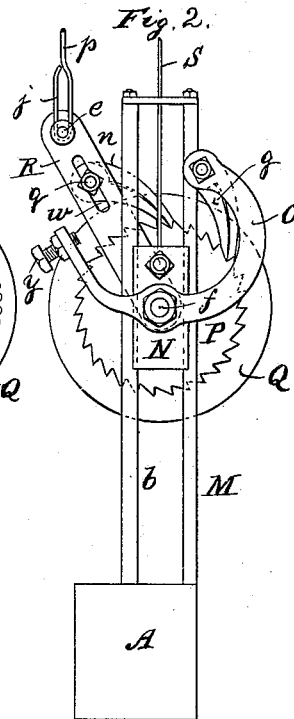
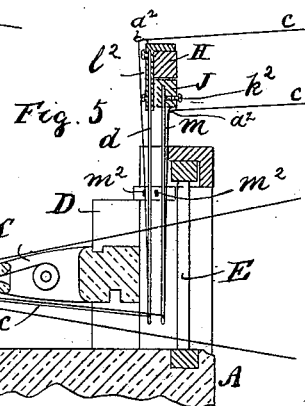
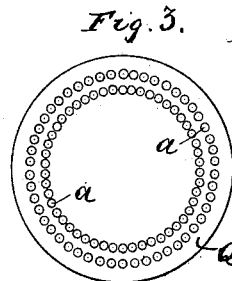
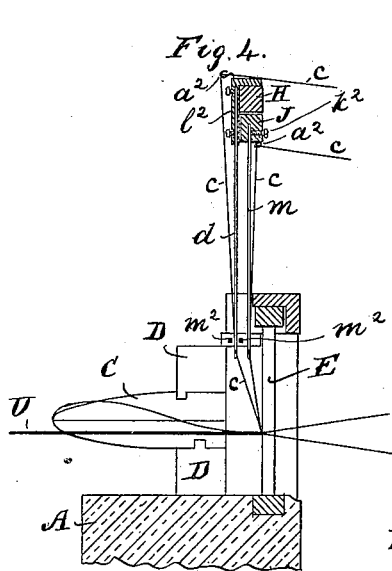
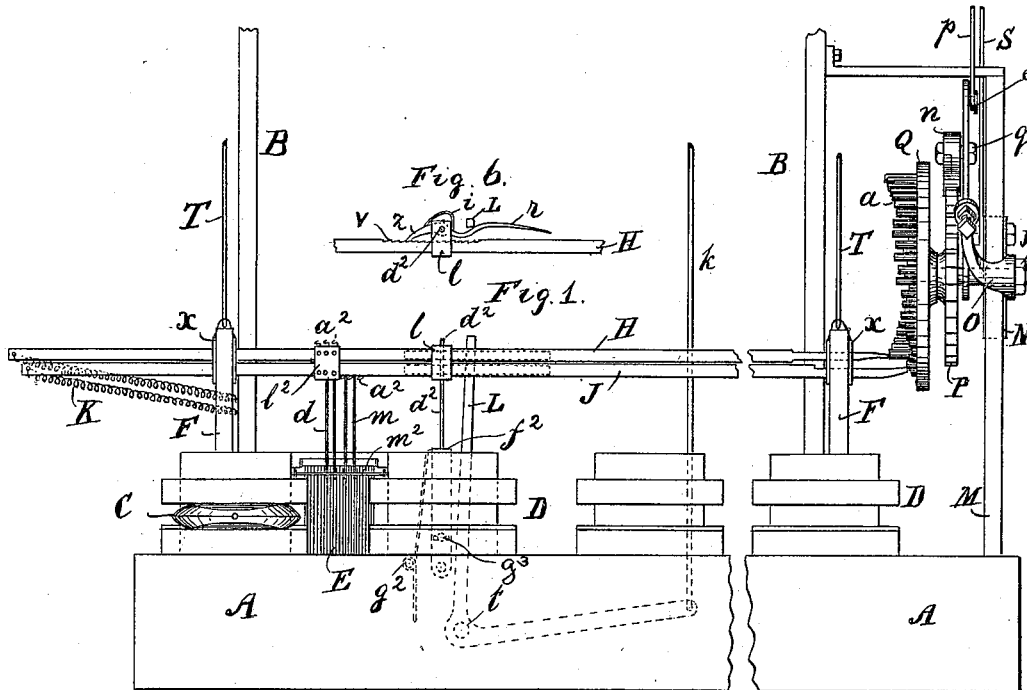


G. H. HODGES.  
LAPPET LOOM.

No. 343,316.

