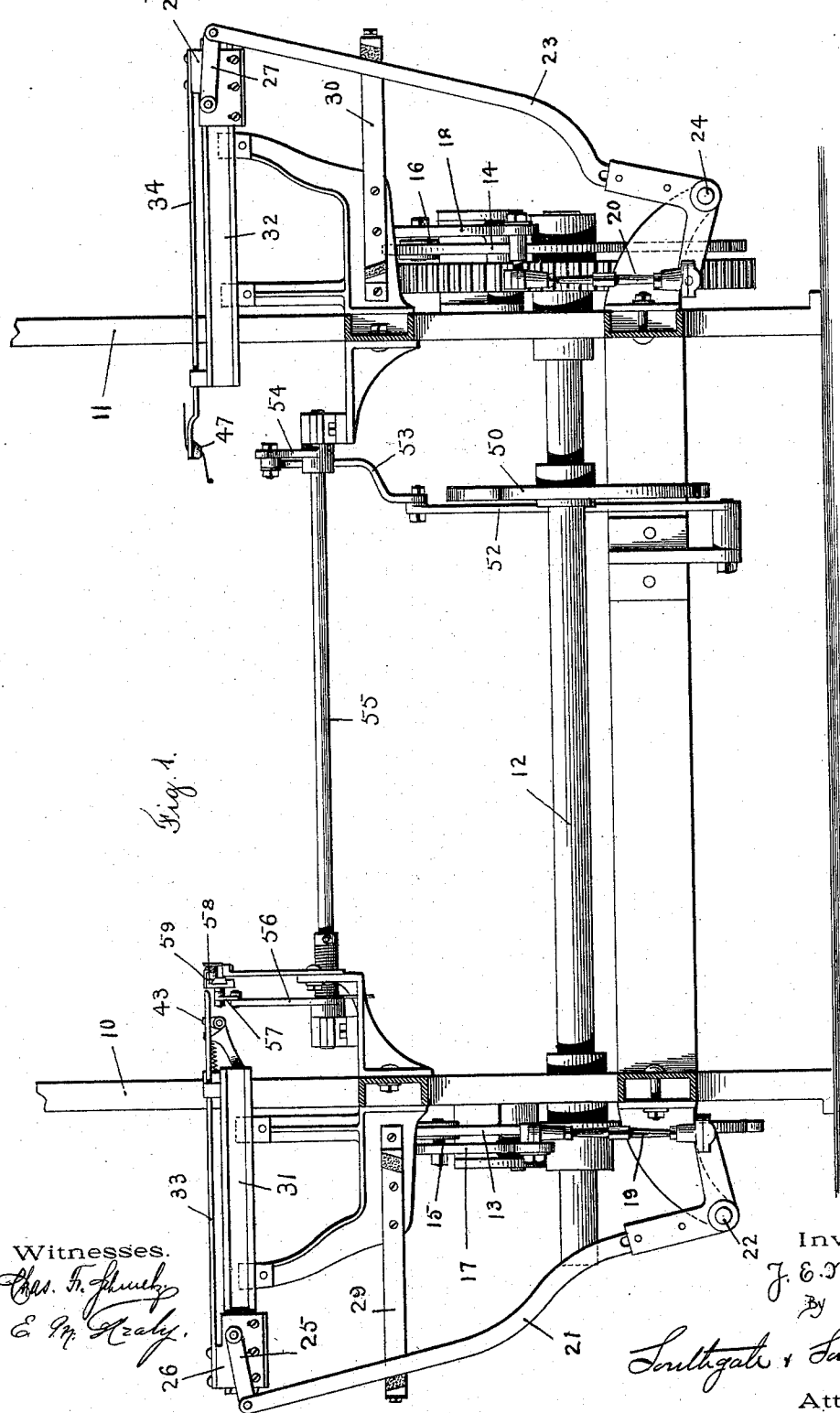
(No Model.)

4 Sheets—Sheet 1.

J. E. MARTIN.
NEEDLE LOOM.

No. 573,827.

Patented Dec. 22, 1896.



