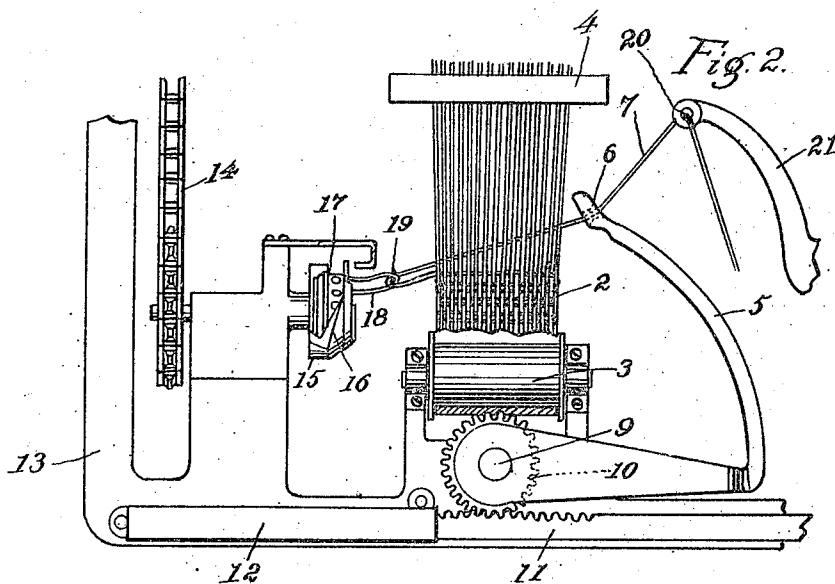
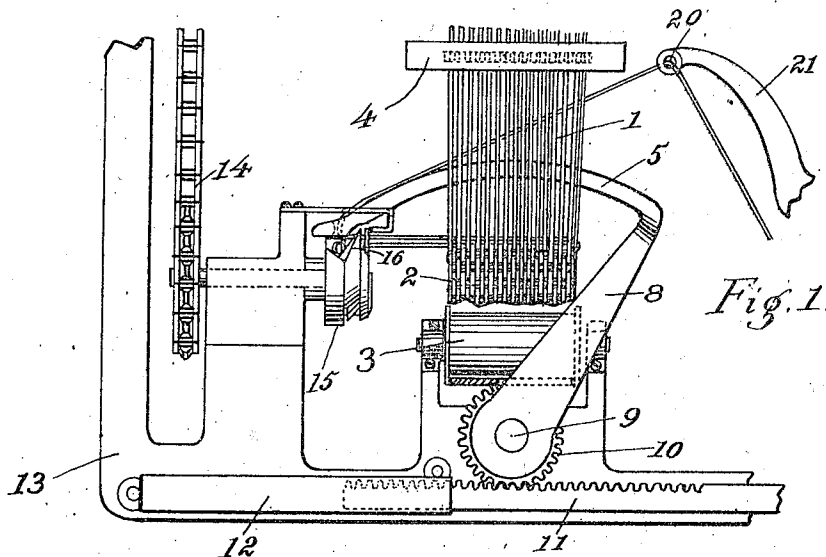


W. B. CAMPBELL AND C. W. STRICKER.
 LOOM AND THE FABRIC PRODUCED THEREBY.
 APPLICATION FILED AUG. 19, 1918.

1,405,274.

Patented Jan. 31, 1922.

2 SHEETS—SHEET 1.

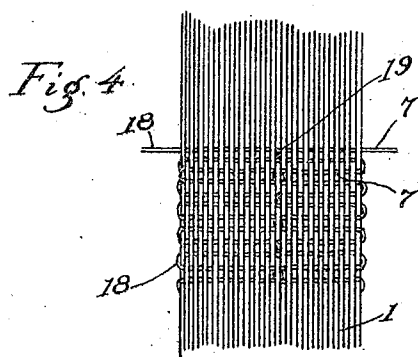
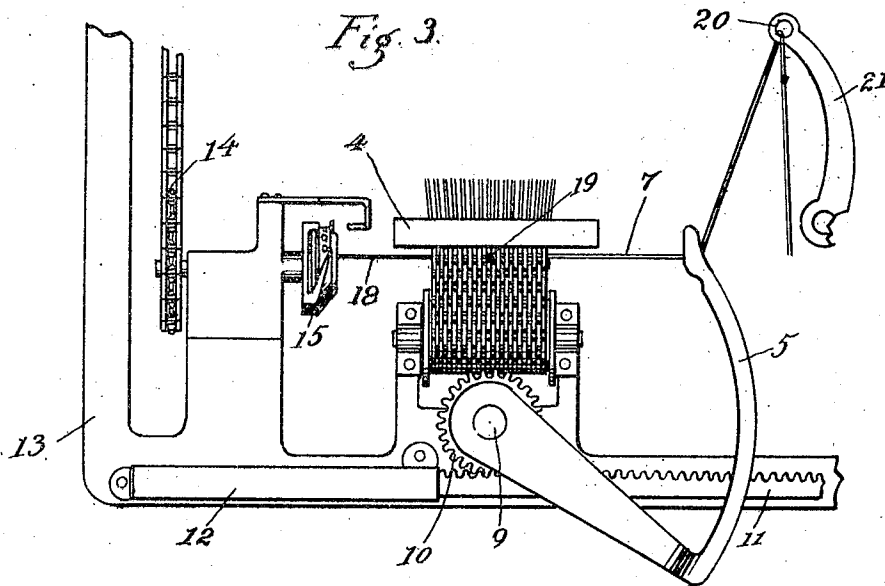