Patented June 8, 1886.



Witnesses.

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G. J. White

Inventor.

George H. Hodges,  
Per C. C. Shaw,  
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(No Model.)

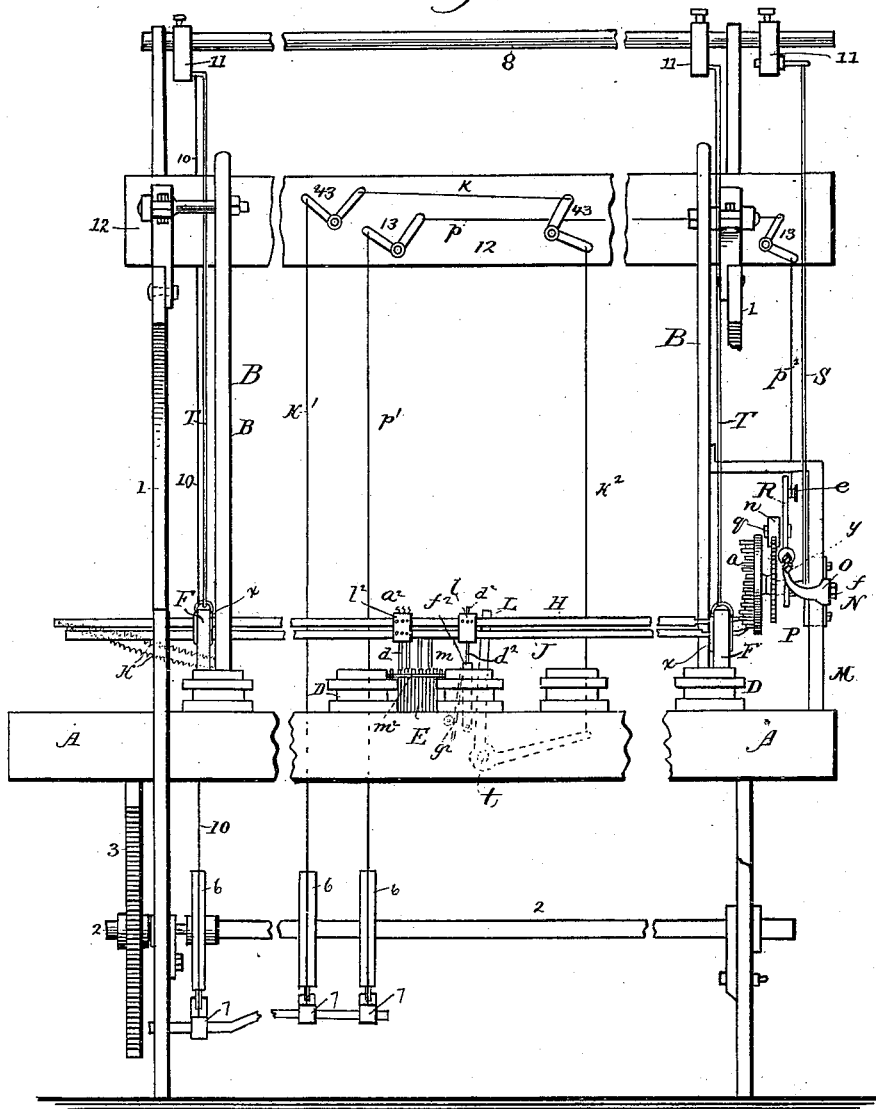
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*Fig. 7*



