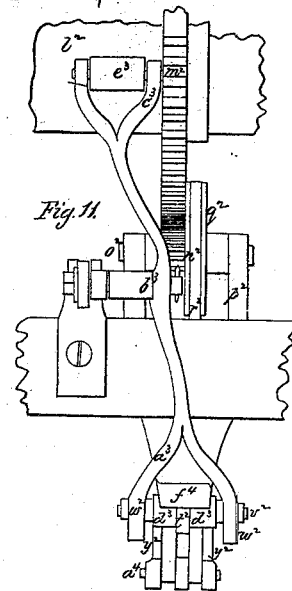
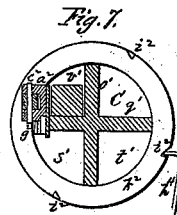
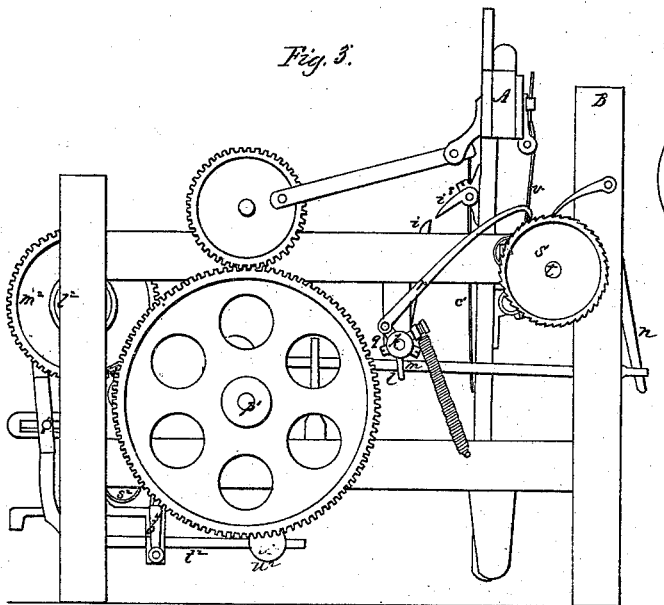
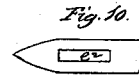
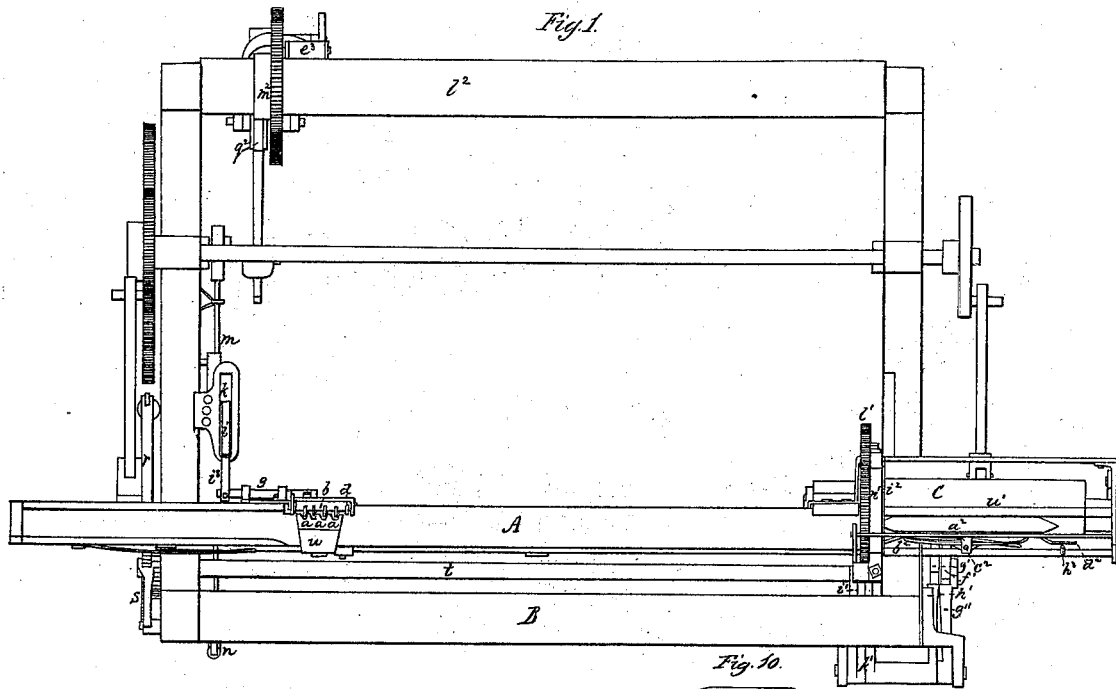


J. Nield.
Weaver's Loom.

(20 Sheets) Sheet 1

N^o 3,954.

