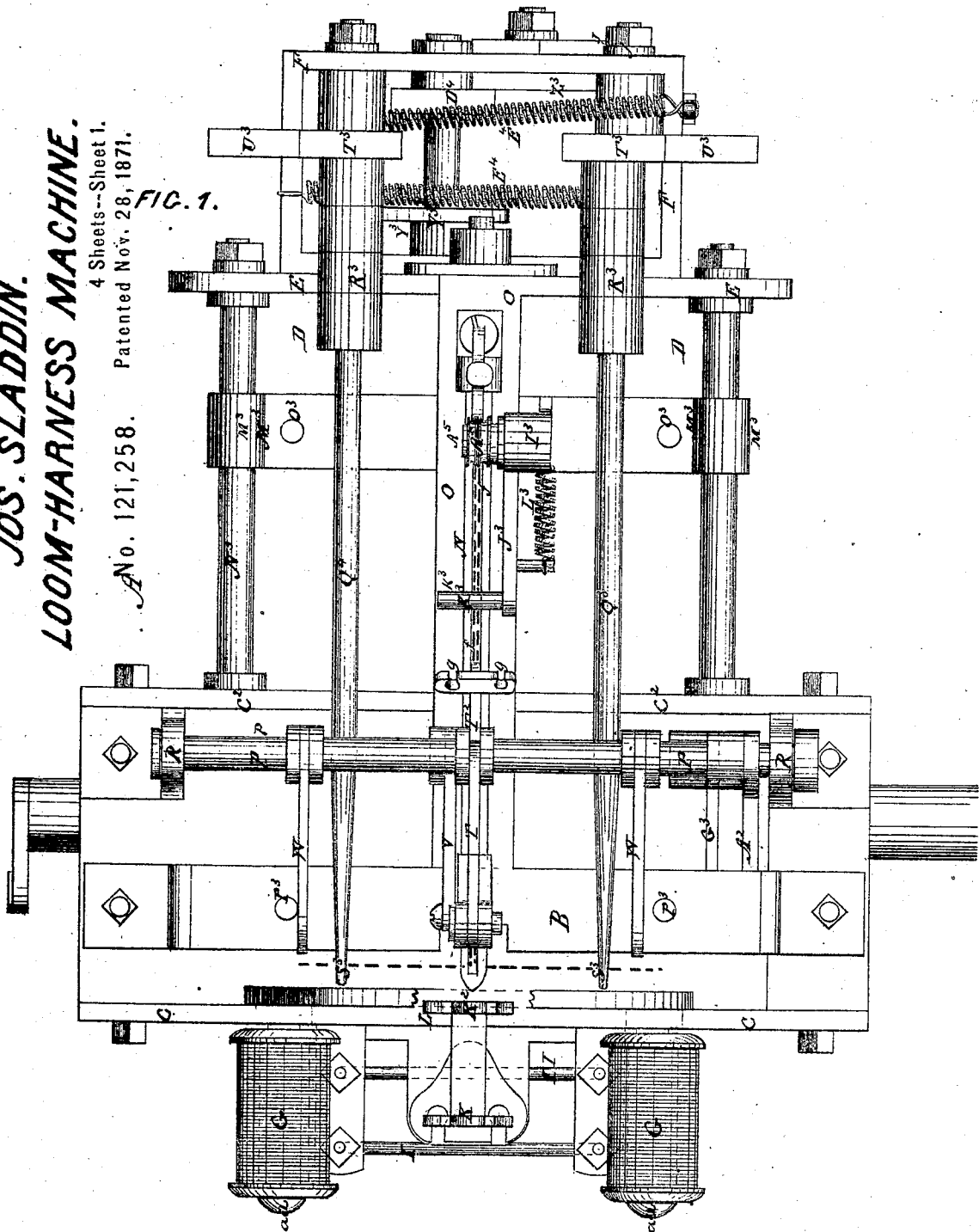


JOS. SLADDIN.
LOOM-HARNESS MACHINE.

4 Sheets--Sheet 1.
 Patented Nov. 28, 1871.

FIG. 1.



WITNESSES.