(No Model.)

4 Sheets—Sheet 2.

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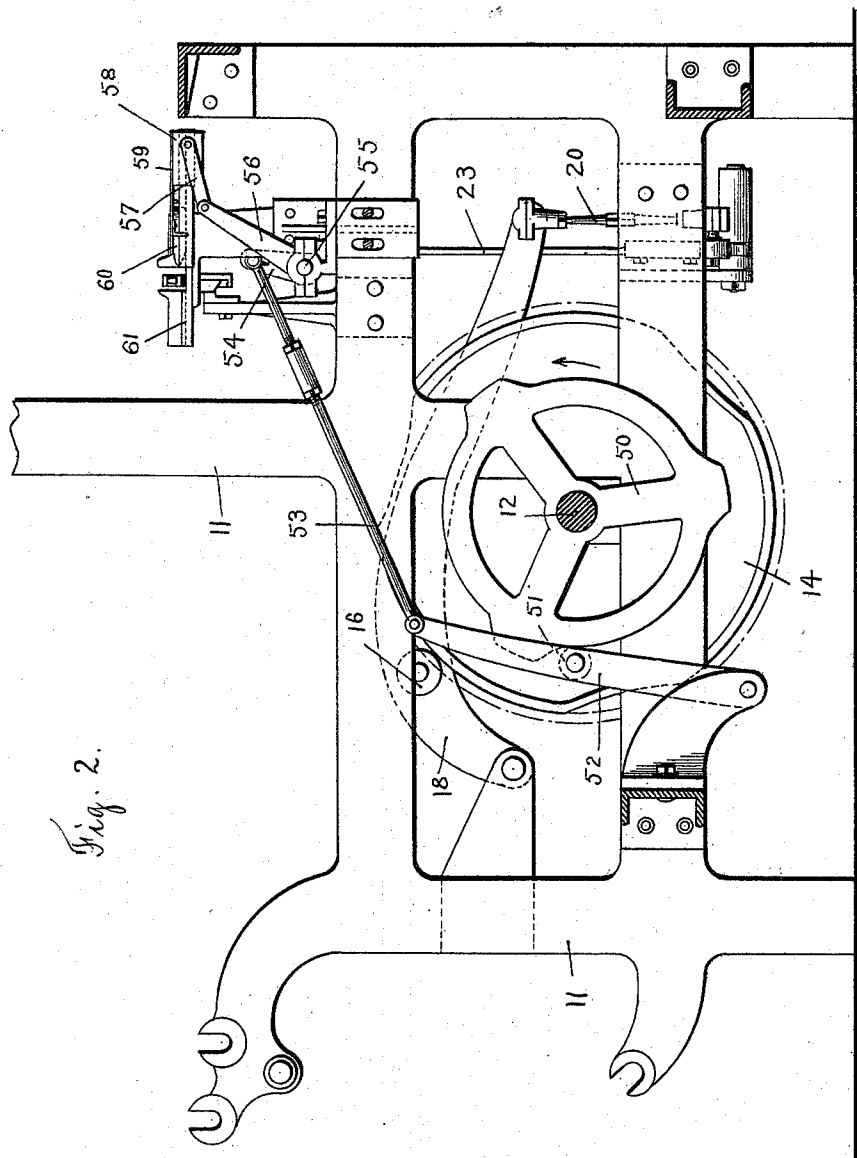


Fig. 2.

Witnesses.

Chas. F. J. J. J.
E. M. Healy.

Inventor.

J. E. Martin,

By

Smithgath & Smithgath

Attorneys.