witnesses:  
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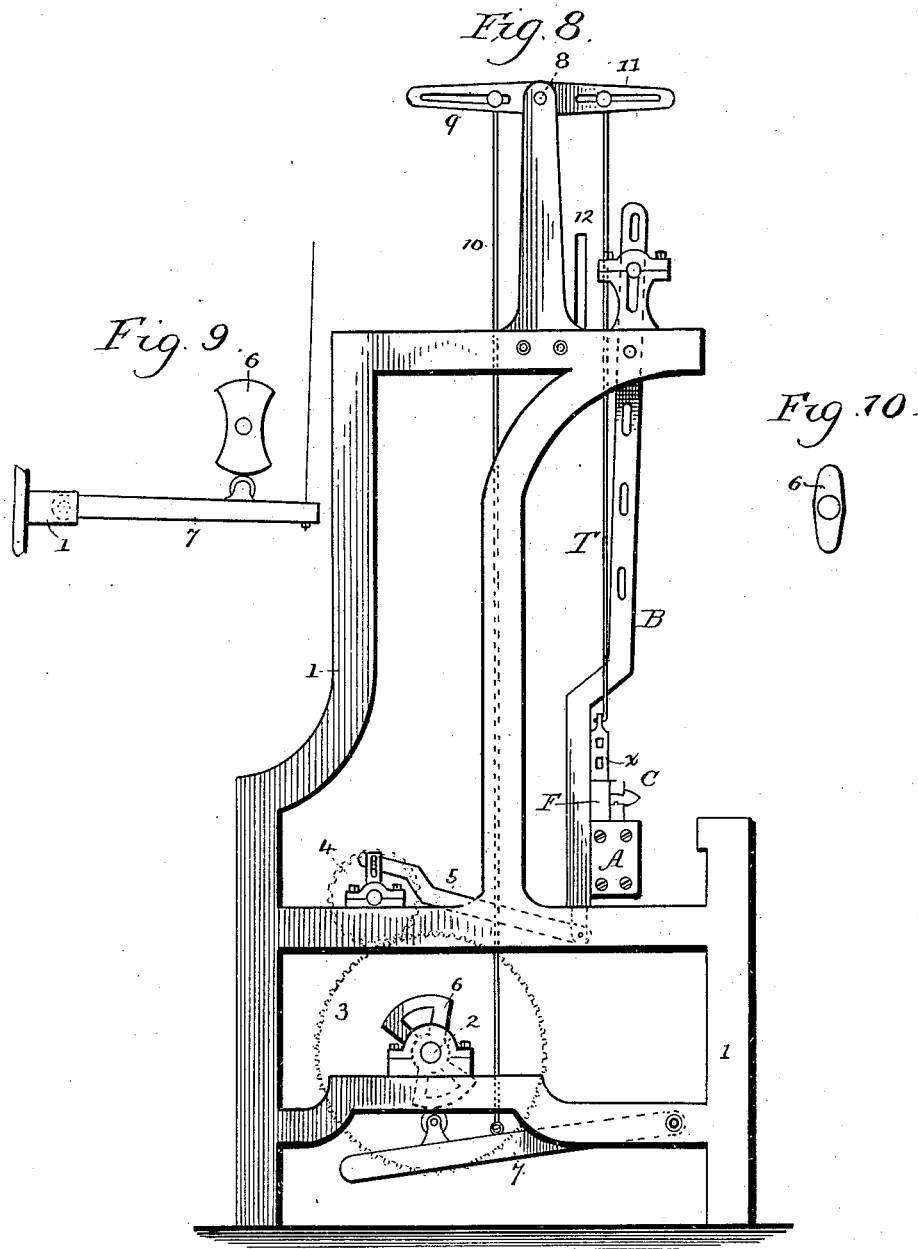
(No Model.)

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# UNITED STATES PATENT OFFICE.

GEORGE H. HODGES, OF CANTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF  
AND THOMAS LONERGAN, OF SAME PLACE.

## LAPPET-LOOM.

SPECIFICATION forming part of Letters Patent No. 343,316, dated June 8, 1886.

Application filed April 13, 1885. Serial No. 162,136. (No model.) Patented in England April 22, 1885, No. 5,011.

*To all whom it may concern:*

Be it known that I, GEORGE H. HODGES, of Canton, in the county of Norfolk, State of Massachusetts, have invented certain new and useful Improvement in Lappet-Looms, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of the lathe and pattern-wheel of a lappet-loom, certain parts of the lathe being represented as broken off; Fig. 2, an end elevation of the lathe, pattern-wheel, and ratchet mechanism for operating the pattern-wheel; Fig. 3, an elevation of the pattern-wheel detached, showing the side opposite that represented in Fig. 2; Fig. 4, a sectional view representing the needles elevated; Fig. 5, a like view representing the needles depressed; Fig. 6, a plan view showing a portion of one of the needle-bars and its pawl. Fig. 7 is a front elevation, partly broken away, of a lappet-loom constructed according to my invention. Fig. 8 is an end elevation thereof, the devices for connecting the needle-bars with their actuating-levers, and also the mechanism for actuating the pattern-wheel being omitted in order to avoid confusion and to better illustrate the features shown in this figure. Figs. 9 and 10 are views of details.

