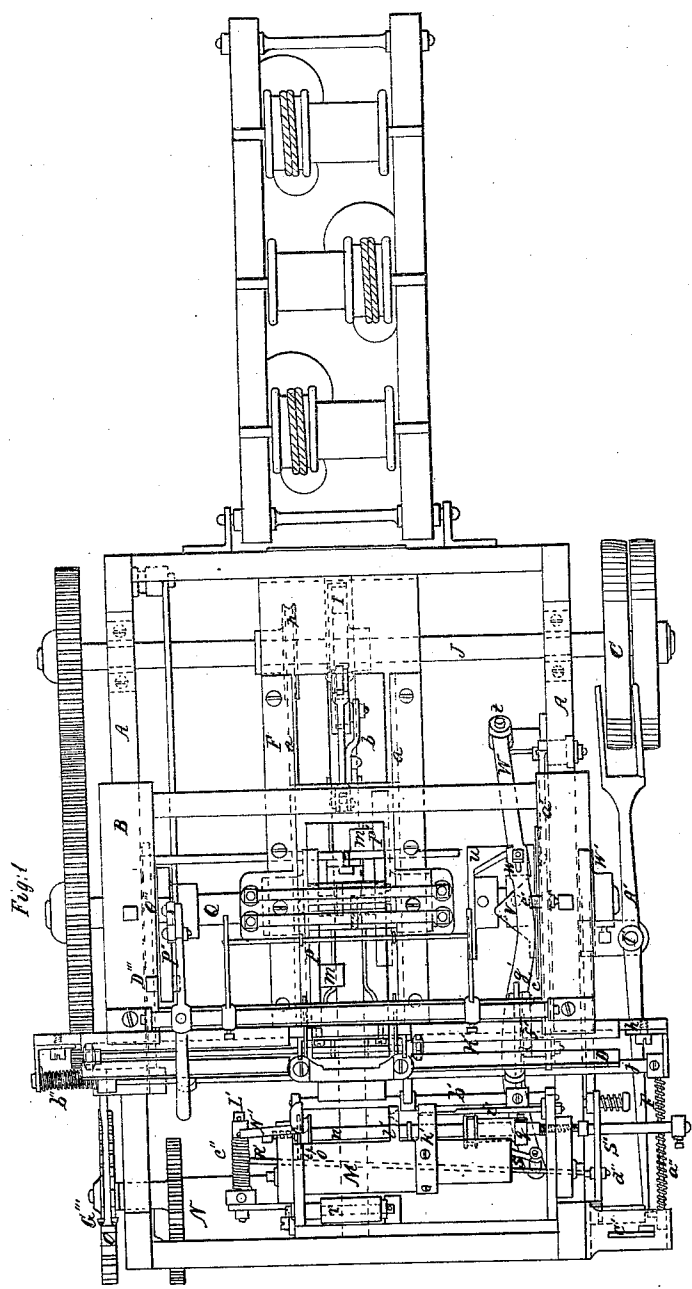


J. H. Murrill.  
Weaving Pile Fabric.

No 10,090.

Patented Oct. 4, 1863.

