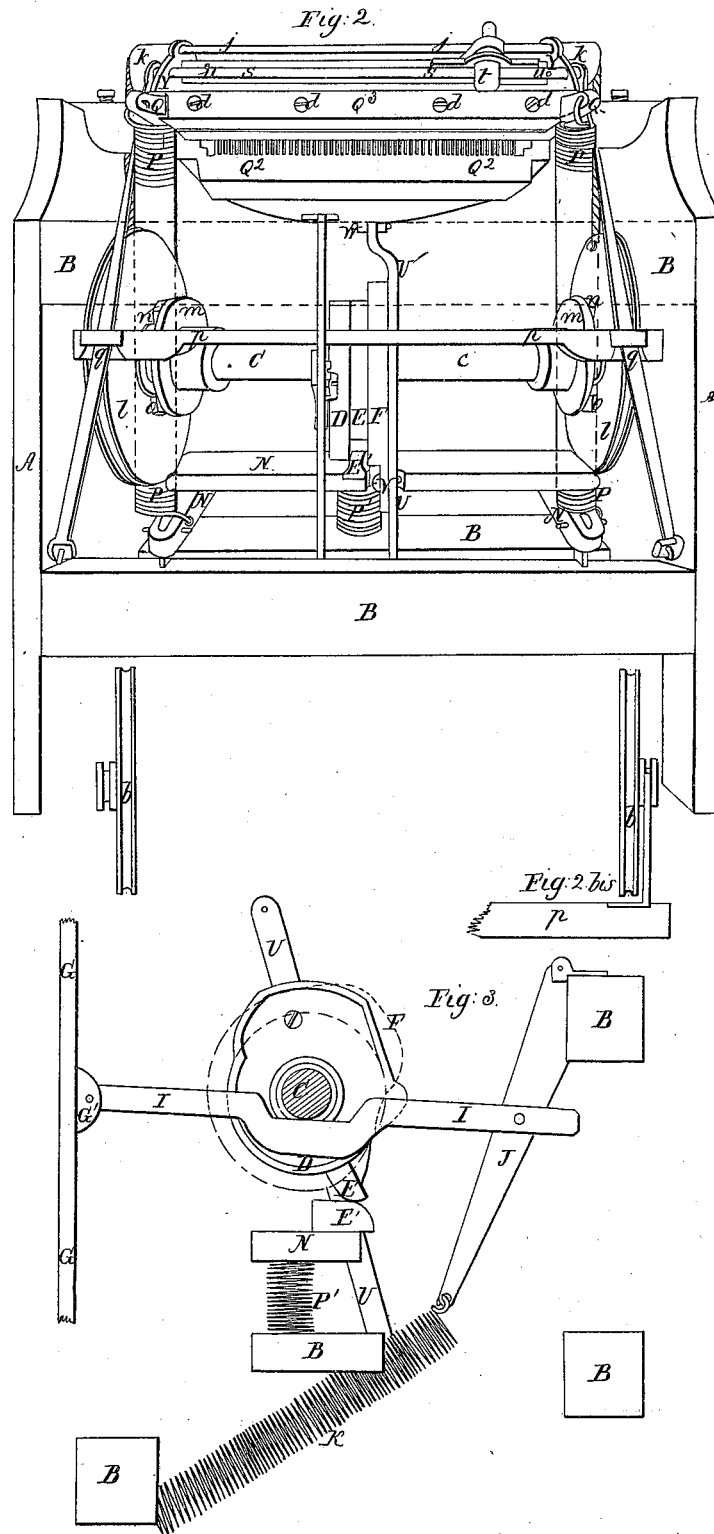




*R. Walker.*  
*Straight Knitting Mach.*

*N<sup>o</sup> 1,421.*

*Patented Dec. 5, 1839.*



# UNITED STATES PATENT OFFICE.

RICHARD WALKER, OF PORTSMOUTH, NEW HAMPSHIRE.

## ROTARY POWER STOCKING-LOOM.

Specification of Letters Patent No. 1,421, dated December 5, 1839.

*To all whom it may concern:*

Be it known that I, RICHARD WALKER, of Portsmouth, in the county of Rockingham and State of New Hampshire, have invented certain new and useful Improvements in the Framework Knitting-Machine or Stocking-Loom, by which improvements it is rendered capable of performing all the necessary movements in the operation of knitting by giving a rotary motion to a cam-shaft, which may be turned by a winch when a single machine is used or may be operated by means of belts and pulleys or other gearing when used in factories and is therefore denominated by me the "rotary power stocking-loom;" and I do hereby declare that the following is a full and exact description thereof.

Figure 1, in the accompanying drawing, is a perspective representation of my machine, taken in front. Fig. 2, is a back view thereof, and Fig. 3, a vertical section of a portion thereof, from front to back, showing the cams on the cam shaft, and certain parts connected therewith.

In the respective figures, the same letters of reference are used to designate the same parts.