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UNITED STATES PATENT OFFICE.

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ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO THE
PERKINS-CAMPBELL COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF
OHIO, AND ONE-HALF TO SAID WENDELL B. CAMPBELL.

LOOM AND THE FABRIC PRODUCED THEREBY.

1,405,274.

Specification of Letters Patent. Patented Jan. 31, 1922.

Application filed August 19, 1918. Serial No. 250,451.

To all whom it may concern:

Be it known that we, WENDELL B. CAMPBELL and CLARENCE W. STRICKER, citizens of the United States, and residents of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Looms and the Fabric Produced Thereby, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

The object of our invention is to weave fabrics very much more rapidly than can be accomplished on the ordinary loom whether of the shuttle or needle type, and while adopting the needle loom type, our object is to obtain a uniform selvage for each edge of the fabric as in the shuttle loom.

Our invention is especially applicable for the weaving of narrow material such as bands, braid, ribbon, belting and the like, although the principles of the invention are equally applicable for the weaving of wider material, and we do not wish to be limited to the weaving of mere narrow fabric.

Needle looms have long been in use for weaving such narrow fabrics, and the principle involved is to carry the weft thread through the shed by a needle which is passed between the warp threads and either caught on the opposite side or looped over a warp thread to permit the needle to be withdrawn in the same path that it entered and before the warp threads of the shed are changed.

In the process of weaving in the ordinary shuttle loom, in which the shuttle is passed back and forth through the shed, the operation is necessarily slow. While in the needle loom as ordinarily employed, except with the use of two needles and the employment of complicated devices of various kinds, it has not been possible to provide for the same selvage along each edge.

The essential principle of our invention consists in the utilization in the loom are of the sewing machine principle for applying the filling or weft threads, and in its essence we have adopted the lock stitch principle of the two-thread sewing machine and we have substituted for the fabric which is operated

on in the sewing machine the warp threads of the loom.

With this construction we are able to weave especially narrow fabric with great rapidity. Only a comparatively slight opening between the threads forming the shed is required, and a very short throw for the heddles and the lay.

The fabric produced is also novel in that the selvage is the same on each edge, and in that the outer thread furnished by the bobbin is drawn into the shed and becomes a part of the filling of the fabric.

Our invention therefore consists of the combination of instrumentalities to be hereinafter pointed out and claimed irrespective of the particular details of construction and specific methods of operating the several instrumentalities.

In illustrating our invention, in the drawings we have therefore only shown such portions of the mechanism as will make clear the construction and operation of the parts by which our method is carried out.

In the drawings, Figure 1 is a plan view of a portion of the loom framework showing the needle in the position it occupies after passing through the shed as the thread is being looped around the bobbin thread.

Figure 2 is a similar view, with the needle withdrawn just prior to the action of the take-up in pulling on the loop.

Figure 3 illustrates the parts with the bobbin thread taken up and the lay in position to press down the threads.

Figure 4 is an enlarged view of the fabric showing the position of the threads.

The shed is indicated at 1, the woven fabric at 2, which is wound or rolled up on the roll 3 automatically as the fabric is woven, in the well known way. The lay is indicated at 4, operated to press down the weft in the usual way. We have not shown the harness for shifting the warp threads with each operation, nor the other operating mechanism of the loom, as our invention, as heretofore indicated, has to do with the application of the weft threads to the fabric.

The needle 5, provided with an eye 6 in its outer end, carries the weft thread 7 from a spool (not shown), the spool being under proper tension. The needle as illustrated is curved to facilitate its passage through the wider portion of the shed, and extends at an angle from the rock arm 8 mounted on the shaft 9 journaled in the framework. This shaft is provided with the pinion 10 which engages a rack bar 11 arranged to be reciprocated by the power mechanism of the machine and guided in a suitable guideway 12 secured on a portion of the framework 13 of the machine. The reciprocation of the rack will cause the needle to reciprocate back and forth through the shed of the warp threads.