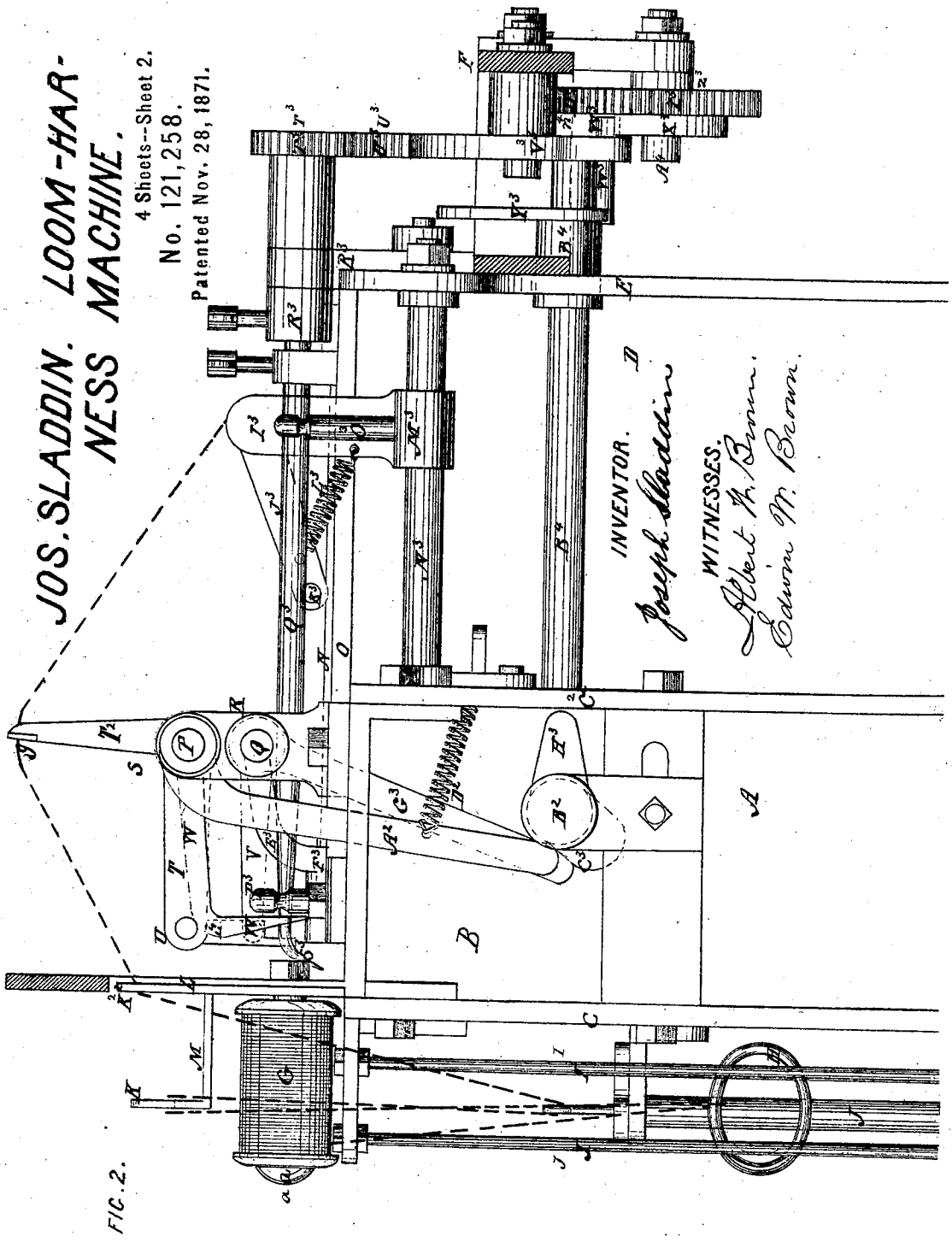
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JOS. SLADDIN. LOOM-HAR- NESS MACHINE.

