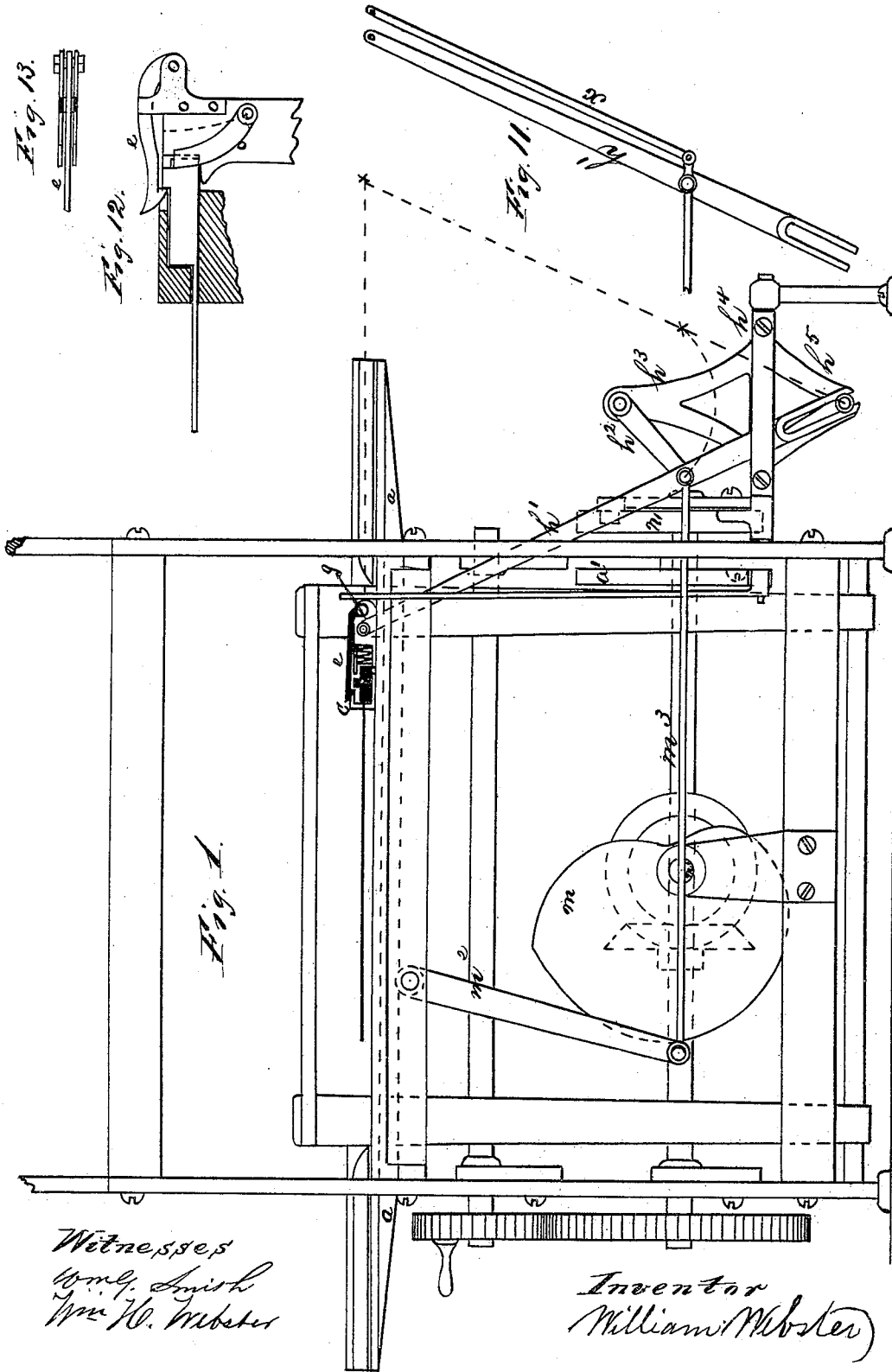


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