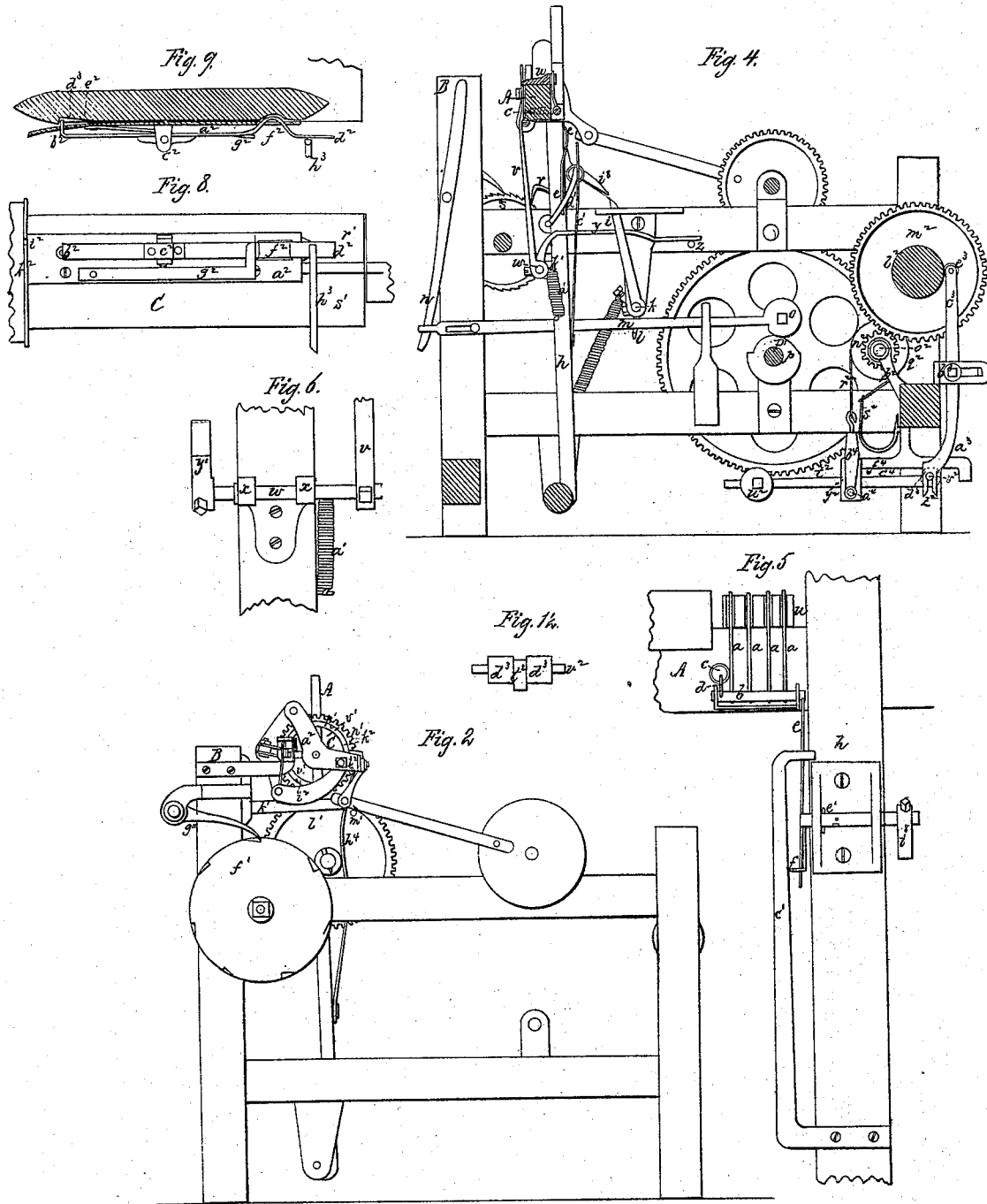
Patented Mar. 15, 1845.



