Sheet 1. 3 Sheets.

Walker & Mc Intire.

Knitting Mach.

No. 3436. Patented Feb. 12, 1844.

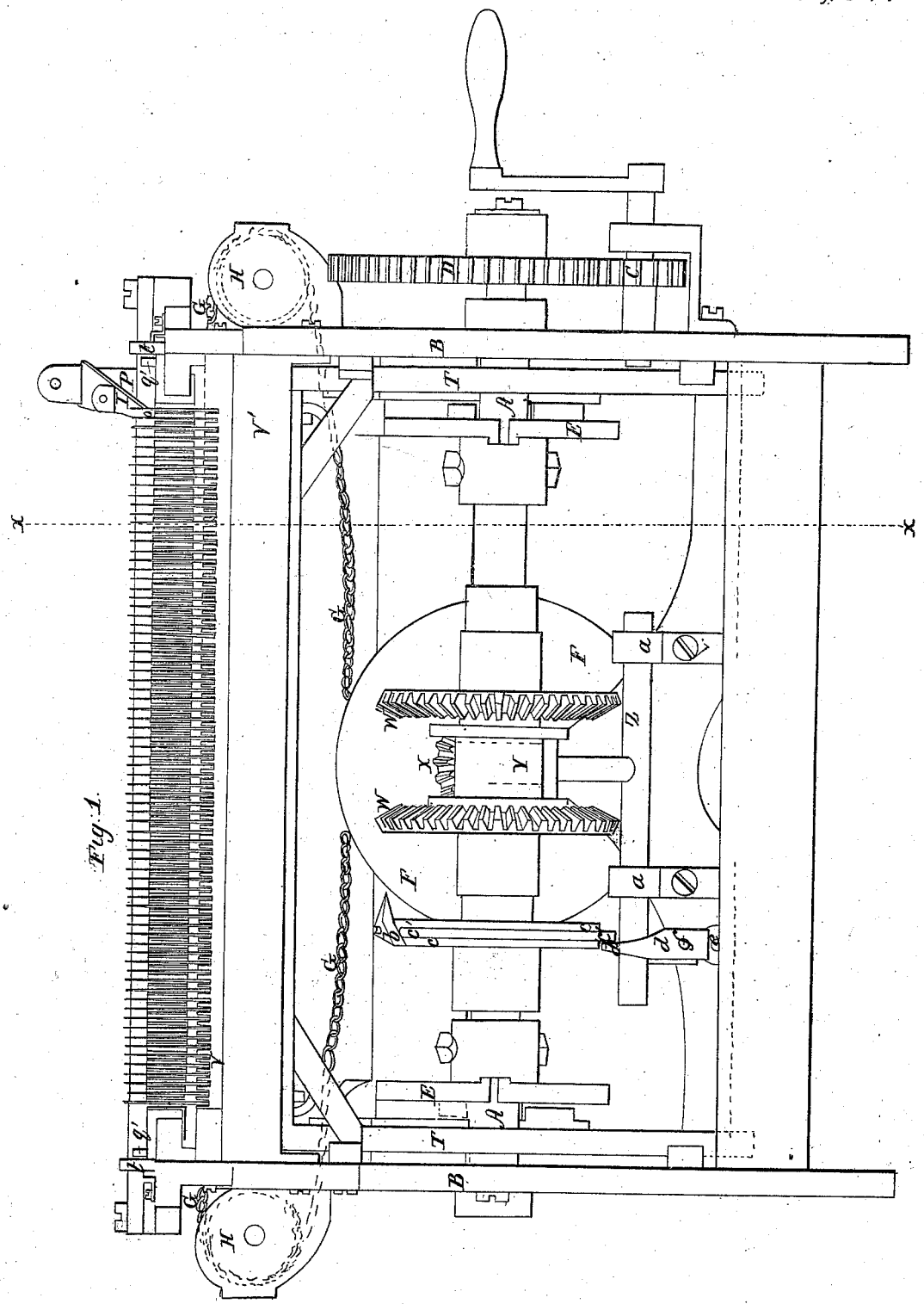


Fig. 1.

Walker & Mc Intire.

Knitting Mach.

No. 3,436. Patented Feb. 12, 1844.

