(No Model.) 2 Sheets—Sheet 1.

M. LACHMAN.

SEWING MACHINE.

No. 377,525. Patented Feb. 7, 1888.

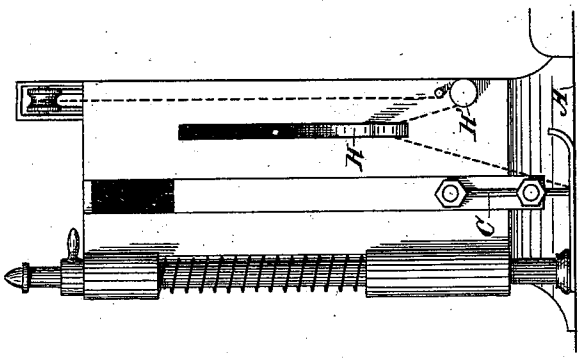


Fig. 2.

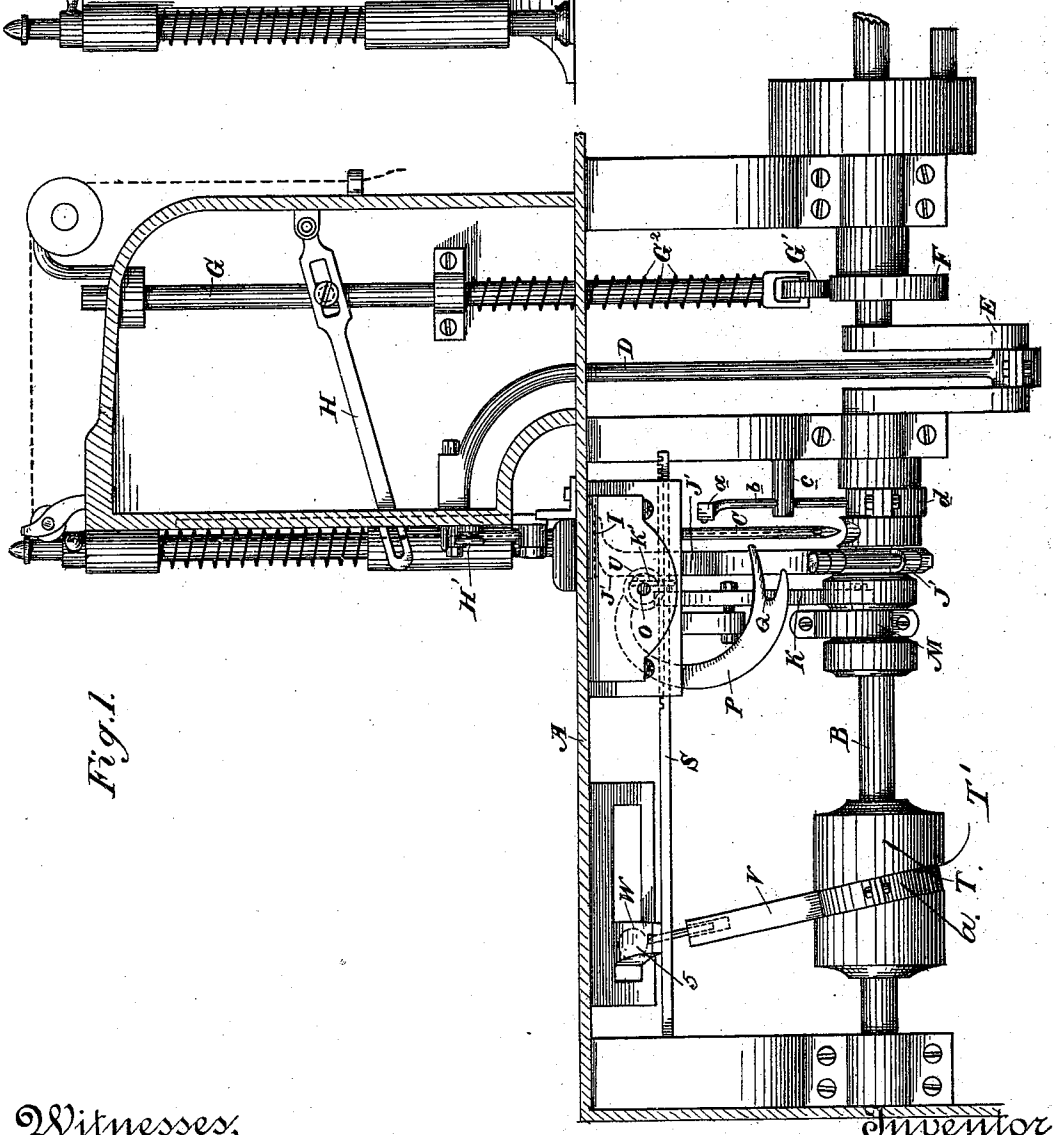


Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

M. LACHMAN.

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Fig. 5.