For webs of less than nine inches wide, the machine will be about sixteen inches long, sixteen high, and thirteen wide. For wider webs, or for a number of webs in succession, the machine must be increased in length, but its other dimensions may remain unchanged.

A, A, are the ends of the main frame, represented as made of cast-iron, and B, B, B, are girths of wood by which these ends are connected; but these, of course, may be varied in form and material.

C, C, is the main shaft, by the revolution of which the whole machine is to be actuated; D, E, and F, being three cams on said shaft, which operate in a manner to be presently described.

G, G, is the lathe in front of the machine; this lathe works upon joint pins in the pieces H, H, attached to the lower girth B, of the frame; in a machine of the size designated, it is about nine inches wide and twelve inches high. In the drawing, the lathe, above the joints, is shown in outline only, or as if transparent, for the purpose of exhibiting the parts behind it, which would otherwise be in some measure obscured by it. The lathe is moved backward and forward by the cam D; the cam rod I, I, upon which

said cam acts being connected to the center of the lathe, at G', by a joint pin, as shown at G', Fig. 3. The rod I, works on a joint pin on the lever J, which being acted upon by the spiral spring K, serves to throw the lathe forward when not forced inward by the cam.

Along the upper bar of the lathe, constituting the needle bar, are placed the needles, which are similar to those used in the English stocking loom, having a spring beard at their points. They are bent down at right angles, about two inches from their points, so as to be embraced between the two metallic plates of which the needle bar consists; this is seen at a, a', Fig. 1, and in cross section at Fig. 4, where b is one of the needles; the back plate, a', is attached to the plate a, of the lathe, by a row of screws, firmly securing the needles in place. The plate a, is notched on its top edge, said notches forming grooves which receive the needles, and give them the proper direction forward; in Fig. 1, the row of needles is hidden by the depressor L, L, the office of which is to press down the beards of the needles at the proper time. The depressor is made of a plate of steel, which has its ends bent down at right angles, as shown at L', L'; these ends are attached to the arms M, M, of the lathe by joint pins c, c. The depressor is forced down upon the points of the needles by means of the cam E, in the following manner:

N, N, is a frame connected to the depressor by the rods O, O, working on joints at each of their ends, as represented. The frame N, is hinged at its back end, Fig. 2, and is borne up by the spiral springs P, P, P'. The projecting part E, of the cam Fig. 3, coming in contact with the stump E', on said frame, will consequently force down the depressor. In Fig. 2, the spiral springs P, P, are, in part, shown by vertical lines only. Their upper ends are attached to the back end of the sinker frame, upon which they act, as well as upon the frame N. The construction and office of this sinker frame will now be described.

Q, Q, Q, Figs. 1 and 2, is the sinker frame, which sustains the sinkers R, R. The sinkers are made of thin sheet-iron, or other metal; their office is to carry the thread down to a sufficient depth between the needles to form the stitch. Their construction and operation, are, in this respect, the same as in the English stocking-loom, the

difference being such only as to adapt them to the size and particular construction of my machine; they are, in such a machine as I am describing, about eight inches long, and about an inch deep. On their fore ends, they have a head about three inches deep, which passes down between the needles, having a lip and throat in the same general form of the English stocking-loom sinker, now in ordinary use; but differs from it in the sinker and jack constituting but one piece, as shown in Fig. 5. The sinker frame is about a foot wide, from front to back, and it vibrates upon bearings S, S, attached to the main frame A, A; these bearings, or pivots, enter it near its center. A steel rod T, passes through these bearings and through holes in the sinker plates, constituting the fulcrum upon which they turn. The rod T, may be drawn out when it is desired to vary the number of sinkers according to the width of the web. The front bar, Q', of the sinker frame has plates of metal projecting from its underside, which plates pass between the sinkers, and serve to guide them in their motions, the bar itself being so situated as to govern the height to which they shall rise. The bar Q<sup>2</sup>, Q<sup>2</sup>, which is shown in Fig. 2, extends along the sinker frame, under the sinkers, and has plates of metal projecting from its upper side to receive them, and through these plates, as well as through the sinkers, the rod T, passes.

Q<sup>3</sup>, Fig. 2, is the hind bar of the sinker frame. The screws *d*, *d*, *d*, seen upon this bar, are set screws which bear upon a slide bar between it and the back end of the sinkers. This slide bar is faced with cloth, or some other elastic substance, which is made to bear upon the back end of the sinkers, so as to produce the degree of friction necessary to keep them stationary, excepting when they are moved by acting parts of the machine. The spiral springs P, P, before mentioned, serve to keep the front of the sinker frame elevated, when not brought down by the cam.

The cam F, is for vibrating and governing the motions of the sinker frame, which it does through the intermedium of the cam bar U, U, upon which there is a bearing piece V, on which the cam acts. This bar works on a hinge joint at W, upon the lower side of the sinker frame, and in front of the fulcrum upon which it vibrates.