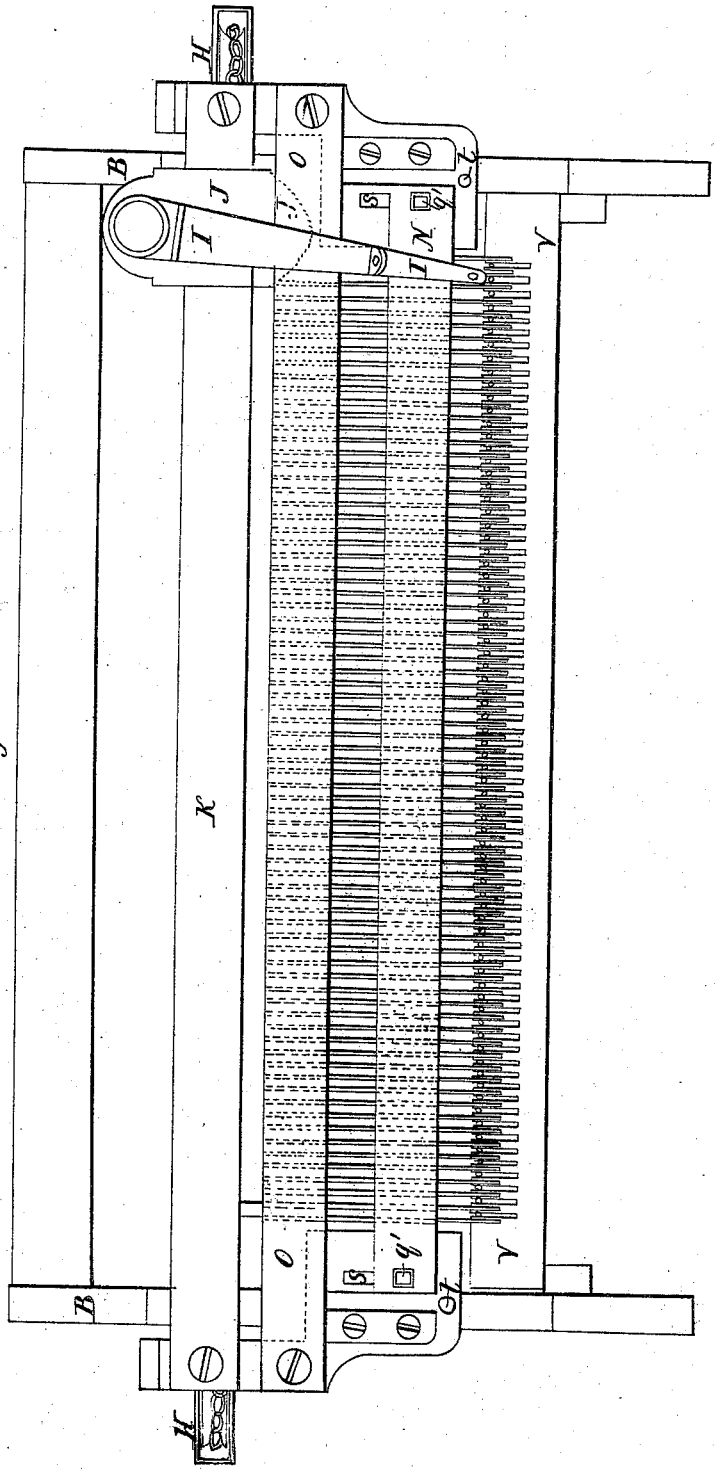


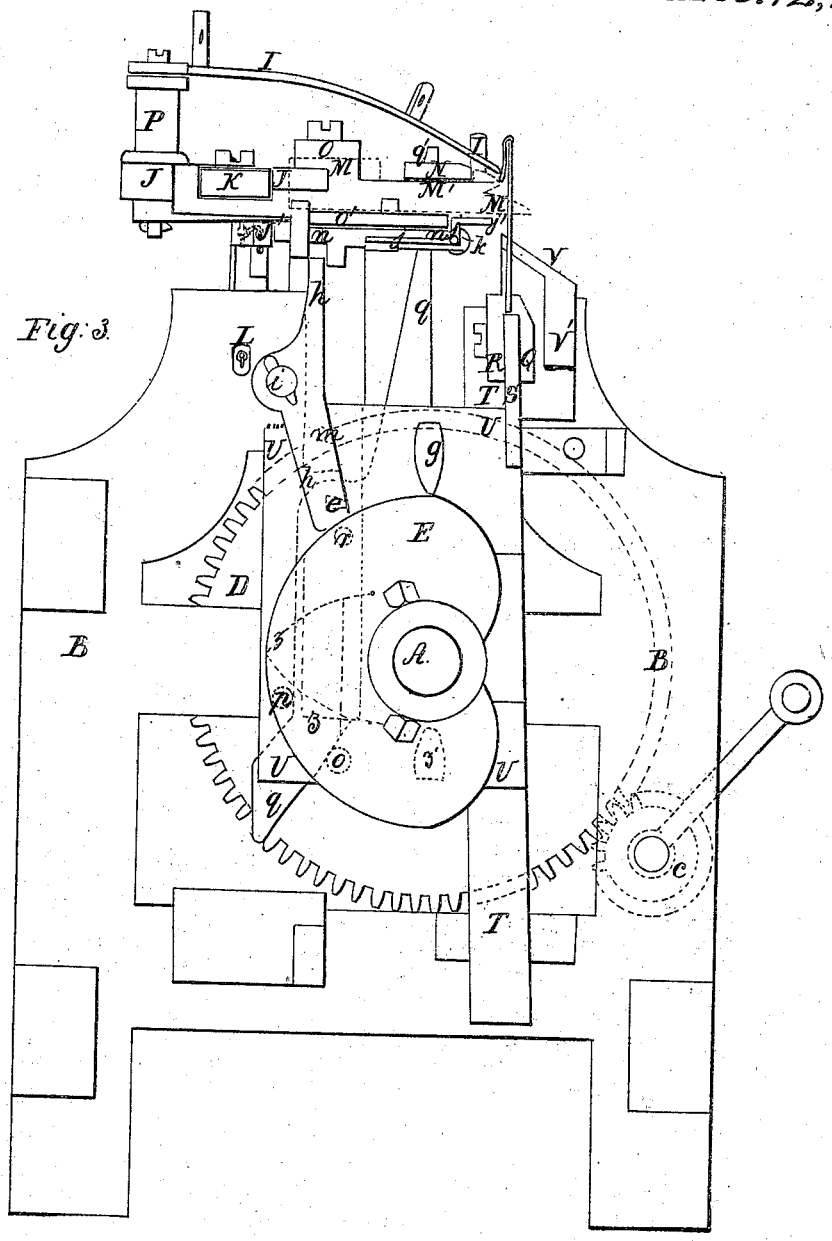
Fig. 2.

Walker & McIntire.

Knitting Mach.

No. 3436. Patented Feb. 12, 1844.

Fig. 3.



UNITED STATES PATENT OFFICE.

R. WALKER AND J. McINTIRE, OF PORTSMOUTH, NEW HAMPSHIRE.

KNITTING-LOOM.

Specification of Letters Patent No. 3,436, dated February 12, 1844.

To all whom it may concern:

Be it known that we, RICHARD WALKER and JEFFERSON McINTIRE, of Portsmouth, in the county of Rockingham and State of New Hampshire, have invented certain new and useful improvements in the manner of constructing looms for knitting stockings and other articles, which loom is to be operated by any adequate power applied to a revolving shaft; and we do hereby declare that the following is a full and exact description thereof.

In the knitting loom which we have invented, our first improvement consists in the substituting of horizontal sliding stitchers for the falling jacks, or sinkers, heretofore employed, by which means the friction is diminished, and this part of the apparatus is simplified, and much less liable to get out of order than the falling jacks.

Our second improvement consists in the manner in which we arrange and operate the needles, said needles being placed vertically, with their backs toward the front of the frame, and the depressor behind them, under the strikers; by which arrangement the work is elevated and exposed to the eye of the operator at all times.

Our third improvement consists in the particular combination and arrangement of the machinery by which the thread is carried along for the formation of the stitches.

The accompanying drawing is made on a scale of about one half the size of the actual machine, the looms which we have constructed being about twenty inches long, eighteen inches high, and thirteen inches wide; which dimensions may, however, be varied, but we esteem the foregoing a good size.

Figure 1, is a front elevation of the machine; Fig. 2 a top view thereof, and Fig. 3, a vertical section from front to back in the line *x x*, of Fig. 1, affording an inside view of that part of the apparatus which is immediately within the ends of the frame.

A, A, is the main shaft, having its bearings in the cast iron ends B B of the frame, which ends are connected together by suitable girths of wood, or metal.