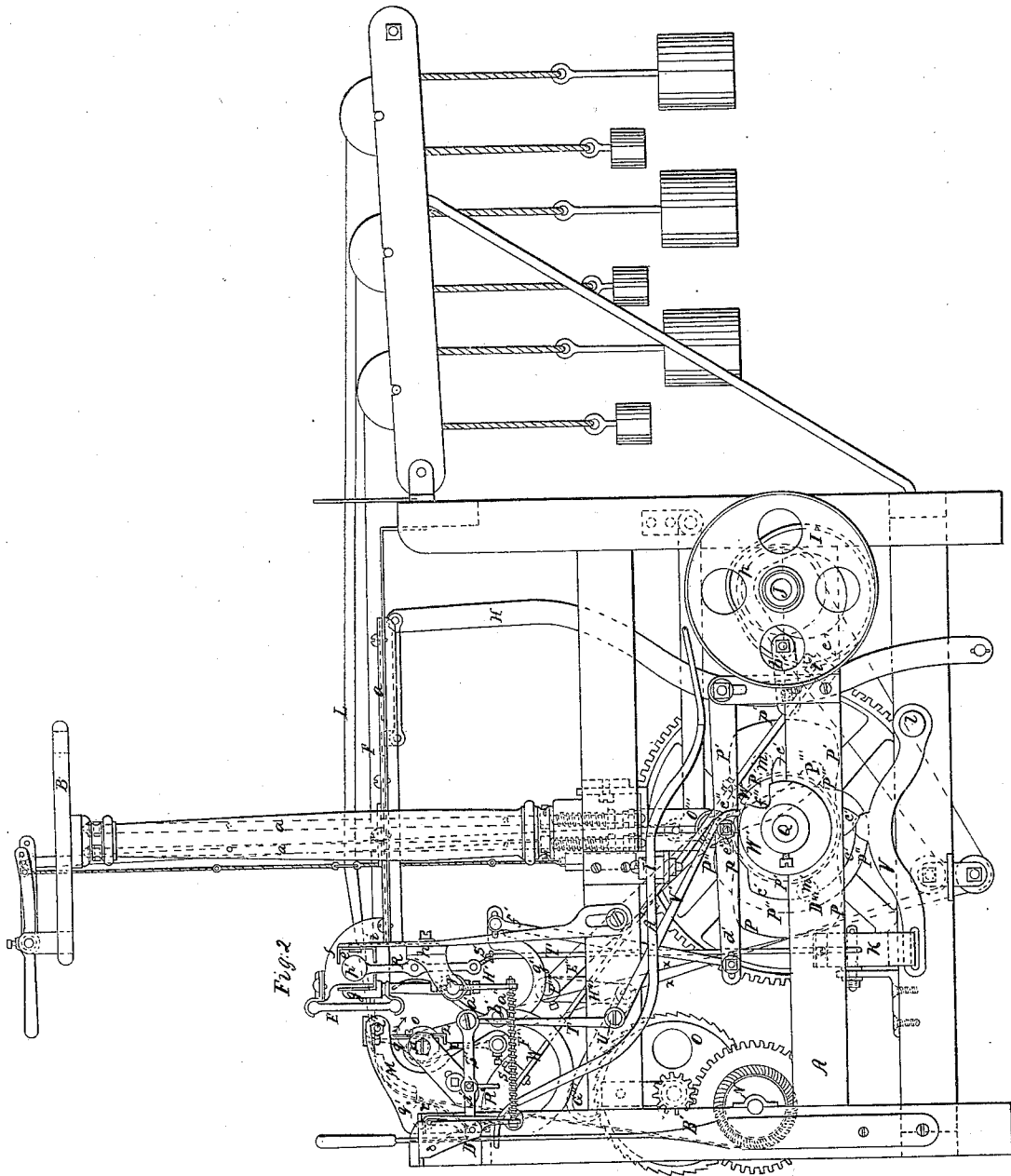


Sheet 2, 3 Sheets.

*J. H. Merrill*  
*Weaving Pile Fabric.*

No. 10,090.

Patented Oct. 4, 1853.