Like letters of reference indicate corresponding parts in the different figures of the drawings.

My invention relates more especially to that class of looms which are designed for manufacturing figured or ornamental elastic fabrics—such as suspender-webbing, and also ribbons, tapes, and narrow goods generally.

The nature and operation of my improvement will be readily understood by all conversant with such matters from the following explanation, it not being deemed essential to show all parts of the loom in order to illustrate the invention.

In the drawings, A represents the lathe, B the pendulous arms by which the same is suspended, C a shuttle, D the shuttle-race, and E a section of reed, these parts being all of the ordinary form and construction. Projecting

upwardly from the lathe there are two standards, F F, and fitted to work vertically in a suitable slot in either of said standards there is a slide or box, *x*. Two horizontally-arranged bars or needle-holders, H J, are fitted to slide longitudinally in the boxes *x*, the lower bar, J, carrying two vertically-arranged eye-pointed needles, *m*, and the superposed bar H two corresponding needles, *d*. A coiled-spring, K, is attached to each of the bars or holders H J, one end of the spring being secured to the bar and the other to one of the pendulous arms B, the springs acting contractively to force the bars constantly in the direction of the pattern-wheel, as hereinafter more fully described. A U-shaped clamp, *l*, is passed from front to rear over the bars H J, which bars slide freely through the same, and pivoted in the projecting ends of said clamp on the rod *d*<sup>2</sup> at the rear of said bars there are two ratchet pawls, *z*, said pawls being respectively adapted to engage teeth *v* on said bars, and provided with cam-shaped projections *i*, and curved arms or tail-pieces *r*. The rod *d*<sup>2</sup> is fixed at its upper end in the clamp *l*, and slides freely at its lower end in the socket *f*<sup>2</sup>, which latter is pivoted on a fixed portion of the lathe and adapted to oscillate slightly to permit the lateral movement of the rod *d*. The rod *d*<sup>2</sup> is loose in said socket, whereby the clamp *l* is permitted to rise and fall with the rods H J. A bell-crank lever, L, is pivoted at *t* to the rear portion of the lathe A, the vertical arm of said lever being adapted to engage the tail-pieces *r* of the pawls *z*, and its horizontal arm provided with a vertically-arranged rod, *k*, for a purpose hereinafter set forth.

Projecting upwardly from one end of the lathe A there is a standard, M, provided with a slot, *b*, in which a slide or box, N, is fitted to work vertically. This slide is provided with a fixed horizontally-arranged stub-shaft, *f*, and a two-armed bracket, O. A ratchet-wheel, P, and pattern-wheel Q are journaled on the stub-shaft *f*, and pivoted to one of the arms of the bracket O there is a retaining-pawl, *g*, adapted to engage the wheel P. A bar or lever, R, has its lower end pivoted to the shaft *f*, and its upper end provided with a rod, *p*, said rod having a loop or slot, *j*, in its lower end, in which the headed stud or

wrist-pin *e* works. An actuating-pawl, *n*, adapted to engage the ratchet-wheel P, is pivoted to the lever R by means of the bolt *g*, which passes through a slot, *w*, in said lever 5 and is made adjustable therein by a nut screwed onto its body at the other side of the lever. One of the arms of the bracket O is provided with an adjusting-screw, *y*, adapted to engage the lever R and prevent it from falling too low when it is depressed in actuating the ratchet-wheel P, said wheel being attached to the wheel Q in such a manner as to cause them to revolve conjointly. A rod, S, has its lower end secured to the slide or box N, said rod being employed in raising and lowering said box, and the wheels P Q, bracket O, lever R, and pawls *g n*, conjointly or in unison with the needle-holding bars H J, a rod, T, being secured to each of the boxes *x*, for raising and lowering said bars. A double row of pins, *a*, project laterally from the wheel Q, said pins being constructed of unequal lengths, or in accordance with the pattern to be followed in ornamenting the web, the inner row of pins being adapted to engage the end of the bar H, and the outer row the end of the bar J. The main frame 1 supports in suitable bearings a shaft, 2, to which motion is communicated from a source of power. The shaft 2 carries a gear-wheel, 3, which meshes with another gear-wheel, 4, the shaft of which carries a crank. A rod, 5, connects this crank with the lathe A, and reciprocatory motion is thus imparted to the latter in a well-known manner. The shaft 2 also carries a number of cams, 6, having suitable faces for the work they are designed to perform, and pivoted in the main frame 1 are levers 7 provided near their free ends with friction-rollers adapted to bear upon said cam-faces. A rock-shaft, 8, has its bearings also in said main frame, near the top thereof, and a slotted arm, 9, extends to the rear of said shaft. A rod, 10, connects said arm 9 with one of said levers 7, and oscillatory motion is thereby imparted to said shaft 8. Slotted arms 11 project to the front of said shaft, to which the rods T T and S are attached, whereby at every revolution of the cam 6 the rods H J and pattern-wheel Q, with their accompanying mechanism, are twice raised and lowered.