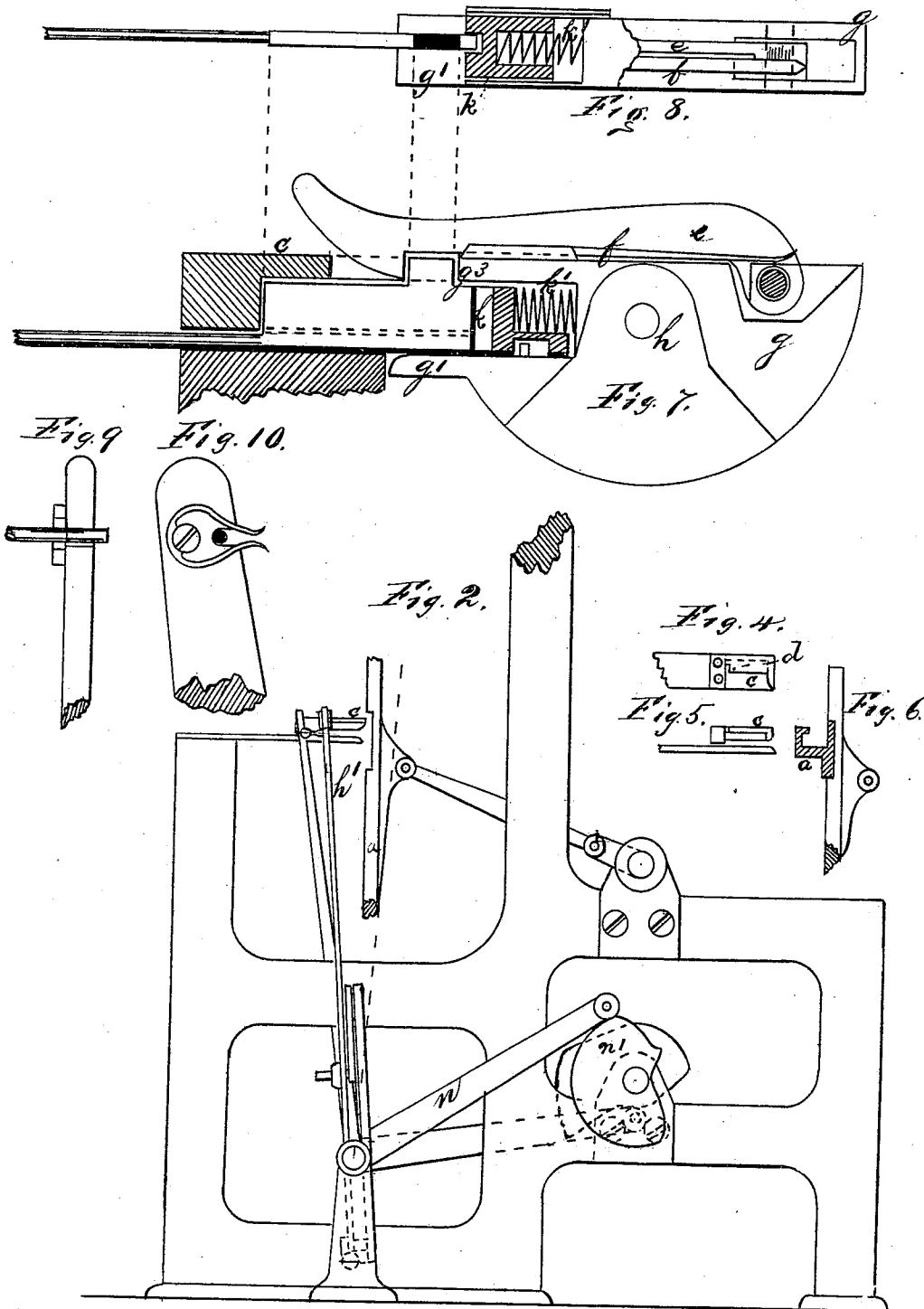