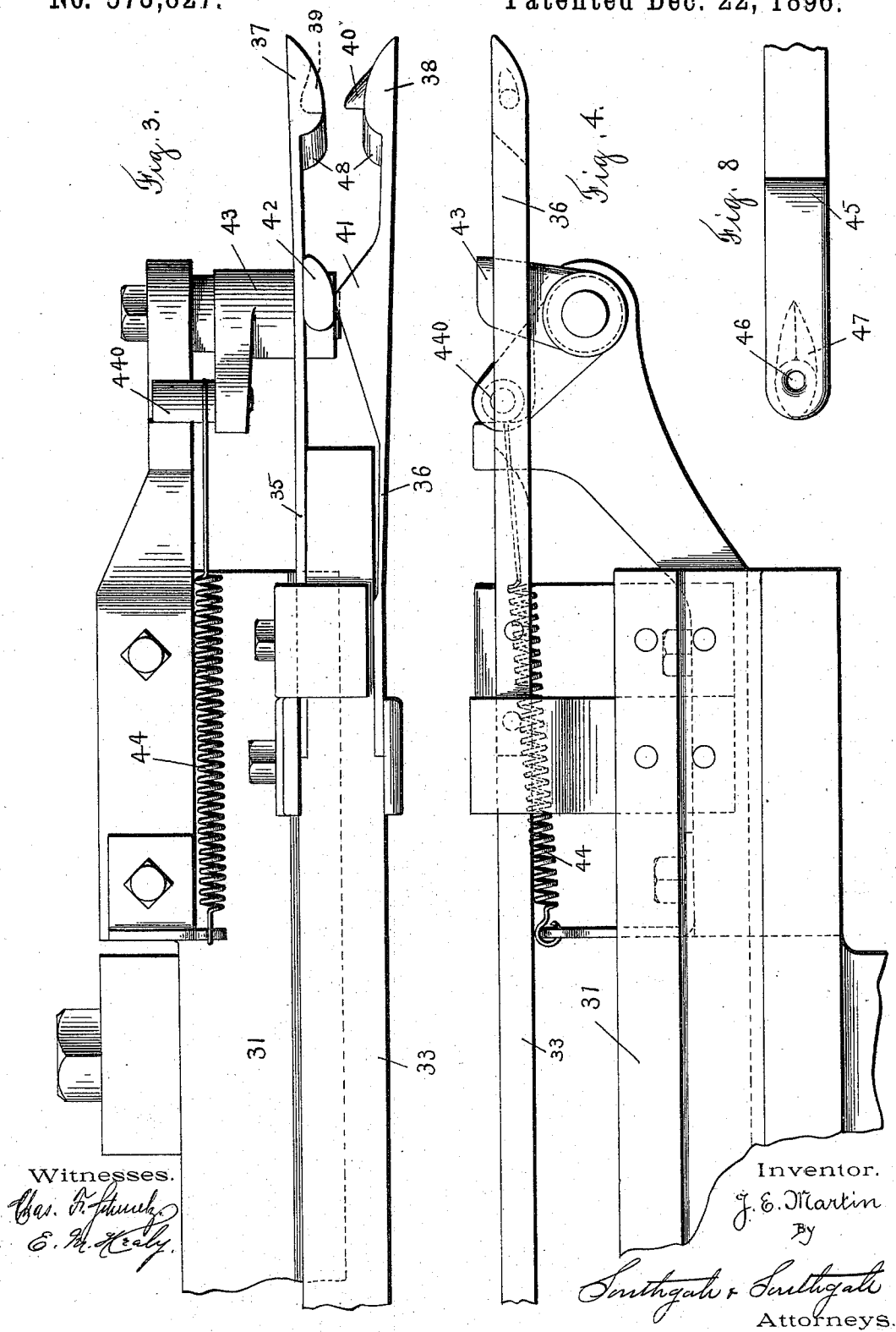
(No Model.)

4 Sheets—Sheet 3.

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Witnesses.

Jas. R. Smith
E. M. Kelly

Inventor.

J. E. Martin
By

Smithgate & Smithgate
Attorneys.

(No Model.)

4 Sheets—Sheet 4.

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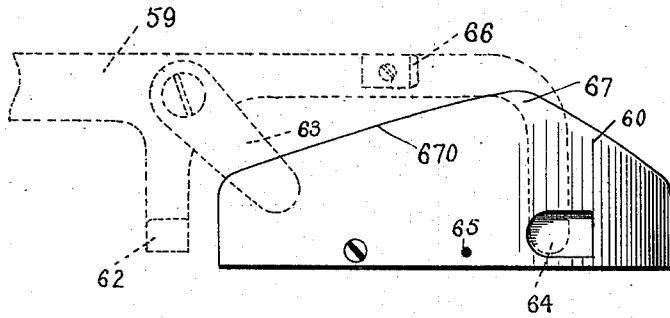


Fig. 5.