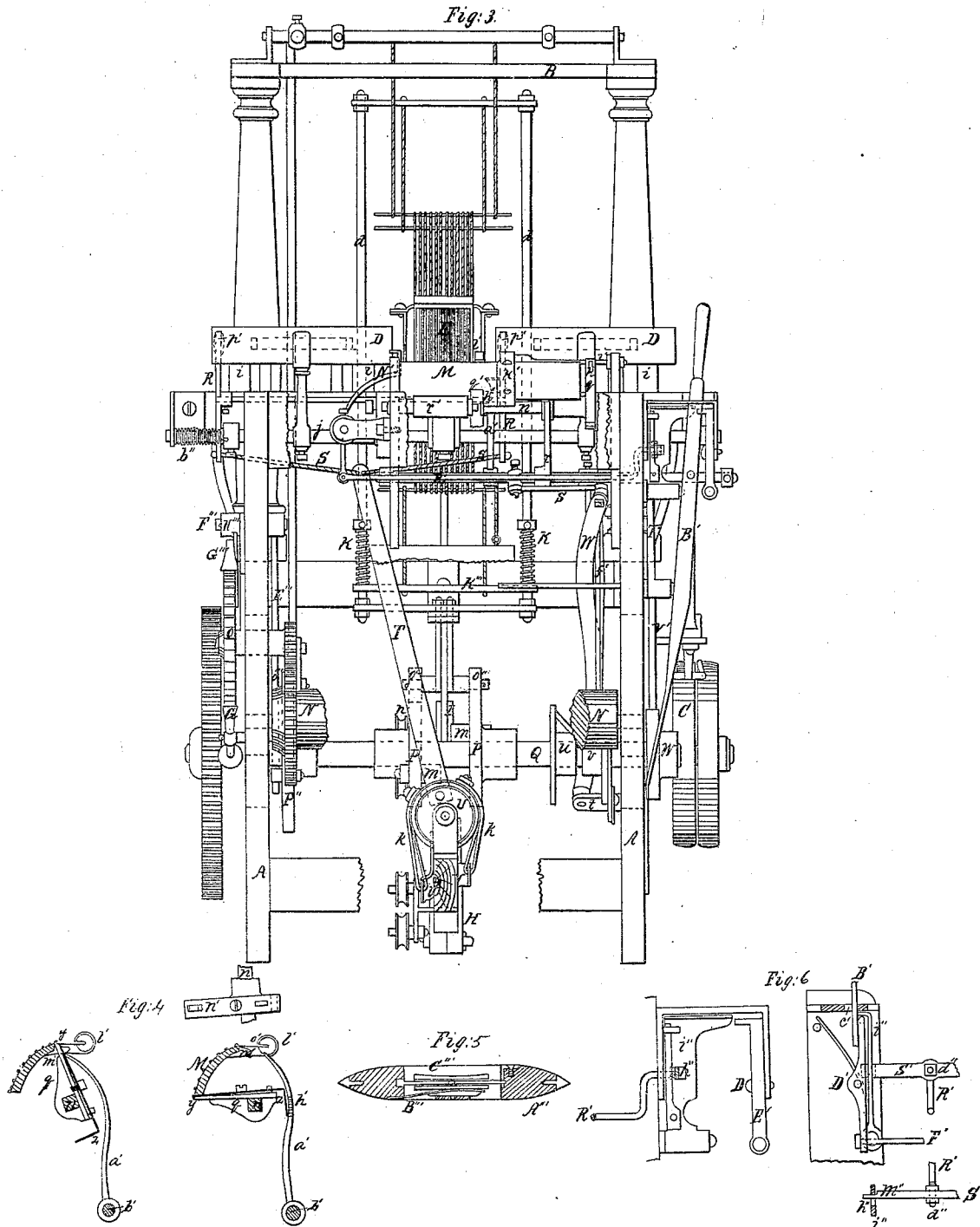


*J. H. Merrill*

### Weaving Pile Fabric.

№ 10,096.

*Patented Oct. 4, 1853.*



# UNITED STATES PATENT OFFICE.

JAS. H. MURRILL, OF RICHMOND, VIRGINIA.

## LOOM FOR WEAVING COACH-LACE.

Specification of Letters Patent No. 10,096, dated October 4, 1853.