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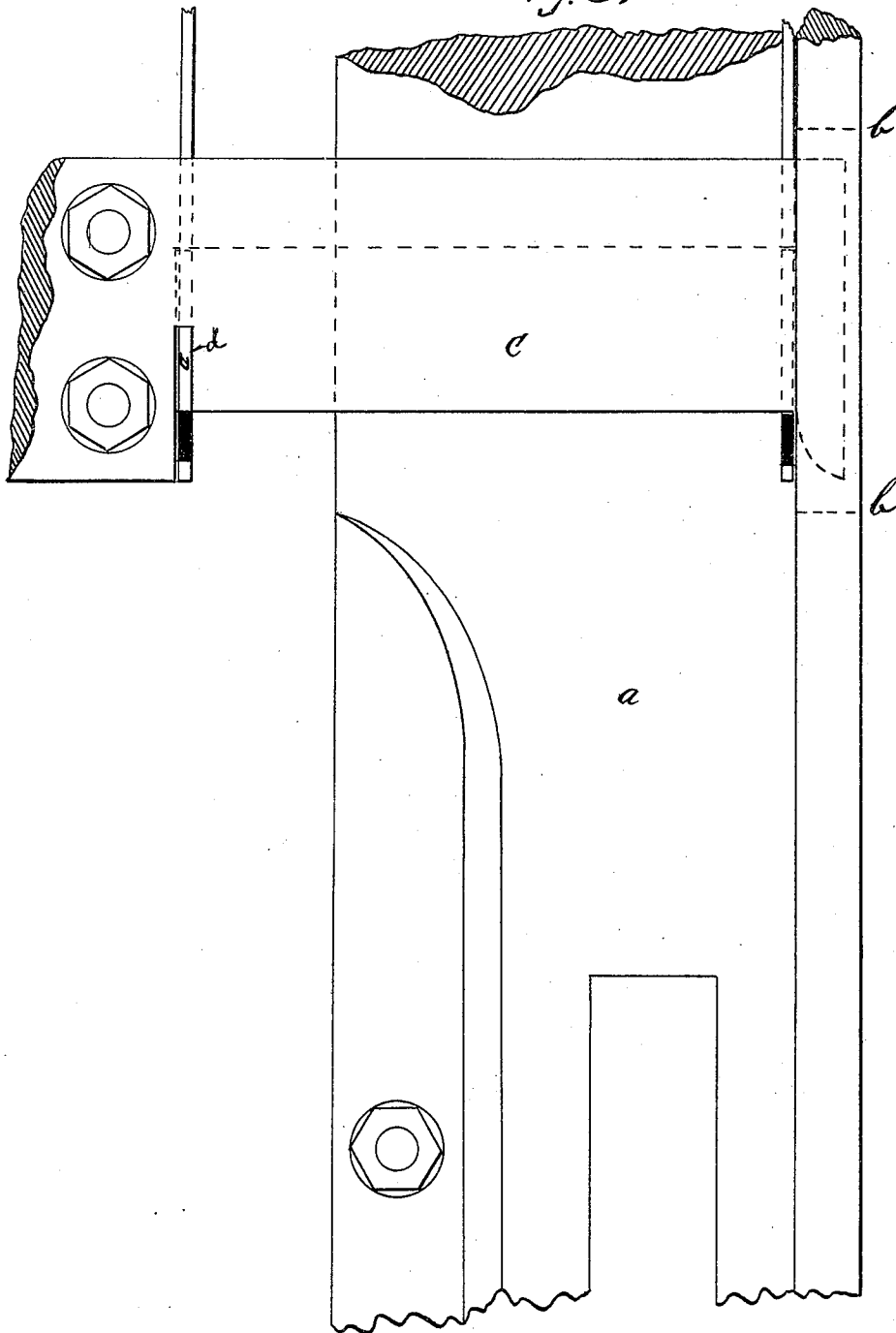
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Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM WEBSTER, OF MORRISANIA, NEW YORK, ASSIGNOR TO WEBSTER LOOM COMPANY.

IMPROVEMENT IN WIRE-MOTIONS FOR LOOMS.

Specification forming part of Letters Patent No. **174,714**, dated March 14, 1876; application filed November 5, 1875.

To all whom it may concern:

Be it known that I, WILLIAM WEBSTER, of Morrisania, county and State of New York, have invented certain new and useful Improvements in Wire-Motions for Looms; and that the following, taken in connection with the drawings, is a full, clear, and exact description thereof.

In the drawings, Figure 1 is a front elevation of parts of a loom with my improvements applied thereto, the wire-box, &c., being in section; and Fig. 2 is an end elevation of the same on the wire-box side. The other figures are of details, some of them being on a large scale, and they will be described hereafter.

Prior to the date of my invention, numerous wire-motions for looms have been devised and put in practice; and I desire especially to call attention to an early wire-motion of Bigelow's, patented May 5, 1857, and to those patented by myself in May and August, 1868, and in August, 1872. In the last of these there is described a latch which takes charge of a wire from the commencement of the withdrawal to the completion of the insertion thereof, which latch is operated by a stationary resisting-surface, being the latch herein described; and in Bigelow's patent there is described means of supporting the wire in its transfer from the point of withdrawal to the point of insertion, which somewhat resembles that herein described, while in my patent of 1868 there are described spring-holders resembling the one used in my present wire-motion.