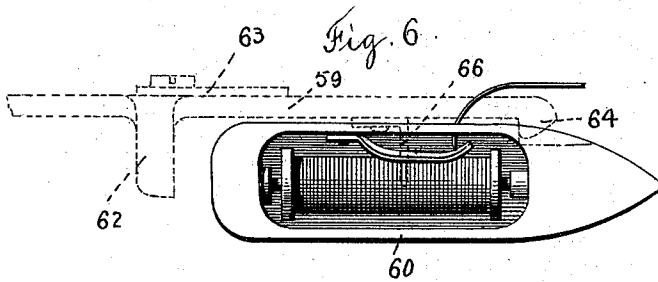


Fig. 6.

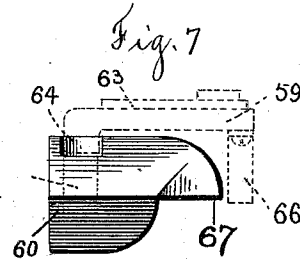


Fig. 7.

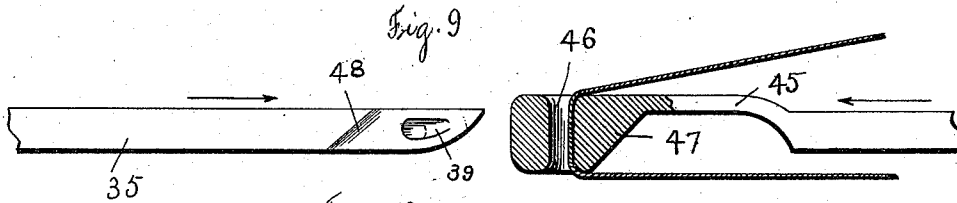


Fig. 9.

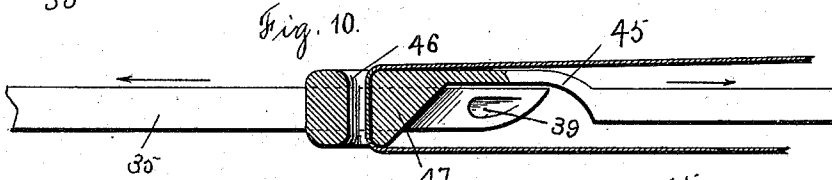


Fig. 10.

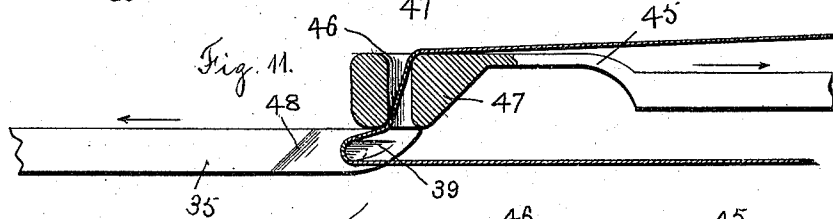


Fig. 11.

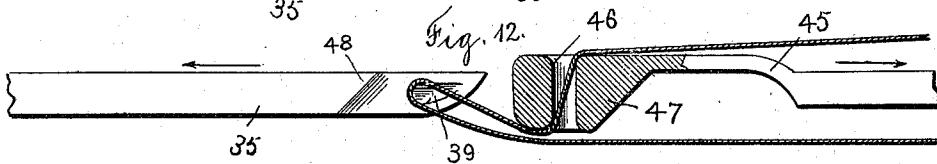


Fig. 12.

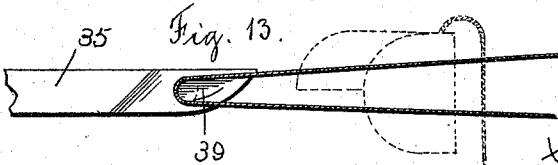


Fig. 13.