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Weaver's Loom.

N^o 3,954.

Patented Mar. 15, 1845.



UNITED STATES PATENT OFFICE.

JAMES NIELD, OF TAUNTON, MASSACHUSETTS.

POWER-LOOM.

Specification of Letters Patent No. 3,954, dated March 15, 1845.

To all whom it may concern:

Be it known that I, JAMES NIELD, of Taunton, in the State of Massachusetts, have invented a new and useful Improvement in

5 Looms for Weaving, and that the following description and accompanying drawings taken together constitute a full and exact specification of my invention.

Figure 1, exhibits a top view of a loom 10 having my improvements. Fig. 2, is an elevation of the right hand end thereof. Fig. 3, is an elevation of the left hand end. Fig. 4 is a vertical and central transverse section taken looking toward the left side.

15 A, in the different figures denotes the lay, and B, the breast beam of the loom. A series of vertical wires *a, a, a* (Fig. 5) projecting from a short horizontal shaft *b*, is placed on the back side of the lay near 20 the shuttle box, the shaft *b*, being supported in suitable bearings at its ends. The wires are drawn toward the lay by means of a helical or other proper spring *c*, represented in Fig. 4, by dotted lines as inserted in the 25 lay connected thereto and attached to a small hook *d*, projecting from the shaft *b*. A rod *e*, extends downward from one end of the shaft *b*, and at its lower end it comes just in front of an arm *f*, projecting downward 30 from the inner end of a horizontal shaft *g*, (see Fig. 5, which denotes the shaft as applied to the back side of one of the swords of the lay) turning in bearings applied to the back side of the sword of the lay. The 35 other end of the shaft *g*, has an arm *i*^s extending from it at right angles as seen in Figs. 1, 4, the said arm having in front of it a lever *z*, which rises upward from a horizontal shaft *k*, supported in bearings applied to the frame of the loom. 40

A short arm *l*, extends downward from the shaft *k*, and is horizontally and underneath a long horizontal sliding bar *m*, supported in bearings and connected with a 45 vertical lever *n*, and having a weight *o*, upon it, and operated or forced back by a cam *p*—on the main shaft *p'* acting on the weight whenever this end of the lever is not lifted up. Upon the outer end of the 50 horizontal shaft *k*, a short arm *q* extends upward as seen in Fig. 3, and is jointed to a pulling pawl *r*, which engages at its other end with a ratchet wheel *s*, upon the end of the shaft *t*, connected with the cloth beam 55 in the usual manner to take the cloth, and which also in the manner to be hereafter

described, communicates motion to the machinery by which the shuttle boxes are operated.

Every time the lay departs away from the breast beam, the arm *i*^s presses forward the upper part of the lever *z*, and thereby causes the pulling pawl *r*, to give motion to the ratchet wheel *s*, so as to wind the woven cloth beam, or thus "take up" the cloth. 60 A block *u*, having a series of vertical recesses formed in its front side, to receive the wires, *a, a'*, is placed directly in front of said wires, and is fixed upon the top of a vertical arm *v*, which rises upward on the 65 front side of the lay, and from the inner end of a horizontal shaft *w*, turning in bearings *x, x*, applied to the front side of the sword of the lay, as more particularly represented in Fig. 6, which is a front view of 70 the shaft. An arm *y*, bent or shaped as seen in Fig. 4, extends horizontally from the other end of the shaft *w*, and rests and moves at its bent or curved end upon a pin *z*, projecting from the inner side of the 75 frame of the loom. The block *u*, is drawn toward the wires *a, a*, and the arm *y*, down upon the projection *z*, by means of a spring *a'* connected to a small projection or arm *b'*, of the shaft *w*, and to the sword of the lay. 80 As the lay beats up, the block *u*, will be caused by means of the spring *a'* and the form of the bent arm *y*, acting over the projection or pin *z*, to advance gradually toward the wires *a, a, a*. The sword of the 85 lay has a long spring *c'* secured to it and extending upward, and having its upper end bent at right angles as seen in Fig. 5. A bent fixed arm *d'* extending from the frame of the loom, stands directly in front 90 of the spring, and of the arm *f*, of the shaft *g*. 95