C, is a pinion, which gears into a wheel D, on the shaft A, by which motion may be communicated to the whole apparatus.

E E, are two cams on the shaft A, which are so formed as that during one half of their revolution they shall allow the frame by which the needles are raised and lowered to remain at rest; and during the other half they shall cause said needles to be elevated and depressed to the requisite extent.

F, F is a chain wheel, having two grooves on its periphery, and around which passes the two ends of the chain G, G; said chain also passes around guide pulleys in the cases H H, and has its ends attached to the wheel F F, and its middle made fast to the under side of the slur which throws out the stitchers, said slur, and the feeding rod I which is attached to it, being carried back and forth by means of the chain G, G.

I′ is a stud which rests on the slur, and supports the feeding rod.

The slur is shown at J, J, Figs. 2 and 3, the bar K, which it embraces being that along which it slides.

J′, Fig. 3, is a piece attached to the under side of the slur, to which piece the chain G, is made fast. L is a hole in the frame through which the chain passes to the chain wheel. One of the stitchers is shown in this figure, in red lines, at M M. In the actual machine they are about four and a half inches long, and their general width is about three-fourths of an inch, but at M′, they are cut in width square shoulders so as to reduce them to about half an inch in width, which is done in order to admit the regulator, or bar, N, between their shoulders. This bar is about five-eighths of an inch less in width than the recess in the stitchers, and serves to move the stitchers back, preparatory to their being acted upon by the slur, and to stop them correctly as they are thrown forward by it; the manner of moving the regulator back and forth will be presently described. The thin plates of which the stitchers consist slide within grooves in the stitcher frame, which consists mainly of the stationary bars O, O′, by which they are guided correctly back and forth, grooves being cut across said bars to receive them. P is a stud on the top of the slur which sustains the feeding rod I.

Q and R, Fig. 3, are two plates, or bars, of metal, which embrace the needles between them, and constitute a part of the needle frame; between the upper edges of these, a row of English needles is held which stand vertically, their shanks being retained by grooves cut in the plates to receive them. The plate Q and R, extend the whole length

between the ends of the loom, and are firmly screwed together.

S is a piece of metal, embraced between the pieces Q and R below the needles, and attached to a sliding piece, or arm, T T which descends vertically and slides up and down in grooves at each end of the loom. To each of the arms T, T is fastened a plate of metal U, U, which carries the studs upon which the cams E, operate in carrying the needle frame up and down, and other studs to be presently described. The plate U, U, is perforated to allow the shaft A, A, to pass through it. These plates have studs also on their outer sides which operate on the regulator, as hereinafter described.

V, V′ is a metal girth, or breast piece, extending from end to end on the upper part of the frame, and having grooves about half an inch deep, cut in its beveled edge V′, to receive each of the needles. Within these grooves said needles slide up and down their whole length, the teeth, or thongs, between said grooves serving to cast over the work at every revolution of the machine. Z, Z, is a cam on the back side of the cam E which when brought into contact with a stud Z′, on the plate U, serves to depress it, at the proper time.

We will now describe the manner of communicating motion from the main shaft A A, to the respective parts of the apparatus.

W, W′, are two bevel geared wheels six inches in diameter, having sockets which enable them to turn loosely on the shaft A, and which are alternately thrown out of, and into gear with the bevel wheel X which wheel is three inches in diameter, and is attached to the chain wheel F.

Y, is a socket surrounding the shaft A, and capable of being moved back and forth so as to clutch, by means of suitable teeth, or projections, with the wheels W, W′; this socket is moved back and forth by the sliding bolt Z, which passes through holes in the stands *a*, *a*. The sliding, or shifting, motion is given to the bolt Z, by means of a Y-formed switch *b*, working on a pin through its center, on the periphery of the wheel *c* said wheel having a fillet *c′*, *c′* around it, and being made fast to the shaft A. The switch *b*, as the wheel *c* revolves, is brought into contact with the end *d′*, of a lever *d*, and carries it alternately to one side or the other of the fillet *i′*, *i′*; and as the lever *d*, is made to change its position, the switch *b*, is turned on its center pin, and is thereby placed in the right situation for carrying the lever *d*, back at the next revolution. The lever *d*, has its fulcrum at *e*, is connected by a pin at *f*, with the bolt Z, to which a reciprocating motion is consequently given, and the wheels W, W′, are alternately thrown out of, and into, gear with the wheel X; the required motions are thus communicated to the chain wheel.