Upon an extension, 12, of the main frame 1 are pivoted bell-cranks arranged in pairs 13 13 and 43 43, the members of said pairs being connected by rods *p* and *k*, respectively. Rods *p*' and *k*' connect one member of each pair with separate cam-levers 7, and rods *p*<sup>2</sup> and *k*<sup>2</sup> at the other end of the frame connect the other members of said pairs with the levers R and L, respectively, whereby at proper intervals the rods H J are shifted laterally, and the pawl *n* operates the ratchet-wheel P, all as hereinafter described. The web U is ornamented by means of threads *c*, which pass from spools (not shown) mounted on the loom through the guides *a*<sup>2</sup> and thence respectively

through the eyes of the needles *d m* and into the web.

Guards *m*<sup>2</sup> are employed to prevent the needles *d m* from being sprung or drawn out of proper position by the strain on the threads *c* during the process of incorporating said threads in the web. These guards consist, respectively, of rigid wires or rods arranged horizontally in front of the needles near the upper portion of the reed E and firmly secured at either end to a fixed portion of the lathe or shuttle race in such a manner that when a needle is bent a trifle outwardly or toward the front of the lathe by the action of its thread it will strike one of the guards, the vertical movements of the needle not being interfered with thereby. The needles work vertically and pass through the unfilled warp-threads between the path or race of the shuttle C, the reed E, the pattern-wheel and needles swinging with the lathe A. Lateral movements of the needles in one direction or to the left are caused by drawing up the horizontal arm of the lever L by means of the rod *k*, thereby bringing the vertical arm of said lever into contact with the projections *i* on the pawls *z* and causing said pawls to engage the teeth *v* and slide the bars or holders H J to the left, the reverse lateral movement of the needles to the right being caused by the action of the springs K when the vertical arm of the lever L is withdrawn from the projection *i* by depressing the rod *k*. The clamp *l* is returned to its normal position after the vertical arm of the lever L is withdrawn by means of the springs *g*<sup>2</sup>, its movement toward the right being arrested by the stop *g*<sup>3</sup>, which determines the oscillation of the socket *f*<sup>2</sup>. When the vertical arm of the lever L is withdrawn from the projections *i* on the pawls *z*, and strikes the curved arms *r* of said pawls, the pawls are thereby disengaged from the teeth *v* on the bars or holders H J, permitting said bars to be forced by the springs K against their respective pins in the wheel Q; but as said pins are of unequal lengths one of the bars will travel toward the right a greater distance than the other, thus changing the relative position of the needles *d m* with respect to the web E. It will be obvious, however, that when the vertical arm of the lever L strikes the projections *i* on the pawls *z* both of said pawls will be caused to engage the bars simultaneously and both of said bars moved in unison to the left.