4 Sheets--Sheet 2.
No. 121,258.
Patented Nov. 28, 1871.



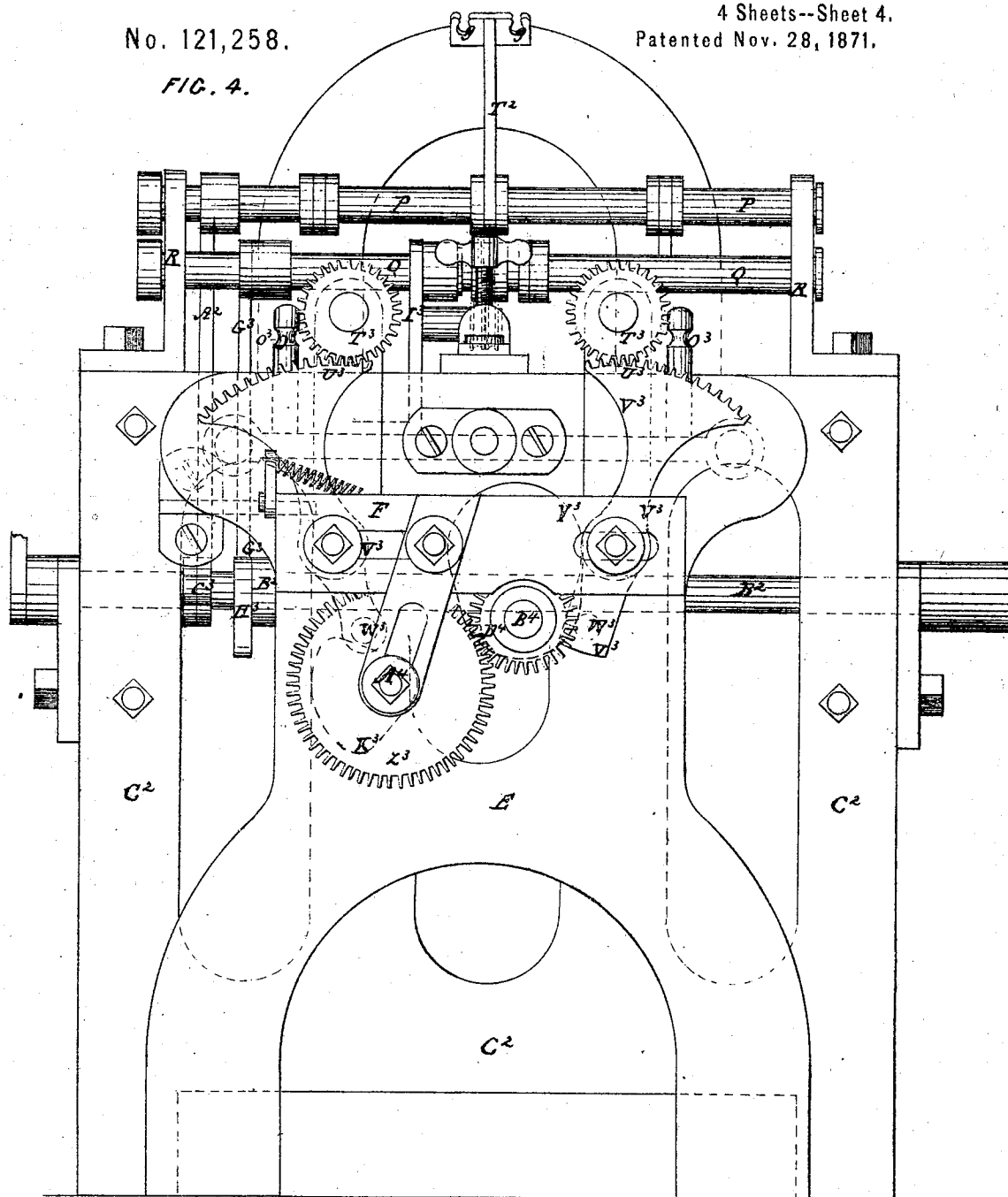
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JOS. SLADDIN. LOOM-HARNESS MACHINE.

No. 121,258.

4 Sheets--Sheet 4.
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FIG. 4.



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UNITED STATES PATENT OFFICE.

JOSEPH SLADDIN, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR TO HIMSELF
AND JOHN LORD, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR MAKING LOOM-HARNESS.

Specification forming part of Letters Patent No. 121,258, dated November 28, 1871; antedated November 13, 1871.

To all whom it may concern:

Be it known that I, JOSEPH SLADDIN, of Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Making Harness for Looms; and that the following is a full and exact description of the same, reference being had to the accompanying drawing.

The present invention relates to improvements in a machine for making harness for looms, forming the subject of Letters Patent issued to me, dated August 4, 1868, and numbered 80,774. The invention consists: First, in the arrangement of a yielding presser-lever to bear upon and across the upper face of the stationary needle of the machine for confining the heddle-yarns in the groove of the needle to prevent abrasion of the heddle-eyes, and also for holding the needle down in position and yet allowing the harness made and as fed along to pass under it to the delivery end of the machine. Second, of the combination with each set of the stitching or knitting mechanism of the machine of a lever, or what I term a "temple," for holding each stitch, after it is thrown off, in position while the machine is operating to form another heddle-eye and to extend the yarns to the rig-bands, &c. Third, in an arrangement of reciprocating rotary rods for opening the harness as it is made, or, in other words, for producing what is known as the "leese" in the harness.