In Fig. 3, *g*, is one of the studs attached to the plate U, against which the cams E, operate in raising and depressing the needles, as will be understood by inspection. A lever *h*, hung on a pin at *i*, serves to operate the depressor, which is a thin plate of brass, *j*, *j*, the edge *j′* of which is to be brought up against the needle beards; this depressor is hung upon pivots at each end, as at *k*, and when its fore edge is brought up against the needle beards, their friction against it causes it to descend with them, keeping the points down until they pass through the work, when the depressor resumes its former position, the pivot being a little out of the center toward the front, and its gravity consequently tilts its back when it is freed from its pressure against the needles. The depressor is bent into a form similar to that shown in the drawings, so that its fore edge may be nearly in contact with the stitches, its rear portion being under, and at a little distance from, the lower part *o′*, of the stitcher frame. The dotted part *l*, shows the place of a stud on the lower end of the lever *h*, projecting toward the face of the plate U, and the dotted part *m*, a stud on said plate, which two studs come into contact with each other as the plate is raised and lowered; as it is raised, the lever *h*, is merely tripped out of its way; but as it is lowered, the upper ends of the levers *h* force forward the sliding pieces *n*, which carry the depressor forward by the action of the pivots *k*, at the right time for their operating on the needle beards. When the studs *l*, and *m* have pressed each other the depressor is carried back by the action of a spring on the sliding pieces *n*, or in any other convenient way.

The motion of the regulator, back and forth, is accomplished in a manner resembling that for vibrating the depressor, namely, by the rising and falling of the plate U; but it is most convenient to effect this by means of levers and studs on the outer sides of said plate. The arrangement adopted by us is shown, principally, in dotted lines, in Fig. 3; *o*, and *p* are two studs affixed to the plate U, and *q*, is a lever of which there is one at each end attached to the frame of the machine by a joint pin at *r*; the upper ends *q′* of these levers pass through the two ends of the regulator, and serve to give to it the required motion backward and forward; *s*, *s*, are slots in the top of the frame, to allow the lever *q*, to move back and forth; by this motion of the regulator the stitchers are taken back from between the needles, clearing the stitchers in their downward passage; and in their upward passage it brings the stitchers forward, entering their points

between the needles, setting them ready for another stitch, and for the operation of the slur.

The stitcher frame, with all its apparatus, including the depressor, may be readily removed from the machine at any moment, as it is held down by screws passing through its feet into the top of the main frame. The feeding rod is set forward of the stitchers that are to be moved by the slur, by its coming into contact at each end with a pin *t;* the stud P, which supports the feeding rod turning in the slur through which its lower end passes.

In the operating of this machine, when the needles are depressed to their lowest point, the studs by which they are raised rest on that part of the cams E, which is nearest to the main shaft, and when this shaft is carried around one-fourth of a revolution they arrive at their greatest elevation. While this is being effected, the studs in the plates U, which act upon the regulator levers, will have caused the regulator to throw the stitchers forward, entering their points between the needles, setting them ready for the reception of the thread, and the operation of the slur. By the time the needles have attained their greatest elevation, they are then sustained by the circular part of the cam, and the clutch will have locked with one of the bevel gears, and the chain wheel will be set in motion, the feeding rod will consequently be carried along, and the slur made to act on the stitchers. This operation continues during one-half of the revolution of the shaft; the clutch is then unlocked, the needles descend during the next quarter of a revolution, and the depressor levers are acted upon, putting down the beards of the needles; the regulator likewise takes back the stitchers from between the needles, the work is cast over by the grooved metal plates and the machine is ready to repeat the same operations.

Having thus fully described the manner in which we construct our improved knitting loom, and shown the operation of its respective parts, what we claim therein as new and desire to secure by Letters Patent is—

The manner in which we have arranged and combined the regulators, on bar N, with the stitchers M, M, so that said bar will, by its vibration move said stitchers back and forth by its action between the shoulders thereof, as described; the horizontal position of the stitchers, and the manner of combining the bar N with them, rendering it unnecessary to use springs, or any analogous device for actuating the stitchers.

RICHARD WALKER.
JEFFERSON McINTIRE.

Witnesses:
DAN P. DROWN,
DANL. A. DROWN.