I have invented one new element; but my invention consists, chiefly, in an adaptation of or new combinations of old devices.

In my present wire-motion there are used a wire-box, open toward the lay, a stationary surface thereon to operate the latch, a latch, and a lay, so shaped as to clear the wire-box, all as in my former wire motion, patented in 1872; but in this loom I dispense with the wire-trough, and use a beak-support for that end of the wire which is nearest the box while being transported, and in this loom, like my

patented one of 1872, the construction and arrangement of parts are such that I can use a shuttle-box rigidly attached to the lay on the wire-box side of the loom.

In the drawings the lay of the loom is represented at *a a*, actuated, by preference, by cranks and connecting-rods, (see Figs. 1, 2, 3, and 6;) but it may be driven in any known way, and it is depressed so as to work under the bottom of the wire box, and has the rear side of the shuttle-box slotted out at *b b*, so as to clear the rear end of the wire-box. This construction is represented in Fig. 3, which is a top view, on a large scale, of the wire-box, and a part of the lay, with the shuttle-box, and slot for the picker-staff. In lieu of this construction, I sometimes intend to use the bent-back lay of Bigelow, or other known forms of lay which will clear the wire-box. The wire-box is represented at *c*, (see Figs. 1, 2, 3, 4, and 5;) it occupies the usual place, has a bottom on which the wire heads rest, a top to cover them, and is opened at the rear end, or that nearest the lay, so that wires may be entered into the shed diagonally or parallel to the fell of the cloth through the box, or may be inserted partially into the shed, and then moved sidewise into the box. Its top is shaped so as to lift the latch when the latch's nose is shoved against it, and it has a slot in the top at *d*, into which the hook of the latch can drop, so as to seize that wire which is to be withdrawn.

This wire-box is substantially like that described in my patent dated 27th August, 1872, No. 130,961. The latch which withdraws the wires and takes charge of them until they are inserted is represented at *e*, (see Figs. 1, 7, 8, and 9,) Fig. 7 showing the latch and its spring *f*, inside elevation, on a large scale, with the wire-box and spring-holder in section, and Fig. 8 being partly a top view of and partly a horizontal section through the same parts. This latch is pivoted upon a head-block, *g*, (see Figs. 1, 7, and 8,) attached to the upper end of a long vibrating arm, *h*, and the latch is forced downward by spring, *f*, which bears

upon the latch or a projection therefrom, one end of the spring being secured to the head-block.

Now, the wire head cannot be held during its transportation from the front end of the wire-box to the open shed by the latch alone, or even by a latch aided by a shelf below it, and moving with it, as shown at g^1 , (see Figs. 7 and 8,) said shelf being part of the head-block. I have, therefore, employed a spring-holder, k , to perform this duty. (See, specially, Figs. 7 and 8.) This spring-holder is a block of metal with a vertical slot in one end of it just large enough to receive freely the end of a wire head. It slides in a recess in the head-block, and is pushed outward by a coiled spring, k' .

The operation of these parts is as follows: When the hook of the latch is moving toward the breast-beam, or forward, it is held up by the wire-box, and the spring-holder lies far back in its recess, being held there against the force of the spring by the ends of the boxed wire heads, over which it slides or passes. When the latch comes over the slot in the top of the wire-box its hook is forced down by its spring and takes hold of a shoulder or nick in that wire head which is nearest the breast-beam. (See Fig. 7.) The latch and head-block next move away from the wire-box to withdraw the wire; but the spring-holder for a time stands still, as its spring holds its outer end against the wire heads which are in the box. The latch, therefore, pulls the wire head which it has hold of into the slot in the spring-holder, and then the latter moves with the hook and head-block. The wire, being now in charge of the hook, and supported sideways by the spring-holder, is drawn out and transported rearward to the point of insertion. The head-block, hook, and spring-holder next move toward the wire-box to insert the wire, the wire being shoved in that direction by the spring-holder in its motion with the head-block until this spring-holder brings up against the heads of those wires which are boxed. The spring-holder is then shoved into its recess by the motion of the head-block forcing the holder against the boxed wire heads, the wire being shoved home by the top of the recess at g^1 , (see Fig. 7, which shows the parts in the position of withdrawing a wire,) and the latch being lifted by its nose striking against the top of the wire-box. After the latch is lifted the wire is disengaged both from the latch and the spring-holder, and these two, with the head-block, move toward the breast-beam, the latch being held up by the wire-box, and the spring-holder being held into its recess by the heads of the boxed wires over which it slides.