In the accompanying drawing my improvements in the aforesaid machine for making loom-harness are illustrated.

In Plate 1, Figure 1 is a plan or top view. In Plate 2, Fig. 2 is an elevation from one side. In Plate 3, Fig. 3, and in Plate 4, Fig. 4, respectively, is a view in elevation of each end.

A in the drawing represents the frame of the machine. This frame A, in the present instance, consists of a main frame, B, made of two parallel upright frames, C C², beyond one, C², of which it is extended, making a frame, D, constructed of an upright or standard, E, with a horizontally-projecting frame, F. The series of frames C, C², D, and F are suitably tied together. G, bobbins containing the yarn from which loom-harness is to be made. These bobbins are two in number, and are located on horizontal spindles *a* projecting from the end of frame C, at the up-

per portion thereof. At the same end frame C the tension-rings H, two in number, are arranged to move up and down on vertical guide-rods I, their ends being fixed near the upper portion of frame C and extending continuously down the front of the frame C, as shown more particularly in Fig. 3, Plate 3. Between the vertical portions of the ring guide-rods I are fixed two parallel vertical tubes, J, through each of which plays a stem, *b*, that projects from the upper end of the tubes J and terminates in an eye, *c*. The lower end of each of the stems *b* is provided with a head, *d*, which presses upon a spiral spring, *e*, when drawn upward in the tubes. The stems *b* with their eyes *c*, and the tube J and springs *e*, constitute the additional tension-regulators to the tension-rings referred to in the said Letters Patent, and, in the present instance, denoted by H, the yarn from the bobbins being passed through the said rings and eyes, as indicated by heavy dotted lines in the drawing, and as will be hereinafter particularly described. K K², two guide-posts, each provided with two guide-eyes. These guide-posts K K² are formed in the standard L attached to the frame C, and extended upward above the bobbins G and between the two, the one, K, being in the horizontally-projecting arm M of the standard L and the other, K², a continuation of the standard proper. These guide-posts K K² are for the yarns from bobbins G, which are passed through the eyes in them, as will be hereinafter described. N represents the stationary needle of the machine. This needle is located in rear of the standard L, hereinbefore referred to, and extends therefrom to and along a horizontal bar, O, fixed to the frame-work A across the upper ends of the frames C C², and in the center line or nearly so of the machine. This needle N, at its end near the standard L, is pointed, and extending along its length from such end to the other end is a center groove, *f*, from which, at the pointed end, lead two eyes, one on each side of the groove. Above the frames C C², between their vertical planes, are located two parallel horizontal shafts, P Q, the one above the other, but both arranged to turn in bearings in the same vertical posts R fastened to the top of the frames C C². To the upper shaft P, in the same vertical plane as the needle N, is secured a right-angular arm, S,

one branch, T, of which extends toward the frame C and the other, T², in an upward direction. The branch T² of arm S, at its upper end, terminates in two guide-eyes, g, for the yarn from the bobbins, and the arm T has swiveled to it an arm, U, bifurcated at its lower end, and connected through a link, V, to the lower shaft Q, around which such link is free to play. By the prongs h of this bifurcated arm the heddle-eye is held in shape as the yarn is drawn toward the rig-bands for being secured thereto, and the operation of them as well as of the link-connection V will be hereinafter explained. To the same shaft P, carrying the angular lever S above referred to, are secured two similarly-shaped arms, W W, projecting from the shaft toward frame C and extending downward nearly to the plane of the stationary needle N, where they terminate, being tapered off to a thin edge at their extreme ends. These levers W W are the temples of the present invention, and they are located on the shaft P, one each side of the angular lever S, and in position just inside of the plane of the rig-bands of the machine in each case, (the knitting or sewing-needles, as is obvious, being in action outside of the rig-bands,) and by their extreme ends, as the stitches in turn are thrown off the needle, hold them, while the machine is again performing the operation of making a heddle-eye, drawing the yarn, &c. The operation of the temples will be hereinafter described. A² is a lever applied to shaft P at one end, and extending down to the plane of the driving-shaft B², located in suitable bearings in the under part of the frames C C². H³, a cam-wheel applied to shaft B². On this cam the lower end of lever A² bears, operating through it the shaft P, and imparting to it an intermittent rocking motion at suitable times. D² represents a spring for confining the lever A² to cam H³. To the shaft Q is secured an arm, E³, extending toward frame C, and having its end F³ made of suitable shape to embrace the stationary needle on its sides and top. G³ represents a lever secured to shaft Q, and extending down to the plane of the driving-shaft B², its lower end being borne by a spring against a cam, C³, so that by the revolution of the said shaft B² an intermittent rocking motion is given to the shaft Q, raising the lever E³ from and carrying it down to the needle N at suitable times. To the rear of the shafts P and Q is fixed a post, I³, to which is hung a lever, J³, provided with an arm, K³, that bears upon the upper face of the stationary needle, a spring, L³, confining it thereon with an elastic yielding pressure. This post I³ also carries two guide-pulleys, A⁵, for the bobbin-yarns. M³, the carriage of the machine, having a movement upon and from one end to the other of the horizontal guide-rods N³, being operated by an endless screw, receiving motion in any suitable manner from the driving-power. To this carriage M³ the rig-bands are secured, passing from the posts O³ thereof over guide-pulleys, through lapper-cylinders, to the bobbins, on which they