*To all whom it may concern:*

Be it known that I, JAMES H. MURRILL, of Richmond, in the county of Henrico and State of Virginia, have invented a new and useful Improvement in Looms for Weaving Coach-Lace and other Piled Fabrics; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, forming part of the specification, in which—

Figure 1 is a plan of the loom. Fig. 2 is a side elevation of the same. Fig. 3 is an end elevation. Fig. 4 shows the construction of the pliers and the action of the finger *a'* upon them. Fig. 5 is a longitudinal section of the shuttle through the spring *B'''*. Fig. 6 shows the levers *E'* and *i''* and the manner in which they act upon the spring *B'* for throwing the machine out of gear.

Similar letters refer to the same part of the loom.

My invention refers to improvements in the manufacture of coach lace and other piled fabrics, the figured pile of which it is well known is formed upon needles passed under the figured warp selected by the jacquard, while the weft driven home by a reed completes the process as in ordinary weaving.

The machinery by which these needles are removed from the finished portion of the fabric and inserted at the proper time in front of the reed forms the principal feature of my invention, which consists in passing the warp over a cylindrical stand, while slightly exterior to its axis is a horizontal shaft upon which is a pair of pliers so operated by means of cams and whirls, as to have a revolving motion with the axis, together with a motion of translation in the direction of the axis; also, in connection with the pliers is a finger operated by suitable cams; which closes and opens the jaws of the pliers at the proper moment, the effect of this combination being to seize the exterior needle in the finished portion of the fabric, withdraw it from the lace, carry it up and backward under the figured warp, and release it as the reed advances to drive home the weft; when the pliers immediately revolve back, and seize another needle which is withdrawn, carried backward, inserted and released in the same manner as the preceding. This portion of the loom is furnished with a needle guard by which the

ordinary ungearing apparatus is operated, so that should a needle miss, the loom immediately stops.

Another improvement connected with this portion of the loom is constructing the shuttle box stationary, with the pickers working through a slot in the bottom of the box, the front of the box being fastened to and movable with the projecting rod, so as to throw the machine out of gear should the shuttle miss.

A further improvement consists in so stretching the heddles that the strain upon the eyes shall be relieved by springs against which the stretching bar rests.

The ordinary features of this loom will be readily understood from the drawings by persons acquainted with the art of weaving piled fabrics, and will require but little description; the improved portion I will describe sufficiently minute to enable my invention to be understood by all conversant with the art of weaving.

In the drawings A is the frame of the loom, B the jacquard frame, C the driving wheel, D the shuttle box, and E the reed, which is secured to the horizontal frame *F'* and has a reciprocating motion in the guides *a* by reason of the arm *b* of the bent lever H which has on its extremity a roller running in the groove *c* of the cam I upon the shaft J; this groove *c* being so constructed as to throw the reed forward at the proper time and withdraw it after the weft has been driven home by the reed. The thread L of the warp is carried forward in the usual manner through the reed E, when it is drawn over the cylindrical stand M and tightened upon the shaft N, by means of the ratchet wheel O and dog G.

The arrangement by which the colored threads are operated for making the figures will not require particular notice, as my improvements do not refer to that portion of the machine except as regards springs K on the rods *d*. With this exception my invention does not concern the harness but refers principally to the machinery which operates upon the warp after it has come forward of the shuttle box D, which is stationary and constructed of two parts *e* and *g*; the rear *e* having the cover *f* to prevent the shuttle from flying out, is securely fastened to the bar *h* by the arms *i*, and the front portion *g* is supported by and movable about the protecting rod *j* for throwing the machine

out of gear when the shuttle makes a mis-throw, as will hereafter be more fully explained. In the bottom of the box D is thus formed the slot K', in which the pick rods R move alternately from side to side of the shuttle box by means of the cords S connecting them with the pickstick T which is secured to the pulley U, and has an oscillatory motion, because of the treadles V which have their fulcra at l and are operated by the projecting arms m of the cams P and P' on the shaft Q, so as to be alternately elevated and depressed giving the pulley U an alternate partial revolution by reason of the band k passed over the pulley and attached to the extremities of the treadles V.