All these motions are derived from the motions of the head-block, and the latter must, therefore, move from the point of withdrawal

of a wire outward far enough to pull a wire out; then rearward far enough to transport the wire to the place of insertion in the open shed; then inward far enough to shove the wire home into the shed and box, and, lastly, forward to the point of withdrawal. Further, the out-and-in motions must be suspended while the head-block moves forward along the boxed wire heads. When the lay has a shuttle-box rigidly attached, the motion forward must be in such time, in reference to the forward movement of the lay, that the latter shall not strike the head-block.

In order to impart the requisite motions to the head-block, I have used mechanism very like that of Bigelow. The long arm h^1 is pivoted to a radius-bar, h^2 . This latter is mounted on a pin on an arm, h^3 , attached to a rock-shaft, h^4 . Another arm, h^5 , depends from this shaft, and carries a headed pin, which is embraced by a slot in the lower end of the long arm h^1 . In consequence of this construction, (see Fig. 1,) the long arm and head-block can move out and in from the position shown in Fig. 1 to that indicated by a dotted line, and can be moved from front to rear from the position shown in Fig. 2 to that indicated by a dotted line, by the rocking of the shaft h^4 .

The out-and-in motions are derived from a cam, m , mounted on a counter-shaft, m^1 , which is driven by proper gearing, as indicated in Fig. 1. This cam acts upon a bowl or friction-roller secured upon a hanging lever, m^2 , which is pivoted at its upper end to the loom-frame. The lower end of the lever m^2 is, by means of a connecting-rod, m^3 , connected to the long arm h^1 ; consequently, as the cam revolves, the connecting-rod, (whose bowl is forced against the cam by a spring,) the long arm, and the head-block move out and in, and the head-block moves horizontally, or nearly so, in consequence of the manner in which it is supported.

The rear and forward motions of the head-block to transport the wire are produced by the rocking of the rock-shaft, as follows: To this shaft is secured an arm, n , with a friction-roller on its end, which rests upon a cam, n' , on the ordinary cam-shaft. The roller is held in contact with the cam by a spring, (not shown on the drawings,) and as the cam revolves the rock-shaft, and consequently the head-block, at times stands still, and at others rocks, the head-block being thus moved forward and rearward. The cams shown in the drawings will give the proper motions at the proper times for a wire inserted at every other beat of the lay.

An intelligent loom-builder can easily modify cams and gearing for other number of beats to each insertion of a wire; but care must be taken in all cases that the head-block comes up to insert a wire while the lay is out of the way, and that it shall move forward to the

place of withdrawal of a wire in advance of the movement of the lay to beat up when a rigidly-attached shuttle-box is used, so that the latter shall not strike the head-block. I prefer to cause the head-block to pause an instant in its forward and rearward motion while the wire is being boxed, and to that end I make the rock-shaft cam of the shape shown in Fig. 2.

It is hardly necessary to direct the constructor to make the joints of the connecting-rod with considerable play, as such is a common device in looms; but they must have such play in order to compensate for the motion of the rock-shaft.

I have thus particularly described the mechanism for moving the head-block, but intend at times, when more convenient, to substitute therefor other known mechanical devices, which will impart the requisite motion thereto.

The wire in charge of the hook and spring-holder is held firmly at the head end, but would not by these means alone be carried with its point in proper position.

Bigelow used a fork which had an up-and-down and a forward-and-backward motion to control that part of the wire nearest the wire-box, when the wire was partially or wholly withdrawn. I could use, and at times intend to use, his fork in connection with my latch and spring-holder, but prefer to use a beak-controller invented by myself, which is so constructed that it will operate properly when having motions in two directions only—viz., forward and rearward—whereas the fork of Bigelow must have not only these motions, but, in addition, motions upward and downward.