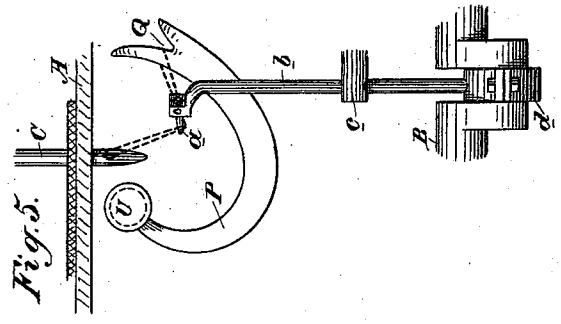


Fig. 8.

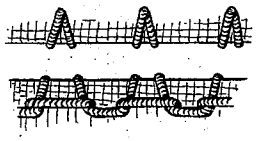


Fig. 4.

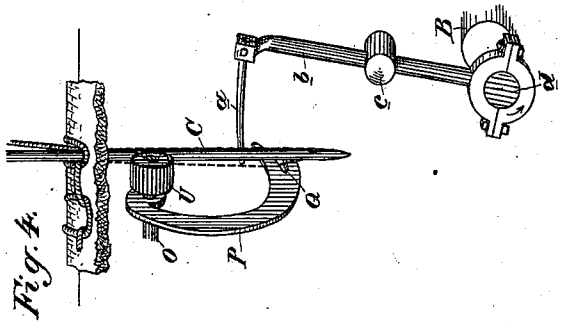


Fig. 3.

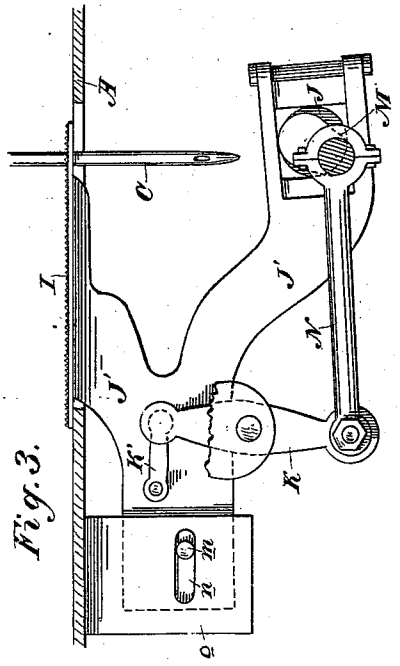


Fig. 7.

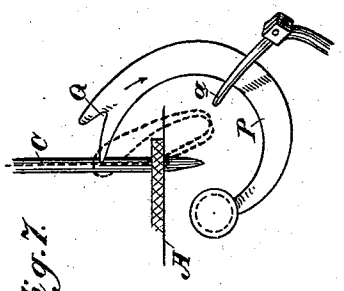
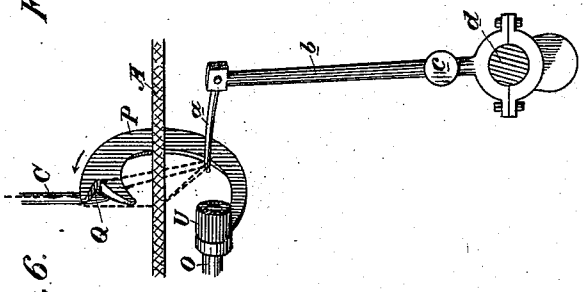


Fig. 6.



Witnesses,
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UNITED STATES PATENT OFFICE.

MORRIS LACHMAN, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO THE COMMERCIAL OVERSEAMING SEWING MACHINE AND MANUFACTURING COMPANY, OF SAME PLACE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 377,525, dated February 7, 1888.

Application filed October 7, 1886. Serial No. 215,631. (No model.) Patented in England January 25, 1887, No. 1,113.

To all whom it may concern:

Be it known that I, MORRIS LACHMAN, of the city and county of San Francisco, State of California, have invented an Improvement in Sewing-Machines, (for which I have obtained Letters Patent in Great Britain, dated January 25, 1887, No. 1,113;) and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in sewing-machines, and is especially based upon a device for which application was filed by Charles Kohler, February 20, 1886, and upon which a patent has been allowed.

My present improvement consists in the peculiar constructions and combinations of devices, which I shall hereinafter fully describe and claim.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a vertical section taken through the table of the machine, showing the driving-shaft and operating parts below the table, and also the parts above the table. Fig. 2 is an end view of that portion of the machine above the table, showing the presser-foot, needle-carrying bar and guide and thread and tension. Fig. 3 is a view of the mechanism by which the feed is operated. Figs. 4, 5, 6, and 7 are views showing the relative position of the vertical thread-carrying needle and the hook from the commencement to the termination of the stitch. Fig. 8 shows the stitch.

A is the table of the machine, and B is the driving-shaft, upon which all the various mechanisms are attached for operating the machine.

C is the vertically-moving needle, which is actuated by the arm D, connecting with the needle-guide and extending downward through the table to the crank E, by the operation of which the needle is caused to reciprocate.