Mounted to rotate with the movement of the needle and driven as illustrated in the drawings by a sprocket chain 14 is an ordinary rotating shuttle 15, such as is in common use in the two-thread sewing machines. The type shown is the lock-stitch shuttle for the sewing machine, provided with a rotating looper 16, a point of which enters the loop of the needle thread and carries it around the bobbin 17 which furnishes the bobbin thread 18, the action being to form a loop 19 between the weft thread and the bobbin thread. The weft thread is threaded from the spool through eye 20 on the take-up arm 21, which is provided with the proper tension devices as in the sewing machine to take up the thread at proper timed intervals.

The operation of the mechanism will be clear from a consideration of the three views, Figures 1, 2 and 3, which illustrate the position of the parts at various stages of the operation. In Figure 1 the weft thread has been carried by the needle through the shed and the rotating looper driven in timed relation to the movement of the needle is just about to pick up the loop. In Figure 2 the sliding rack has been reciprocated and the needle drawn back through the shed with the weft thread looped through the loop of the bobbin thread, with the take-up arm 21 about to begin its action of drawing the loop tight. In Figure 3 the needle has moved to the end of its throw in the outer direction and the take-up 21 has drawn the loop 19 of the filling threads into the central portion of the shed and the lay 4 has been rocked to press down the weft threads, and is in position ready to press down the threads. Upon the outward movement of the lay, the heddles are shifted to change the warp threads, the take-up released and the needle is again driven forward through the shed, the bobbin takes up the loop, the needle is withdrawn and the take-up again draws the loop into the center of the fabric. In this way, we obtain a woven fabric in which the

threads are disposed as illustrated in Figure 4. The bobbin thread forms half of the weft and the weft thread the other half, and exactly the same selvage is produced on each edge.

It is of course not essential that the loop of the weft threads should be brought to the middle line of the fabric and the take-up tension may be of course so regulated as to bring the loop to one side or the other of the middle line, and by automatically varying the action of the take-up the location of the loop of the weft threads may be readily changed.

It is of course not essential that the needle should be curved, as a straight needle can be employed, although for some reasons the curved needle is preferable, as its path will be through a wider portion of the shed.

The advantages of our invention will, we believe, be obvious. As the sewing machine principle is adopted for the weaving in of the weft threads, extreme rapidity of movement may be obtained, and the lay and heddles may be located comparatively close to the path of the needle, and only a comparatively slight movement of the heddles will be required for the shed.

Another great advantage obtained is that the bobbin thread becomes a part of the weft and the selvage is exactly the same along each edge. When beaten up by the lay, the loops disappear in the fabric, and if with certain materials the line of loops should show, the action of the take-up can be automatically and intermittently varied as stated above, so that the loops of the weft threads shall not take any definite line.

As our invention, as heretofore described, relates to the employment in the loom of the two-thread lock-stitch construction of the sewing machine art, it is obvious that the various mechanical movements can be attained in a great variety of ways without departing from the spirit of our invention, and we do not wish to be limited to the construction illustrated.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. In a loom, the combination with a frame and shed forming mechanism for the warp threads and two weft threads, of means for carrying one of the weft threads through the shed and back without changing the warp threads, lock stitch mechanism for looping the second weft thread with the first weft thread, and means for drawing the second weft thread within the shed, to become a part of the filling.

2. In a loom, the combination with a frame and shed forming mechanism for the warp threads and two weft threads, of a needle for carrying one of the weft threads through the shed and back without chang-

ing the warp threads, lock stitch mechanism for looping the second weft thread with the first weft tread, and means for drawing the second weft thread within the shed upon the back movement of the needle, to become a part of the filling.

3. In a loom, the combination with a frame and shed forming mechanism for the warp threads and two weft threads, of a needle for carrying one of the weft threads through the shed and back without changing the warp threads, a rotating looper and bobbin for looping the second weft thread with the first weft thread and a take-up device for drawing the second weft thread within the shed upon the back movement of the needle, to become a part of the filling.

4. In a loom, the combination with a

frame and shed forming mechanism for the warp threads and two weft threads, of a needle carrying the weft threads, and means for reciprocating the needle to carry said thread through the shed and back without changing the threads, a rotary looper with a bobbin carrying the second weft thread, and mechanism for operating the same in timed relation with the needle movement to loop the second weft thread over the first thread, a take-up device to draw the second weft thread within the shed midway of the side edges of the fabric upon the back movement of the needle, whereby the two weft threads constitute each one half of the filling of the fabric.

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