2 Sheets--Sheet 1.

# S. SANFORD.

## Loom for Weaving Pile Fabrics.

No. 165,428. Patented July 13, 1875.

*Fig. 1*

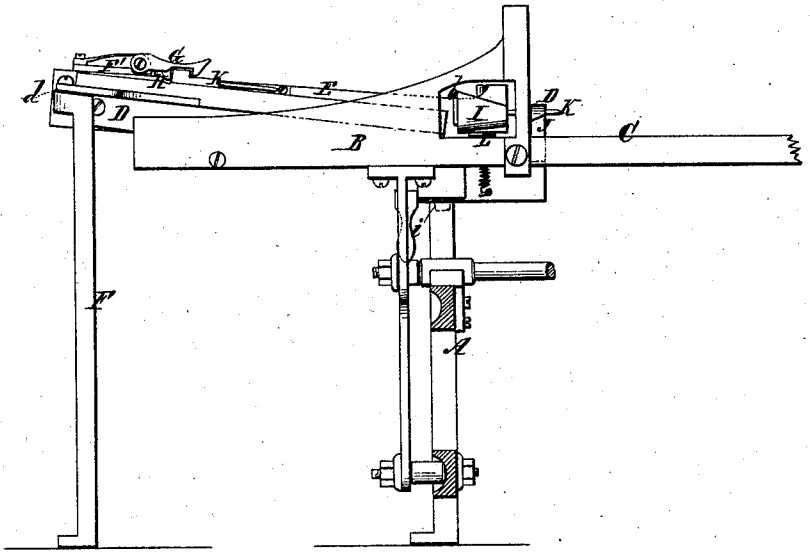
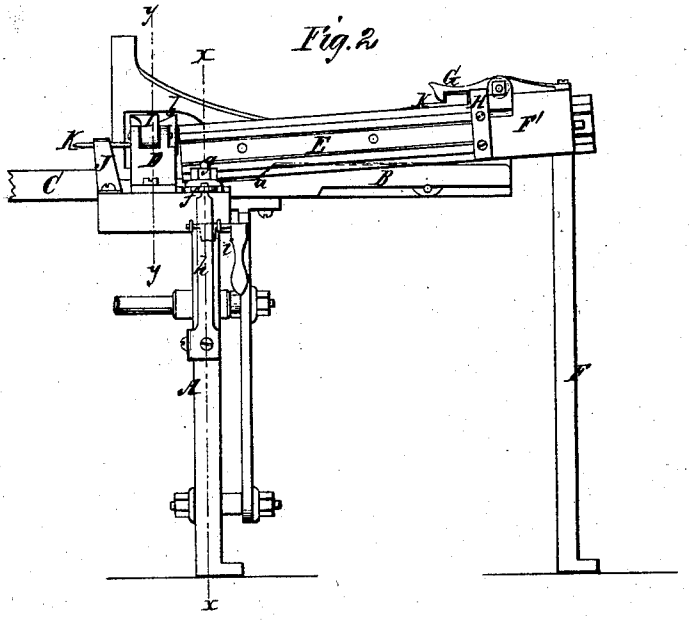


*Fig. 2*



Witnesses.
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2 Sheets--Sheet 2.

# S. SANFORD.

## Loom for Weaving Pile Fabrics.

No. 165,428. Patented July 13, 1875.