Witnesses.
Chas. F. Johnson
E. M. Healy

Inventor.

J. E. Martin,
By

Southgate & Southgate
Attorneys

UNITED STATES PATENT OFFICE.

JAMES E. MARTIN, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE
CARPET LOOM COMPANY, OF SAME PLACE.

NEEDLE-LOOM.

SPECIFICATION forming part of Letters Patent No. 573,827, dated December 22, 1896.

Application filed February 26, 1896. Serial No. 580,872. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. MARTIN, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Needle-Looms, of which the following is a specification.

My invention relates to that class of looms in which the weft or filling thread is carried across the loom by means of needles or bars.

The especial objects of my invention are to provide an improved form of needle-loom in which I employ a pair of improved cooperating needles or bars, which are actuated toward and away from each other, so that they will meet substantially in the middle of the loom; to provide an improved construction for opening the female needle when said needle is drawn back to its normal position; to improve the construction of shuttle which is employed for forming one of the selvages, and to provide means for positively slipping or releasing the loop of thread from the stud or projection carried by the female needle.

To these ends my invention consists of the parts and combinations of parts, as hereinafter described, and more particularly pointed out in the claims at the end of this specification.

In the accompanying four sheets of drawings, Figure 1 is a front view, partially in section, of sufficient parts of the needle-loom to illustrate the application of my invention. Fig. 2 is a side view of the same, partially in section. Figs. 3 and 4 are detail views illustrating the means which I preferably employ for opening the female needle when the same is drawn back. Figs. 5, 6, and 7 are detail views of the shuttle, the operating-arm being shown by dotted lines. Fig. 8 is a plan view of the end of the male needle. Figs. 9 to 12, inclusive, are detail views illustrating the relative positions assumed by the two needles and the manner in which the loop of thread is transferred from one to the other; and Fig. 13 is a detail view, the position of the shuttle being indicated by dotted lines.

In a needle-loom constructed according to my invention the warp-threads running lengthwise of the loom pass through suitable harnesses and are alternately raised and

lowered in the ordinary manner, which it is not necessary to herein show or describe. The weft or filling thread is drawn off from the ordinary cop and is carried by an automatic tension device which is arranged to give out the thread as required, and to keep the thread under proper tension, and to draw back the slack from the weft-thread when the loop is released from the female needle at the opposite side of the loom. This automatic device for letting out, tensioning, or taking up the weft-thread may be of the ordinary or approved construction and need not be herein illustrated or further described. From the tensioning device the weft-thread passes through an eye in the male needle. When the harnesses are shifted in the ordinary manner, the needles will be actuated to carry a loop of filling-thread across the loom. One of the selvages or edges will be formed by a shuttle which moves longitudinally with respect to the loom.

Referring to the drawings and in detail, 10 and 11 designate the usual side frames, which carry the operative parts of the device. Journaled in the side frames 10 and 11 is a driven shaft 12. Fastened upon the shaft 12 near its ends are cams 13 and 14 for operating the needles. The cams 13 and 14 engage with rolls 15 and 16, which are journaled upon levers 17 and 18, respectively. The levers 17 and 18 are connected by links 19 and 20 to bell-crank levers 21 and 23, which are journaled upon studs 22 and 24, respectively. At their upper ends the bell-crank levers 21 and 23 are connected by links 25 and 27 to boxes 26 and 28, mounted upon ways 31 and 32. The male needle 34 is fastened upon and moves with the box 28. The female needle 33 is fastened upon and moves with the box 26. As most clearly illustrated in Figs. 3 and 4, the female needle 33 is split or forked at its end, having spring branches 35 and 36. The branches 35 and 36 are provided at their ends with enlargements 37 and 38. The enlargement or boss 38 is provided with a projecting spur 40, which may fit into and engage a corresponding recess 39 in the enlargement 37. The branch or arm 36 is provided near its center with a projection 41, which is adapted to engage with a cam 42, so as to separate the

branches 35 and 36 when the female needle is drawn back. The cam 42 is carried by a sleeve 43, which is journaled upon a stud projecting from a bracket secured on the way 31.