In order to more clearly understand the method of incorporating the threads *c* in the web U, and thereby ornamenting the same, I will describe the operation of the principal parts shown during one full revolution of the main driving-wheel of the loom, or one complete traverse of the lathe. The lathe being at the front of the loom, the shuttle at the right-hand side of the web, and the needles, needle-bars, and pattern-wheel elevated, with the needles threaded, and said bars against their respective pins in the pattern-wheel, if, now, the

loom is started up the lathe will be moved or swung back from the breast-beam, and at the first quarter of its traverse the needles, needle-bars, and pattern-wheel will be lowered, and the needles carrying their threads will pass through the warp-threads and remain down while the lathe passes through the second and third quarters of its traverse. After the lathe has passed through the first quarter of its traverse, and while it is making its second and third quarters the shuttle is passed from right to left of the web, completing its passage at about the center of the third quarter of the traverse of the lathe. The needles begin to rise as the lathe enters upon the fourth quarter of its traverse, their upward movement being completed before the lathe completes its fourth or last quarter. The lathe then continues to advance to the front to beat up the filling, and while completing the fourth or last quarter of its course the lever L is actuated through the rod *k*, and the needles carried to the left, after which the pattern-wheel is revolved one notch or step to change the position of its pins with respect to the bars or holders H J, after which the lever L is withdrawn from the projections *i* of the pawls *z*, and striking the arms *r* of said pawls disengages the pawls from the bars H J, and permits the springs K to move the bars to the right into contact with the pattern-wheel, and thereby change the position of the needles preparatory to repeating the operation. The needles *d* are secured to the needle bar or holder H by a screw-clamp, *I*<sup>2</sup>, and the needles *m* in the bar J by screws *k*<sup>2</sup>; but any other suitable means may be employed for this purpose. Any desired number of needles and needle-holders may also be employed.

Instead of using the rows of pins *a*, annular cam-shaped flanges may be employed on the wheel Q, against which the bars H J may abut, if desired.

The movements of the needles may be so timed as to cause them to work "pick-and-pick," or pass through the warp-threads at each throw of the shuttle or otherwise, as desired.

The pawls *z* and lever L afford a convenient means for locking the bars H J together, and moving them away from the pattern-wheel conjointly.

A proper tension and take-up mechanism (not shown) is used with each of the threads *c*.

But one shuttle and one reed are shown in the drawings, but it will be understood that several may be employed in the same loom; also, that one or more needles may be employed with each shuttle and reed, as desired.

It will be understood that it is preferable to have the threads carried by the needles of a

different color or colors from those composing the warp and filling of the fabric; also, that in commencing the weaving the needle-threads should be drawn some distance through the eyes of the needles, in order that the loose ends of the threads may be caught and secured in the web by the shuttle-thread.

I do not confine myself to using the loom for weaving narrow fabrics only.

Having thus explained my invention, what I claim is—

1. The lathe A, shuttle C, reed E, standards F, having boxes *x*, and rods T, in combination with the bars H J, springs K, eye-pointed needles *d m*, collar *l*, pawls *z*, socket *f*<sup>2</sup>, spring *g*<sup>2</sup>, rod *d*<sup>2</sup>, lever L, rod *k*, a pattern-wheel, devices for actuating the rods T and *k*, and devices for rotating the pattern-wheel, substantially as described.

2. The bars H J, socket *f*<sup>2</sup>, spring *g*<sup>2</sup>, rod *d*<sup>2</sup>, lever L, and devices for actuating said lever, in combination with the collar *l*, and the pawls *z*, provided with the projections *i* and arms *r*, substantially as described.

3. The pattern-wheel Q, in combination with the bars H J, devices for moving said bars longitudinally independently of said pattern-wheel, and mechanism for rotating said pattern-wheel, substantially as described.

4. The lathe A, provided with the standard M, having the sliding box N, pattern-wheel Q supported therein, and means for rotating said pattern-wheel, in combination with the standards F, having boxes *x*, the bars H J, carrying eye-pointed needles *d m*, and the springs K, and mechanism for raising and lowering said pattern-wheel and boxes simultaneously, substantially as described.

5. The lathe A, socket *f*<sup>2</sup>, pivoted thereto, and spring *g*<sup>2</sup>, adapted to bear upon said socket, in combination with the rods H J, means for raising and lowering them, the collar *l*, means for attaching said collar to the bars H J, and the rod *d*<sup>2</sup>, adapted to enter said socket, substantially as described.

6. The pattern-wheel Q, ratchet-wheel P, lever R, rods S *p*, and means for operating said rods, bracket O, pawls *g n*, and sliding box N, in combination with the needle-holders H J, carrying needles *m d*, and means for moving said needle-holders vertically and laterally, substantially as described.

7. The lathe A, provided with the standard M, having the sliding box N, carrying the pattern-wheel Q, and ratchet mechanism for intermittently rotating said wheel independently of its up and down motion, substantially as described.

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