*Fig. 3*

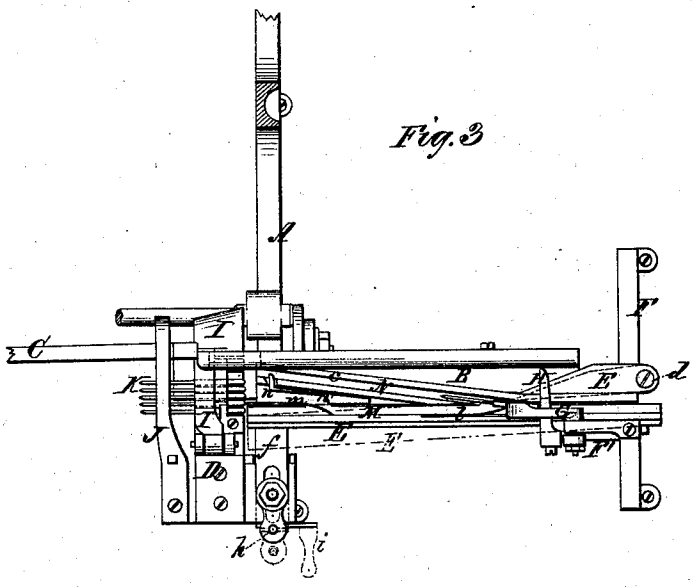


*Fig. 4*

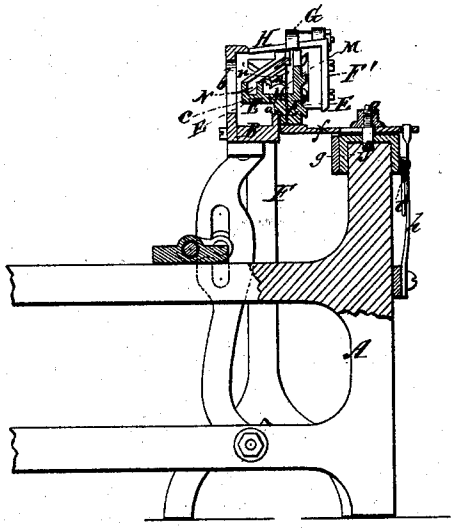
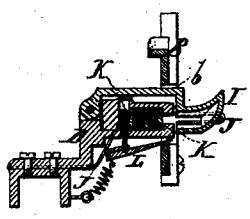


*Fig. 5*



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# UNITED STATES PATENT OFFICE

STEPHEN SANFORD, OF AMSTERDAM, NEW YORK.

## IMPROVEMENT IN LOOMS FOR WEAVING PILE FABRICS.

Specification forming part of Letters Patent No. **165,428**, dated July 13, 1875; application filed May 28, 1875.

*To all whom it may concern:*

Be it known that I, STEPHEN SANFORD, of Amsterdam, county of Montgomery, State of New York, have invented a new and useful Improvement in Wire Motions for Looms for Weaving Pile Fabrics; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 is a back view of one of the end portions of a loom, and a portion of a lay with shuttle-box, rigidly attached to and moving with it. This view shows how my wire-motion is combined with a rigid shuttle-box and lay. Fig. 2 is a front view of the same. Fig. 3 is a top view of the same, the parts being in the position they occupy when the wire is withdrawn from the cloth and the lay in the act of driving up the wire which has previously been inserted. The wire-supporting table is also shown by dotted lines in a position it is automatically adjusted to, when pressed back by a shuttle caught between the back of the wire-table and the shuttle-box. Fig. 4 is a cross-section in the line *x x* of Fig. 2, looking toward the end of the loom; and Fig. 5 is another cross-section looking in an opposite direction in the line *y y*, Fig. 1.

The object of my invention is to render practicable the use of a shuttle-box, which is rigid with the lay, in connection with a stationary wire-supporting table, provided with a suitable wire motion, which withdraws the wires from the cloth and inserts them into the open shed. Another object is to relieve the shuttle, and prevent it being broken, in the event of the shuttle being caught between the lay and the wire-supporting table; also, to afford facilities for adjusting the wire-table to a position which will permit the wires to be withdrawn by hand, when necessity requires. Another object of my invention is to effect the withdrawal and insertion of the wire on a practically stationary table, with simply a latch and pusher acting alternately upon the head of the wire, and a suitable device for carrying the point of the wire over to the point of insertion. Another object of my invention is to effect the proper direction of the wires into the open shed by a guide or guides between the cloth and a wire-supporting table, which has its outer end elevated, and is provided with a suitable wire motion, and is so constructed that it permits a shuttle-box, rigid with the lay, to be used in connection with it. Another object of my invention is to prevent the wires descending into the grooves of the table during the act of withdrawing and inserting the same, and thus avoid the necessity of lifting the point of the wire to a position for the carrier to properly take it across to the point of insertion.

To enable others skilled in the art to make and use my invention, I will proceed to describe it.

A is one of the sides of a loom; B, the shuttle-box, attached rigidly to a lay, C. D is the wire box attached fast to the loom-frame. E is the wire-supporting table of the wire-motion, connected by its outer end to a standard, F, and at its inner end to the loom. F′ is the reciprocating slide, which carries the withdrawing-latch G and pusher H. I is the first and J the second guide for the wires to the open shed. K are the wires and L a lifter for elevating the wire-heads for the latch to take them.

The supporting-table E is elevated on an incline from its inner to its outer end high enough to permit the shuttle-box, which moves rigidly with the lay, to pass under a portion of it, and thus allow the reed to drive up the wire which has been last inserted. Under this construction the relation of the groove of the table, in which the wire is inserted, to the shuttle-box is such that the shuttle-box stands in nearly the same vertical plane with the inner end of said groove, when the reed is in contact with or driving up the wire last inserted. In order to have the shuttle-box occupy this position a portion of its front flange is cut away, as at *a*, so as to admit the shuttle-box to pass under the laterally-extended portion *c* of the table, and a passage, *b*, is made through the rear flange or side of the said box, so that the guide I shall be passed without obstruction, as the shuttle-box is moved up with the lay. The said guide extends through the passage when the shuttle-box is forced up with the lay, and the reed is driving up the wire last inserted.