The bent part of the top of the spring should come directly back of the rod *e* of the shaft *b*. From the above it will be seen 100 that, while a filling thread from the shuttle is laid between the block *u*, and the wires, *a, a*, the wires will not enter the vertical spaces or recesses of the block. The consequence will be that, when the lay beats up, 105 the spring *c'* will be brought in contact with the top of the arm *d'*, and pressed forward by the same. The arm *i*^s, will fall so that its end will come below the top of the lever *z*, and will be stopped from falling further, 110 or too far, by the arm *f*, coming in contact with the fixed arm *d*. Then when the lay

retreats after having beat up the arm i^s will press the lever i back, or carry it with it and thus cause the pulling pawl r , before mentioned to give motion to the ratchet wheel s , for the purpose of taking up the cloth as fast as it is woven. Now should the filling thread of the shuttle break during the passage of the shuttle from one box to the other of the lay, no thread will intervene between the block u , and the wires a , a , a . Consequently when the lay beats up, the wires will enter the recesses of the block, and thus fall back a little or so as to cause the rod e , which depends or extends from the shaft of the wires, to press against the arm f , of the shaft g , and thereby raise the arm i^s above the lever i , so that the retreat of the lay carries this arm over the lever, and does not move it backward so as to cause the pulling pawl to act upon the ratchet wheel s .

Whenever the lever i is thrown backward by the retreat of the lay, it lifts the sliding bar m , so much above the cam p , that the latter will not act upon the former but when the lever i , is not thrown back in consequence of the breaking of the filling thread the cam p will slide the bar, m , backward and thus stop the loom, by its connection with the protection lever known to all persons acquainted with power looms, and which therefore does not require a representation in the drawings. A small wire e' is passed vertically through and fixed in the shaft g , so as to come in contact at its top and bottom with the front side of the sword of the lay, and thus act as a stop to prevent the arm i^s from being too far raised or depressed. On the shaft of the ratchet wheel s , and on the opposite side of the loom there are two wheels f' , g' , Figs. 1 and 2, with their peripheries notched, and so arranged that the notches on one are nearly opposite the spaces between the notches on the other. Two arms h'' g'' , each attached to a separate arbor, the arbor of the one g'' passing through the other, rest on the peripheries of the wheels f' , g' , the arm h'' on wheel g' and the arm g'' on wheel f' ,—and as the wheels rotate the arms alternately fall into the notches and depress the dogs i' k' , attached to their arbors as represented in the drawings.

The dogs i' , k' , are at such a distance apart that a toothed wheel l' which turns on an arbor extending from the sword of the lay, will play between them as the lay beats up. This toothed wheel has a series of pins, m' , m' , inserted at proper distances apart, in each side of it, and at such distances from the center of the wheel, that at the expiration of intervals of time, one of the dogs i' or k' will be dropped downward by its notched wheel and come in contact with one of the pins m' , as the lay beats up, and thus cause the toothed wheel l' to turn upon its

arbor a short or sufficient distance to turn a revolving shuttle box C, so as to bring around another shuttle to the action of the lay. This is effected by means of the toothed wheel l' , engaging with another toothed wheel n' fixed at one end of the revolving shuttle box. The said shuttle box is formed of two plates o' p' of metal crossing each other at right angles as seen in sections in Fig. 7—which represents the parts on an enlarged scale—and thus forming four angular recesses q' r' s' t' , for the reception of shuttles as seen at v' . Suitable openings v' v' v' v' , are formed through the toothed wheel of the shuttle box, for the passage of the shuttles into and through the lay; and the shuttle box is supported in any convenient manner in the end of the lay, so as to rotate.

The front part of each shuttle recess of the revolving shuttle box should have a plate a^2 screwed to it, as seen in Fig. 1, and in side view in Fig. 8, on the same scale as Fig. 7, and in section in Fig. 7. Only one of these plates is represented in the drawings as applied to one of the recesses of the shuttle box, the remaining recesses being supposed to be similarly provided. On the central part of the plate a^2 , a lever b^2 c^2 d^2 is jointed at c^2 so as to move horizontally. The inner end b^2 of the lever has a pin or projection d^3 extending at right angles from it and through a hole formed through the plate a^2 and enters a long angular notch e^2 formed in the side of the shuttle, the same being represented in Fig. 9, which is a horizontal section of the plate a^2 and its lever. The other end of the lever has a rounded projection, or is curved as seen at f^2 , Fig. 9, and passes through an orifice formed through the side of the plate a^2 , and rests against the side of the shuttle as seen in Fig. 9. A spring g^2 forces this end of the lever inward or toward the shuttle.