Having thus, fully explained the manner in which the three cams D, E, and F, operate in communicating the required motions to the lathe, the depressor, and the sinker frame, I now proceed to describe that part concerned in the feeding, or supplying, of the thread to be knit, or woven.

A steel bar X, is supported upon the sinker frame by means of the arch pieces Y, Y, and from end to end of this bar the car-

riage Z, is to slide: *e*, *e*, are two friction rollers, which are shown distinctly in the separate Fig. 1, *bis*, the front plate being removed for that purpose; these rollers bear against the underside of the bar, and the third, *f*, bears upon, and depresses, the sinkers as it passes along the bar which it does about half an inch in advance of the centers, or fulcrum, of the sinkers; thus sinking, or carrying down, the thread, between the needles. To protect the edges of the sinkers from being injured by the roller *f* I cover them with a thin steel saddle, put on them like the back of a tenon saw. The thread is taken from the bobbin, and is passed in under the lip of the sinkers by the feeding rod *g*, *g*, attached to the arm *h*, of the carriage. The arm *h*, turns upon a pin *i*, at the rear of the carriage, and has room to vibrate to a given distance between the projections Z, Z, on its front. The cord *j*, *j*, by which the carriage is moved is clasped firmly to the arm *h*, and by the drawing of this cord, the arm, as it traverses in either direction, is brought over so as to keep the thread forward of the falling sinkers. The cord *j*, *j*, passes over friction rollers within the caps *k*, *k*, at either end of the bar, and is conducted down to the pulleys *l*, *l*, on the main shaft, the operation of which will be shown most distinctly in Fig. 2.

The grooved pulleys *l*, *l*, are loose upon the shaft *c*, *c*, Fig. 2, and to them are firmly attached the ends of the cord *j*, *j*. They are made of such diameter that by half a revolution they will draw the carriage once across the sinker frame, which they are made to do by means of clutches, constructed in the following manner. Collets *m*, *m*, are attached to the shaft C, C, and have on them clutch teeth *n*, *n*, and upon the pulleys there are corresponding clutch teeth *o*, *o*. A shipping bar *p*, *p*, has a fork at each end taking into a neck, or groove, on each of the pulleys *l*, *l*, as shown in Fig. 2, *bis*. The bar *p*, *p*, is shifted by the rods *q*, *q*, the upper ends of which are flattened and bear against the ends of the shifting rod, or wire, *s*, *s*; the stud *t* attached to the back of the carriage passes over this wire, and coming in contact with pins *u*, *u*, upon it, causes the clutching and unclutching to be effected in a manner which will be made perfectly plain by the drawing.

By the arrangement above described, the frame work knitting loom is not only rendered self-acting, but it is simplified in its general construction, and its operation is rendered more perfect; the manner in which I construct, and throw down, the sinkers is not only peculiar and novel, but by dispensing with the jacks used in the English loom, and substituting the carriage and roller, there is a more certain, equal and exact pressure produced; the roller carrying the sink-

ers between every needle in succession to the full depth of the gage, enables it to knit such hard twisted yarn as cannot be knit on the ordinary loom. The device of the roller and its appendages may be applied to the hand loom, for depressing the sinkers, and it is my intention so to apply it.

Operation: When the carriage Z, is at one extremity of the sinkers, the pulley at the opposite end is clutched, and as the carriage is drawn by the arm *h*, of the feeding rod, said rod starts first and keeps the thread forward of the falling sinkers. One half revolution of the shaft, draws the carriage home to the opposite end, which in its passage depresses the sinkers, carries the thread between the needles, and finally unclutches the pulley which operated it, and prepares the other for action. At the commencement of the other half revolution, the cam D, bears against the rod I, and draws the needles back, so as to bring the thread under the beards, to the points of the needles. The cam E that moves the sinker frame, lets it rise at the same time by the action of the spiral springs, and while the sinker frame is rising, and the needles drawing back, the depressor operates upon the beards of the needles, so that they are drawn through the web. The sinker frame is then brought down by the cam, to its full extent, the sinkers being stopped when they are low enough to cast over; the needles then pass through the new stitch, the

sinker frame rises, and the machine is ready to repeat the same routine.

Having thus fully described the construction of my machine, and pointed out the manner in which the same operates, what I claim as of my invention therein, and desire to secure by Letters Patent, is,

1. The manner in which I operate the lathe, the depressor, and the sinker frame, by the three cams upon the main revolving shaft, so as to produce the respective motions in the order described, by a combination and connection of parts substantially the same with that set forth.

2. I also claim the manner in which I make my sinkers, so as to dispense entirely with the jacks used in the English looms, the sinker—and the jack in my loom constituting but one piece, as set forth and represented.

3. I likewise claim the combination of the parts concerned in operating the carriage, these parts consisting of the grooved pulleys, the cord attached to them, and the apparatus for clutching and unclutching, said pulleys, as set forth; together with such variations thereof as may be deemed expedient, while the same end is effected by analogous means.

RICHARD WALKER.

Witnesses:

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