The wire-supporting table E is connected to its standard by a pivot, *d*, and to the loom-frame by a slotted slide, *f*, through which a screw or pin, *g*, passes. The slide is connected to a stiff spring, *h*, attached to the loom-frame. For moving the slide by hand when necessary a lever or cam, *i*, is placed behind the spring. By thus connecting the wire-table to its supports it has a chance to yield laterally when the shuttle becomes bound between the table and its box, and thus breakage is prevented. And by providing the lever or cam *i* the table can be adjusted laterally, as illustrated by dotted lines in Fig. 3, so as to permit the wires to be withdrawn by hand outside of the portion *c* of the table. This is often necessary, and my laterally-adjustable table for this purpose is a very important improvement.

Instead of having the table pivoted to its standard it may be made yielding, or have a lateral movement in many other ways without departing from the spirit of my invention.

The wire motion shown consists of a supporting-table with a single groove, M, and with an oblique switch-groove, N. The switch-groove is formed in the laterally-extended portion *c* of the table, and runs in a diagonal direction from the groove, which is in line with the point where the wire is withdrawn from the cloth to the point where the wire is to be inserted into the open shed. The groove M has a spring-switch, *l*, placed diagonally across it. This switch is higher than the sides of the groove N, so as to have a firm hold upon the side of the wire head and wire when said wire is being drawn back against it. The wire is, by means of the switch, forced laterally in line with the inserting-groove at the moment the head of the wire passes beyond the outer end of the intermediate oblique side of the groove N. While the wire is being forced laterally by the switch *l* its head rests on the bottom of the table, while its point clears the upper edge of the sides which form the oblique groove.

In the withdrawing-groove a spring-guard, *m*, is arranged, so as to cross this groove and support the wire, and in the inserting-groove a spring-guard, *n*, is arranged in the same manner and for a similar purpose. These guards prevent the points of the wires descending into the grooves, and thus render it unnecessary to lift the points of the wires to the proper position for being taken hold of by the device, (not shown,) which is used for carrying over the points of the wires to the proper place for insertion into the open shed. The guard *n* consists of a bevel-nose passed through the inner side wall of the groove N, this nose being on the end of a spring, *n'*, arranged as shown.

The guide I is hinged to the top of the wire box D, and is formed with its interior surface flaring, like a portion of a flattened cone; and the guide J is simply a bent bar with a hook-shaped ledge at one end. This latter guide is attached to the loom-frame, so as to be adjustable. The relation of the guides to one another is clearly shown in the drawings.

The reciprocating slide F', with its withdrawing-latch G and pusher H, is similar to others heretofore used, and need not be more particularly described.

The withdrawing-latch is moved up over and behind the head of a wire, and the latch takes hold of it, and carries the wire along the groove M until the head of the wire clears the partition between the grooves M and N, when the spring-switch *l* moves the wire head in line with the inserting-groove N, and a carrier (not shown) takes the point of the wire across to the proper point of insertion. The pusher now forces against the head of the wire, and drives the wire into the open shed. The wire in its passage to the open shed is controlled and directed by the guides I and J until it reaches its proper place in the open shed.

It should be understood that the wire-supporting table E is, practically, a stationary table, while the parts are operating properly, and therefore the pivot *d*, on which this table is allowed to swing horizontally, might be a rigid or fast connecting device, so far as the operation of withdrawing and inserting the wires is concerned, for the table is not intended to vibrate for the purpose of inserting the wires with the pusher H after they are withdrawn by the latch. I therefore provide a spring stiff enough to prevent the wire-supporting table yielding laterally and moving horizontally until danger of breaking the shuttle exists. The lateral yielding and horizontal movement of the table are for different purposes than usual, and the direction of movement of the table is the reverse of other vibrating wire-supporting troughs or tables. The wire heads may also be constructed so as not to require lifting in the wire-box, and therefore the lifter shown forms no part of my present claim, and my invention is not confined to its use.

What I claim is—

1. The stationary wire-supporting table, elevated at its outer end, and provided with a wire motion, in combination with a shuttle-box made rigid with the lay, substantially as and for the purpose described.

2. The yielding wire-table, for relieving the shuttle-box when the shuttle is caught between the table and the box, substantially as and for the purpose described.

3. The adjusting cam or lever *i*, in combination with the yielding wire-supporting table, substantially as and for the purpose described.

4. The combination of a withdrawing-latch and an inserting-pusher, and a stationary wire-supporting table, having a groove in line with the point of withdrawal, and a groove leading to the point of insertion, and a spring-switch so arranged as to bear upon the wire head, and place the wire in position for insertion in the shed, as and for the purpose described.

5. The combination of the wire guide or guides I and J with a stationary wire-supporting table, which is elevated at its outer end, and is provided with a wire motion, and constructed to permit a shuttle-box, which is rigid with the lay to be used, substantially as and for the purpose described.

6. The spring-guards *m* and *n*, in combination with the stationary grooved wire-supporting table, substantially as and for the purpose described.

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