5 A coiled spring 44 is connected to a crank-pin 440, carried by an arm extending from the sleeve 43, and is arranged to normally hold said crank-pin in engagement with a stop on the bracket, so as to bring the cam 42 in position to engage with and open the branches 35 and 36. When the needle 33 is moved toward the middle of the machine, the spring 44 will yield and allow the cam 42 to turn down out of the way to allow the shank of the

10 needle 33 to move freely over the same.

As illustrated most clearly in Figs. 9 to 12, the male needle is offset, as at 45, and is provided with an eye 46 for receiving a loop of weft-thread and has a downwardly-projecting extension or cam 47 for engaging with and separating the forked end of the female needle when the needles are brought into engagement near the center of the loom. The shape of the extension or cam 47 is illustrated by dotted lines in Fig. 8. The rear edge of the downwardly-extending projection 47 is inclined or beveled to cooperate with the inclined or cam surfaces 48, formed on the rear of the bosses or projections 37 and 38 of the female needle. By adopting this relative construction for the needles I have provided a simple and efficient construction for transferring the loop of weft-thread from the male needle to the female needle. The manner in which these parts cooperate is most clearly illustrated in Figs. 9 to 12.

In Fig. 9 the needles are represented as approaching each other. As the needles come into engagement the downwardly-extending projection 47 of the male needle will pass between the branches of the split or forked end of the female needle, so that the parts will assume the position illustrated in Fig. 10. When the needles are retracted, or commence to move away from each other, the inclined rear edge of the downwardly-extending projection 47 of the male needle will engage with the cam-surfaces 48 of the female needle, and the male needle will ride up over the top of the female needle, as illustrated in Fig. 11, so that as the needles move away from each other the loop of thread will then be carried by the spur 40 of the female needle, as illustrated in Fig. 12. The female needle will draw the loop of weft-thread a short distance beyond the edge of the cloth which is being woven. While the woof or weft thread is held in this position a shuttle will be passed through the same to form a selvage. When the shuttle

60 passes through the loop of weft-thread, the loop of thread will be moved out of engagement with the spur 40 of the female needle and the slack or surplus thread of the weft will be drawn back by the automatic tension device in the ordinary manner.

I also preferably provide means for positively throwing the loop off from the spur

40, so as to insure the loop of thread being disengaged from the female needle. As illustrated, a shuttle-operating cam 50 is secured upon the shaft 12. The cam 50 engages with a roller 51, journaled upon a lever 52, which is connected by a link 53 with an arm 54, secured upon a rock-shaft 55. The rock-shaft 55 is also provided with an arm 56, which is connected by a link 57 with a box 58, mounted upon ways 61. Fastened upon the sliding box 58 is a part 59, which I term the "shuttle-operating arm," which is provided with suitable projections for engaging with and moving the shuttle 60.

As illustrated by dotted lines in Figs. 5 to 7, inclusive, the shuttle-operating arm 59 is provided with a downwardly-extending projection 62, which engages behind the end of the shuttle 60. A latch 63 is pivoted upon the arm 59 and serves to prevent the shuttle from moving up. Also fastened upon the shuttle-operating arm 59 is a downwardly-extending piece 66, which I term the "throw-off" or "wiper." When the shuttle-operating arm 59 has been moved far enough to insert the head of the shuttle 60 into the loop of thread, the throw-off or wiper 66 will engage the thread and positively throw the loop of thread off from the spur 40 of the female needle. On its upper side the shuttle 60 is provided with a notch, which is engaged by and cooperates with a latch 64 on the arm 59.

In some cases it may happen that the loop of weft-thread may be thrown off from the stud 40 of the female needle before the shuttle 60 has had time to enter well within the loop, and the slack of the thread then being drawn back by the automatic tension device there is danger, where the ordinary shuttle is employed, that one stitch of the selvage will be dropped and an imperfect selvage formed. To overcome this difficulty, I preferably form my shuttle of greatest width near its head and gradually taper the shuttle toward the rear end.