The usual method of forming the figured pile upon the lace by means of needles which are removed from the finished portion of the work and inserted under the colored warp is not departed from in my machine, and it is in the manner of removing, carrying up, and inserting these needles, that the principal feature of my invention consists. The construction of this portion of the loom is as follows—

Slightly exterior to the axis of the cylindrical stand M is the spindle n which is driven by a band x passed over the whirl o and pulley p on the shaft J, and upon this spindle n are the pliers q formed of two parts one capable of sliding upon the other and constructed in other respects as seen in Fig. (4); these pliers besides the rotary motion they possess by being on the spindle n, have also a motion of translation along the spindle n by reason of the arm r, connecting rod s and lever w; this lever has its fulcrum at t and is caused to have an oscillatory motion by the cams u and v on the shaft Q striking alternately the projecting pin w under the lever W. In connection with this portion of the machine is the finger a' upon the rock shaft b', operated by the cam c', through the lever d', projecting pin e', connecting rod f', and arm g' of the rock shaft b'.

The operation of the pliers q and the machinery connected with them is as follows: The warp being stretched and carried over the stand M in the same manner as over the usual breast beam of looms, a sufficient number of needles are inserted by hand to cover the surface of the stand M; the pliers will then commence operating, revolving back in the direction of the arrow. By the action of the whirl o the extremity of the lowest needle enters the groove y (see Fig. 4) in the lower lip of the pliers, at which moment the rock shaft b', operated as above described, moves forward, the finger a' causing the projection h' of the finger a' to press against the rear extremity of the upper lip Z of the pliers q and push the

lip Z over the needle in the groove y, causing it to be held tightly by the pliers; then the cam u commences acting upon the lever W, causing the pliers to move along the spindle n until the extremity of the stand M is reached, the band x slipping on the wheel O during this operation. This motion of translation draws the needle from the fabric in the direction of the stand. As soon as the pliers are free from the bottom of the stand M the side motion ceases and they revolve up until they strike against the guide i', the needle held in their lips describing a cylindrical surface, its point passing under the guard k'. When the pliers strike the guide i' the band x slips and the cam v, commencing its action upon the lever W, causes the pliers to travel along the spindle n in the opposite direction from the previous translation, the needle entering the trumpet l' and passing under the colored warp. At this moment the finger a' advances by the action above described, pressing upon the back of the pliers and driving them upon the wedge m' (see Fig. 4), which entering the slot n' of the pliers causes the spring z to slip back and release the needle just as the reed advances to drive home the weft. The needle passing through the slot o' in the side of the trumpet l' is driven up with the weft with the figured pile formed upon it. The finger a' then falls back, suffering the whirl o to act and carry the pliers around to the lowest needle, which is seized, withdrawn, carried up, inserted, released, and driven home in the manner above described. The ends of the needles all pass under the shield k' as they slide over the stand M, and near the point of withdrawal they pass between the spring g' and the stand, which keeps them from slipping at the time the pliers strike against them, thus allowing but a single needle to be drawn at each revolution of the pliers. This is seen fully in Fig. 2. In front of the stand M is the roller r', its axis being movable to adjust it to different thicknesses of work.

The ungearing apparatus consists of the usual lever A' movable upon the fulcrum I' by the spring B' working in the slot C', the belt being thrown off when the spring B' occupies the position of the slot nearest the frame. To the right of the spring B' and movable about the fulcrum D' is the lever E' (see Fig. 6), the lower extremity of which is connected by a rod F' with the arm H' of the protecting rod j, which acts as a rock shaft between this arm and the stud G supporting the front of the shuttle box D, so that when the front of the box is drawn forward, as is the case when the shuttle misses, the arm H' is thrown back, drawing with it the lower arm of the lever E', and causing its upper arm to press

against the spring B', (see Fig. 6,) and throw it into the slot C', where its own force carries it to the portion of the slot nearest the frame, operating the lever A' so as to throw the band from the driving wheel and stop the loom. The spiral spring a'', together with the spring b'' on the protecting rod, cause the front of the shuttle box to resume its vertical position when the obstruction causing the derangement is removed.