When the shuttle is thrown into the box, it meets the rounded part f^2 , of the lever and presses it outward and thereby presses the pin d^3 inward or into the recess or notch e^2 (see Fig. 10, which is a front view of the shuttle so as to exhibit the notch e^2 more particularly) and thus confines the shuttle in the recess of the shuttle box. The outward movement of the end d^2 of the lever causes the lever to bear against an arm h^3 , which projects vertically from the shaft, from which the projection extends that operates the ordinary protection lever, in order to stop the looms whenever the shuttle is not thrown into the box, or is stopped in its passage from one box to another.

At the termination of each movement of the shuttle box in its bearings, it is held in its right position with respect to the top surface of the lay by means of a spring catch h^4 taking into one of a series of angular notches

i^2 , i^2 of a circular plate k^2 connected to the shuttle box. The yarn beam is represented at l^2 . It has a gear wheel m^2 (affixed upon or near one end) which engages with a toothed pinion n^2 fixed on a horizontal arbor o^2 , which is supported and revolves in suitable bearings within a standard p^2 , projecting from the frame of the loom. A friction pulley q^2 is fixed on the shaft o^2 by the side of the pinion n^2 , a strap or band r^2 , passing partly around or over the pulley, and having one end connected to a curved arm or spring s^2 and the other to a hook in the top of a stirrup b^4 , carrying a roller a^4 , in its lower end upon which a lever t^2 rests as seen in Figure 4. A moveable or sliding weight v^2 is applied upon one end of the lever t^2 , while the other end of the lever is sustained in position by a pin v^2 —which passes through the lips w^2 w^2 (see Fig. 11, which is a back elevation of the mechanism represented on the same scale as Figs. 7 and 8) of a vertical lever a^3 b^3 c^3 . Similar lips y^2 are arranged at the inner end of a horizontal bar or support piece f^4 , in order to steady or guide the lever which moves longitudinally between them.

Each of the lips w^2 w^2 of the lever a^3 b^3 c^3 has a vertical slot z^2 formed through it (see Fig. 4) through which the pin v^2 passes the same being for the purpose of allowing of the correct action of the end of the lever t^2 . The vertical lever a^3 b^3 c^3 turns on a fulcrum at b^3 . The lever t^2 has two horizontal rollers d^3 d^3 (see Fig. 12,) in its end which is connected with the lever a^3 b^3 c^3 . The upper end c^3 of the vertical lever a^3 b^3 c^3 , carries another horizontal roller e^3 —which rests against the yarn wound upon the yarn beam. From the above it will be seen that the roller d^3 at the lower end of the vertical lever becomes the fulcrum of the horizontal lever, and as the yarn is gradually unwound from the yarn beam, during the process of weaving, the upper end of the vertical lever is to be as gradually pressed nearer the beam, or against the yarn thereon, thus causing

the lower end of the vertical lever to move in the opposite direction, and thereby move the horizontal lever with it and consequently change the position of the fulcrum of the said horizontal lever to such degree as to cause the weight n^2 to exert a less draft on the friction band r^2 and thereby keep up a regular or requisite friction upon the beam.

I claim—

1. The arrangement of parts constituting the peculiar take up motion in combination with the machinery for arresting the progress of the loom, when a filling thread breaks, as the same is represented in the drawings and as above described—and as combined and operating substantially as set forth.

2. I also claim the mode of operating the revolving shuttle box (represented in the drawings) or turning the same around at suitable intervals of time, for the purposes set forth, namely; by means of the vertical cogged wheel l' having pins m' , extending from its sides, in combination with the dogs of the notched circular plates and with the pinion on the revolving shuttle box; the same being arranged and operated substantially as set forth.

3. I also claim the employment and use of circular notched plates in combination with the connected pawls and dogs as above described, whether the same actuates the shuttle box by the mechanism which intervenes between the said plates, with their appendages and the said shuttle box, as hereinbefore set forth, or by any other, which may be adapted thereto; the whole being arranged and operating substantially as above specified.

In testimony that the foregoing is a correct specification of my said invention, I have hereto set my signature this fourth day of February A. D. 1845.

JAMES NIELD.

Witnesses:

H. WILDING,
 JOEL W. WHITE.