This beak is shown on a large scale in Figs. 9 and 10. It is composed of two springs, nearly meeting at their free ends, and fastened on a staff at their other ends, the whole thing forming a pair of spring-jaws, and being, by preference, made of one piece of metal, and the free extremities being curved, so as to guide a wire into the space between the springs.

When the beak in its movement rearward reaches a partially-withdrawn wire, the springs strike the top and bottom thereof, and open, permitting the wire to pass between the springs where they approach nearest. The wire is then contained between the springs, is supported thereby, and moved when the beak moves.

When the wire is nearly boxed, the beak advances or moves away from the lay toward the breast-beam, and the springs open the wire held by the other wires in the box and by the spring-holder, escaping out of the beak by the opening of its springs. One spring in combination with a stiff rod will answer, or two jaws forced together by springs, or one jaw and a rod.

When a beak like that shown in the drawings is used I prefer to slot the staff horizon-

tally, or nearly so, in order that the wire shall be guided by the springs into the slots, as shown in Figs. 9 and 10; but this is a mere refinement to hold the wire more steadily, and it can be held just as steadily by properly shaping the springs or jaws.

This beak moves forward and backward only, and its first position is so near the breast-beam (see Fig. 2) that while going toward the lay it can grasp a partially-withdrawn wire; then it stands still till the wire is wholly withdrawn; then moves toward the lay so far as to carry the point of the wire to the place of insertion thereof into the shed; then pauses until the wire is partly inserted; then moves in the reverse direction, slipping off the wire which is being boxed, and proceeding to its first position, ready to grasp another wire. Its motions must be so timed that it will grasp a wire when partially withdrawn, and let go of it when partially inserted, and when it transports the wire toward the lay it should move nearly or exactly in coincidence with the rearward motion of the head-block. The staff of this beak is free to rock at its lower end upon a shaft or pin, and is provided with an attached arm, which is actuated by a cam and spring, the latter not shown in the drawings. As the cam revolves, the staff and beak will move toward and away from the lay, and at times stand at rest—viz., during part of the withdrawing and part of the inserting motion—and the movement being so timed that neither the head-block nor the shuttle-box or lay shall strike the beak. The cam which actuates the beak is represented in the drawings as so shaped that the beak will work properly in a loom where a wire is inserted at every alternate beat. The intelligent constructor can easily modify it, so as to be used in looms where more beats intervene between the wire insertions.

I wish it understood that the beak itself, acting as described, is of my invention, irrespective of any special means for giving it proper motions, and that I intend to use other known mechanical means for moving and supporting it than those described, and also to use it in combination with other means than those described for supporting and controlling the wire head.

As the head-block might possibly tumble over on its staff, I intend at times, as a measure of precaution, to extend the connecting rod beyond the long arm h^1 , and pivot upon the extension another arm, x , the upper end of which is to be attached by a pivot to the head-block. Such a construction will hold the head-block horizontal, even when no wire head is contained in it.

I also intend to use at times the head-block and its appurtenances as shown by Figs. 12 and 13, which represent a side and top view of the same, as a modification of the head-

block and appurtenances as shown by Figs. 7 and 8.

I claim as of my own invention—

1. In a loom for weaving pile fabrics, the combination, with a lever and a beak, having spring-jaws for seizing the end of the pile-wires, of mechanism, substantially as described, for imparting to such lever a vibratory motion, as and for the purpose set forth.

2. In combination with the spring-beak and operating mechanism herein described, a head-block provided with mechanism for inserting and withdrawing the pile-wires, as and for the purpose set forth.

3. In combination with the head-block, the spring-beak herein described, and the spring-holder, the mechanism, substantially as described, for withdrawing the pile-wire from the wire-box, as set forth.

4. The combination of the spring-beak, the

head-block, the spring-holder, and the latch, constructed as and for the purposes set forth.

5. In combination, the spring-holder, the latch, the wire-box, the long vibrating arm, (for carrying said holder and latch,) and mechanism for supporting the point of the wire, as shown and described.

6. In combination with the head-block, the spring-holder, the mechanism for withdrawing the wires, the long vibrating arm for carrying the head-block, and the mechanism herein described for supporting the point of the wire, as and for the purpose set forth.

Witness my hand this 27th day of October, A. D. 1875.

WILLIAM WEBSTER.

Witnesses:

WM. G. SMITH,

WM. H. WEBSTER.