Besides the guard above described for operating the ungearing apparatus on the missing of the shuttle, there is also a guard against any derangement in the machinery operating the needles. The following is its arrangement: On the left of the stand M (Fig. 2) is the shaft L' wound with the spring c'' and having on its extremity the lever N' connected with the spring c'', which is so adjusted that the pressure of a needle against the upper arm of the lever N' will be sufficient to keep that portion of the lever N' in a vertical position. The lower arm of the lever N' is connected with the rod R', Fig. 3, which passes under the stand M and is attached to the bar S' at d'' (see Fig. 6) so as to draw the bar S' toward the frame A when the upper arm of the lever N' inclines toward the stand M, as will be the case when there is no needle to press against it and counteract the spring c''. The bar S' is attached at one extremity to the arm T' of the rock shaft U', the other arm V' of the rock shaft having a projection e'' which runs over the perimeter of the notched wheel W' upon the shaft Q. The operation of this guard is as follows: The notched wheel W' is so arranged that the projection e'' of the arm V' of the rock shaft U' will fall into the notch f'' at the moment the needle passed through the trumpet l' should strike the upper arm of the lever N' and keep it in a vertical position; as the projection e'' rises out of the notch f'' the arm T' of the rock shaft U' will push the bar S' forward through the slot h'' in the lever i'' and the loom continue working. But should there be no needle passed through the trumpet l' owing to some derangement of the pliers g, the upper arm of the lever N' will fall toward the stand M causing the bar S' as before stated to be drawn toward the frame A and the shoulder m'' of the bar S' to press against the lever i'' (see Fig. 6), so that, when the projection e'' rises out of the notch f'' the arm T' will not push the bar S' through the slot h'', but will press it against the face of the lever i'' causing it to throw the spring B' into the slot C', operating the ungearing lever A' and stopping the loom.

The springs K on the rods d' prevent the strain and consequent wear on the eyes of

the harness caused by opening the shed for the shuttle to pass, this will be readily seen in the drawings where the harness is secured to the cross beams K''' (see Fig. 3), which press against the spiral springs K wound on the rods d' causing the springs K to give way to the tension of the harness.

The action of the several parts of my loom having been described in detail it is but necessary to state that the different parts are so constructed and adjusted that the movement of each shall be at the precise instant to perform its part of the operation in the best manner. The jacquard, and cams moving the harness performing their functions, while the pliers provide a supply of needles on which the pile is formed as described, and the shuttle operated by the picks throws the weft across the warp, when it is driven home by the reed and the lay completed.

What I claim as my invention and desire to secure by Letters Patent, is—

1. The revolving pliers g constructed as described and operated by the spindle n, whirl o, connecting rod S, lever W and cams u and v, in combination with the finger a' constructed and operated as specified, wedge m' and cylindrical stand M, by which combination the needles, upon which the pile is formed are seized, removed from the finished portion of the fabric, carried up, inserted under the colored warp selected by the jacquard for the figure, and released substantially as specified.

2. The construction of the stationary shuttle box D as described, having its front sustained by and movable about the protecting rod j so as to operate the ungearing apparatus upon a misthrow of the shuttle, in the manner specified.

3. The combination of the sliding reed E with the stationary shuttle box D when constructed and operating substantially as specified.

4. The combination of the notched wheel W', rock shaft U', and arms T' and V', with the lever N', spring C'', shaft L', rod R', and bar S', arranged substantially as described for operating the ungearing apparatus in the manner specified when a derangement occurs in the machinery operating the needles.

5. The springs K arranged upon in combination with the rods d' by means of which the strain upon the eyes of the harness is diminished substantially as specified.

In testimony whereof, I have hereunto signed my name before two subscribing witnesses.

JAMES H. MURRILL.

Witnesses:

WM. P. ELLIOT,  
AUG. HOWLE.