As illustrated, the shuttle 60 is provided with a projecting wing 67, this wing being of greatest width near the head of the shuttle and gradually tapering toward the end of the shuttle, as at 670.

A bobbin may be secured in the shuttle 60 in any of the ordinary manners, and the thread therefrom is passed through a hole in the body of the shuttle. By adopting this construction the shuttle has to penetrate a comparatively short distance through the loop. If the loop is then for any reason thrown off from the stud 40 of the female needle, so that the tension device will begin to act, the tapering part 670 of the wing 67 will act as a cam for guiding the loop of thread around the rear of the shuttle rather than allowing the same to slip off of the front of the shuttle.

I am aware that many changes may be made in the construction of needle-loom by those who are skilled in the art without departing from the scope of my invention, as

expressed in the claims. I do not wish, therefore, to be limited to the construction which I have shown and described; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. In a needle-loom, the combination of a pair of cooperating needles, one of said needles having a split or forked end and the other needle having a cam for engaging and opening the forked end of the first needle and means for operating said needles, substantially as described.

2. In a needle-loom, the combination of a pair of cooperating needles, one of said needles having a split or forked end, one branch of the fork carrying a spur and the other branch having a corresponding recess, the second needle having an eye for the thread and a cam for opening the forked end of the first needle and means for operating said needles, substantially as described.

3. In a needle-loom, the combination of a pair of cooperating needles, one of said needles having a split or forked end, the other needle having a cam for opening the forked end of the first needle, said needles being provided with engaging surfaces for causing them to move out of line as they separate and means for operating said needles, substantially as described.

4. In a needle-loom, the combination of a female needle having a split or forked end, one branch of the fork being provided with a spur, the other branch having a corresponding recess, a male needle having a downwardly-extending projection for opening the forked end of the female needle, the rear edge of said projection being inclined to cooperate with inclined surfaces of the female needle to cause the male needle to ride over the female needle when the needles separate and means for operating said needles, substantially as described.

5. In a needle-loom, the combination of a female needle having a split or forked end, a cam for opening the forked end of the female needle when said needle is drawn back, said cam being mounted so that it will yield to allow the shank of the needle to pass over the same and means for operating said needle, substantially as described.

6. In a needle-loom, the combination of a female needle having a split or forked end, a

movable cam, a spring for holding said cam in position to open the forked end of the female needle when said needle is drawn back, and yielding to allow the shank of the needle to pass over said cam when the needle is moved in the opposite direction, and means for operating said needle, substantially as described.

7. In a needle-loom, the combination of a needle for carrying a loop of thread across the loom, means for operating said needle, and a shuttle cooperating with said needle to form a selvage, said shuttle being formed with its greatest width near its head in order to guide the loop of thread around the rear end of the shuttle, substantially as described.

8. In a needle-loom, the combination of a needle for carrying a loop of thread across the loom, means for operating said needle, a movable shuttle, means for reciprocating the shuttle to form a selvage, said shuttle being formed with an extending wing of greatest width near the head of the shuttle, and gradually decreasing in width near the tail of the shuttle whereby the loop of thread will be guided around the rear end of the shuttle, substantially as and for the purpose set forth.

9. In a needle-loom, the combination of a needle for carrying a loop of thread across the loom, means for operating said needle, said needle having a projecting spur, a movable shuttle, means for reciprocating said shuttle to form a selvage, and means for disengaging the loop of thread from the spur when the shuttle has been inserted into said loop, substantially as described.

10. In a needle-loom, the combination of a needle for carrying a loop of thread across the loom, means for operating said needle, said needle having a projecting spur, a movable shuttle for forming a selvage, a movable arm for reciprocating said shuttle, and a wiper carried by said movable arm for disengaging the loop from the spur, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JAMES E. MARTIN.

Witnesses:

PHILIP W. SOUTHGATE,
LOUIS W. SOUTHGATE.