are wound, as plainly shown and described in the drawing and specification attached to and forming a part of the Letters Patent aforesaid. In the present instance these rig-bands are secured to posts P³, as it was not deemed necessary to show the said arrangement of guide-pulleys, &c., for the reason stated. Q³ Q⁴, the rods for producing the leese in the harness. These rods are two in number. They are located in the same horizontal plane and on each side of the stationary needle, and turn in bearings R³ at one end, just above the frame E, extending therefrom toward the frame C under the shaft Q, and terminating near such frame C, and their ends S³ taper to a point, or nearly so, and are bent at right angles, or nearly so, to the length of the rods. Each rod Q³ Q⁴, at its bearing, is provided with a gear-wheel, T³, gearing into each of which is a sector-gear, U³, hung upon horizontal studs fixed in the frame F. The sector-gears U³ each have an arm-extension, V³, bearing respectively through friction-wheels W³ upon cams X³ and Y³. The cam X³ is upon the back of a gear-wheel, Z³, hung upon a stud, A⁴, of the frame F, and the cam Y³ is fixed to a horizontal shaft, B⁴, arranged to turn in bearings in the frames C² E, and to be driven by the shaft B², hereinbefore referred to, through bevel-gear wheels X X. D⁴, a pinion-wheel on shaft B⁴ gearing into gear-wheel Z³, above referred to. E⁴, spiral springs suitably connected to sector-gear arms V³ to hold the said arms in contact with the cams which actuate them.

Through the arrangement of gear and cam-wheels above described the leese-rods are rocked in their bearings, the rod Q³ having two motions to one of the rod Q⁴, as and for the purpose to be hereinafter described.

Having thus described in detail the construction and arrangement of the several parts of the machine embraced in the present invention, I will now proceed to describe the manner in which the same operate in connection with the other mechanism shown in the aforesaid Letters Patent, first stating that the yarn from the bobbins G G, and from which the harness is made, is passed from said bobbins down through the tension-rings H, and thence through guide-eyes K to and through the stem-eyes e, and from them to and through the guide-eyes K² and the eyes g of angular arms S to and around the pulleys A⁵, and thence along and in the groove of stationary needle N, and out at each side thereof through the eyes near the point of the needle, whence the yarns are taken to the rig-bands and fastened thereto. With the yarn from bobbins G thus conducted to the rig-bands the operation of the machine—so far as looping the yarn from one side of the needle over the needle and holding it, while the loops of the yarn are carried to the planes of action of the barbed needles to secure them to the yarn from the lapper-cylinders, which at the same time is lapped around the barbed needles and wound around the rig-bands, and the needles moved back and closed

against pressers in the usual manner of knitting—is substantially the same in all its parts and arrangements as that described in the schedule annexed to the Letters Patent aforesaid.

This operation is then repeated, and for each operation the carriage M³ is moved toward the frame F a distance corresponding with the space due to one heddle-yarn, or sufficiently to take up the slack and keep a proper tension on the yarn.

When the yarn from one side of the needle is looped around the stationary needle and thereon deposited, the shaft P is operated through the connecting devices described, in the proper direction to bring the tines *h* of the bifurcated arm U onto such loop, which is the heddle-eye, and to hold it in place as the loops of the yarn are drawn toward the rig-bands, as stated, the temples W W at the same time descending and holding the stitches previously thrown off by the knitting-needles at the rig-bands by bearing with their ends against the same on the inner side of the rig-bands. When the yarns have been carried to the rig-bands and stitched thereon the shaft P is operated to lift the bifurcated arm U from the yarn-loop or heddle-eye, and to remove the temples from against the stitches at the rig-bands, and so on at each successive action of the machine.

With the link connection for the bifurcated arm abrasion of the heddle-eyes in the drawing out of the tines, as stated, is prevented, it serving to guide or move the same in its travel out of the heddle-eye without rubbing against the yarn.

At each operation of the machine, and at the proper time, to form a heddle-eye to secure the yarn to the rig-bands, &c., the carriage is moved outwardly a distance corresponding with the space due to one heddle-yarn, and sufficiently to take up the slack and keep a proper tension on the yarn, and through the arrangement of a feeding screw-shaft, as stated.

The heddle-eyes pass along the needle through the feeding of the carriage, as stated, the yarns from bobbins passing through them, as is obvious, and being held down in the groove of the stationary needle by the arm of the yielding lever J³ arranged to bear across the top of the needle, and the yarns in the said groove are thus prevented from abrading the inner surface of the heddle-eye. The lever J³ also holds the needle N down in position, but yields to allow the harness made to pass under it to the delivery end of the machine.

By the arrangement of the yielding stems with eyes, through which the heddle-yarns are passed, as described, in connection with the tension-rings, the proper tension is maintained on the yarns, as is obvious, the one assisting the other.

By the rods Q³ Q⁴, as harness is made in the machine, the leese thereof is produced, this leese consisting in a certain disposition of the yarn from each side of the needle N upon said rods Q³ Q⁴ as each successive heddle-eye is made.

The purpose of the leese is to open the harness for the reception of the harness-shafts, saving the labor of picking the harness, and, in the present instance, to insure also a correct drawing off, so called, of the harness. The operation of the rods Q³ Q⁴ with the mechanism described is reciprocating rotary, the rod Q³ being moved once for each heddle-eye made and the rod Q⁴ twice. In the case of the rod Q³ the two yarns from the heddle-eyes, as successively made, are the two from the first eye laid above such rod, the two from the second eye below, and the next two above, and so on, alternately, laying them both either above or below, as the case may be, the rod Q³, through the mechanism described, being turned to bring its bent end alternately down or up, and receiving motion in either the one or the other direction once for every movement of the yarn-carriers to the rig-bands, and at the proper times with regard thereto.

In the case of the rod Q⁴ the two yarn-lengths from each heddle-eye, as successively made, are, the one length disposed below and the other above the rod, or vice versa, and so on alternately above and below, or vice versa, as the case may be, this rod Q⁴, through the mechanism described, being turned to bring its bent end alternately up or down, and receiving motion twice for each and every movement of the yarn-carriers to the rig-bands, and at proper intervals of time with regard thereto.

By the respective movements of the leese-rods Q³ Q⁴, above described, it is plain that the yarn-lengths between the heddle-eye and rig-bands on one side of the heddle-eye are parallel and on the other side are crossed. This disposition of the heddle-yarns on rods Q³ and Q⁴ is the leese so called; and before the harness is removed from the machine, or the said rods withdrawn, the harness-shafts are inserted from end to end of the woven harness. By crossing the heddle-yarns the correct drawing off of the harness is insured, and by inserting the shafts before removing the leese-rods the labor of picking is obviated.

The leese-rods Q³ Q⁴ may be arranged for operation the reverse to that stated—that is, the one, Q³, to operate twice instead of once in a given time, and the rod Q⁴ once instead of twice; and as the crossing heddle-yarns are always the lower side of the harness when in a loom, for the reason that the harness is drawn off from the lower side, it is preferable to produce such crossing of the heddle-yarns at the knotted end of the heddle-eye, as the knot is a positive barrier to the detachment of the yarn from heddle-eye.

Having thus described my improvements, what I claim as my invention, and desire to have secured to me by Letters Patent, is—

1. The presser-lever J³, having arm K³, in combination with grooved stationary needle N and spring L³, all arranged and operating as described, for the purpose set forth.

2. The leese-rods Q³ Q⁴, having the within-de-

scribed rotary movement, substantially as and for the purpose set forth.

3. The gear-wheels T^3 Z^3 D^4 , sector-gears U^3 , arms V^3 , and cams X^3 Y^3 , in combination with the leese-rods Q^3 Q^4 , substantially as and for the purpose described.

4. The rocking temples W , arranged and oper-

ating substantially as described, for the purpose set forth.

The above specification of my invention signed by me this 25th day of July, A. D. 1870.

Witnesses:

JOSEPH SLADDIN.

ALBERT W. BROWN,

EDWIN W. BROWN.

(95)