F is an eccentric or cam fixed to the shaft B, and it actuates the thread-tension through the vertical arm or rod G and the lever-arm H, which is fulcrumed within the case above the table, its outer end extending through the end of the casing, and being slotted to allow the thread to pass through it from the tension devices H′, which are similar in general construction to those in ordinary use. The rod or bar G moves in guides, and its lower end is provided with a roller, G′, which travels in contact with the eccentric or cam F, so that the rod is forced upward as the larger part of the cam arrives beneath it, and when the cam recedes the rod is carried downward, so as to keep the roller in contact with its periphery by means of the spiral spring G^2, which surrounds the rod.

I is the feed-plate by which the goods are advanced beneath the needle as the stitches are made, the movement being what is termed the "four-motion feed." The necessary movements for the advance of the goods are effected by means of a cam or eccentric, J, and a crank, M, the vertical movement being produced by the eccentric J and the horizontal by the crank M through the rod N, the lever K, and the short connecting-link K′. The cam J revolves in a box or collar in the end of the arm J′, and the opposite end of this arm has pivot or fulcrum pins *m*, which slide in horizontal slots *n* in arms or hangers *o* beneath the table. A fork or branch of the arm J′ extends upward above the end, which is moved by the eccentric or cam J and carries the feed-plate I, which is raised and depressed by this movement. The horizontal movements are produced by the crank M, which has a pitman, N, connecting it with the lower end of a lever, K, centrally fulcrumed to a hanger beneath the table. The upper end of the lever is connected with the arm J′ near its sliding or fulcrum end by a link, K′, so that by this connection the combined movements necessary to raise, advance, depress, and retract the feed-plate are produced by the mechanism above described.

Beneath the table is journaled a short shaft, O, upon which the curved hook P is secured, the end of this hook being notched or having a double point, as shown at Q. Upon the shaft O is fixed the pinion U, and S is a rack-bar sliding in a guide just beneath this pinion, so that its teeth will engage those of the pinion, and when pushed in one direction will rotate the pinion and shaft and cause the curved hook or needle P to be carried from a point below the table around in an arc of a

circle to point above the table and the edge of the fabric which is being sewed. In order to reciprocate this rack-bar S, I have devised an improved mechanism by which I avoid the use of a segmental rack and pinion. This mechanism comprises a grooved enlargement, T, fitted to the driving-shaft and having its groove T′ engaged by a strap, *a*, connecting with an upwardly-extending arm, V, having at its outer end a ball-and-socket joint, as shown at W, whereby said arm V is permitted to move from side to side by the peculiar action of the grooved enlargement, and also allows the head 5 to turn in the socket which is connected with the rack-bar S, so that it reciprocates with it. By this construction I am enabled to take up all wear, and there is no lost motion or noise caused by the rapid operation of the machine. In this apparatus I am enabled to use the two threads and the reciprocating curved needle which are described in the former application above referred to; or, as in the present case, I can use a single thread, which I carry upon the vertical needle C, and which the curved hook P engages below the table and carries around above the fabric, while the vertical needle is rising, so that when it again descends it will pass through the loop thus carried up, and will form a stitch.

a is a hook-shaped arm, which passes over the point of the semicircular hook or needle P after the vertical needle has passed downward and the hook has passed through the loop formed below the table, this arm *a* holding the loop upon the point of the hook, so as to insure its being carried around above the fabric, after which it is released from this arm, which is oscillated by means of the shank *b* sliding through a loosely-oscillating stud, *c*, and connecting with an eccentric or crank, *d*, upon the shaft B, in a manner similar to that shown in the former patent.

The operation of forming the stitch will then be as follows: The hook P being drawn backward beneath the table, the vertical needle C descends with its thread, and as it begins to ascend it forms a loop, through which the point Q of the hook passes, and the notched end takes this loop, as shown in Fig. 4, and carries it forward, as shown in Fig. 5, when the arm *a* is advanced by the operation of its eccentric, so as to pass above the loop and hold it in place, forming a bight as the vertical needle rises, while the curved hook is also passing upward through the table and over the upper edge of the fabric, as shown in Fig. 6. The vertical needle then descends, as shown in Fig. 7, passing through the end of the loop, which has been carried above the table, as in Fig. 6, and the end of the arm *a* is then withdrawn from the bight of the loop, while the vertical needle descends, as shown in Fig. 8, passing through the loop, which has been brought above the fabric by the hook, and it is then tightened up after being released from the arm *a*, so as to form the stitch, the operation being repeated in each case. By simply removing the hook P from the shaft O and substituting the curved needle shown in the former patent, the double thread may be used without other change, and the stitch formed in that manner. By means of these changes and improvements I produce a simpler-running machine with less loose joints.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A vertically-reciprocating thread-carrying needle above and a semicircular or curved hook or needle fixed to a shaft beneath the table, a pinion upon said shaft, and a horizontally-reciprocating rack engaging said pinion, so as to cause it and the shaft to rotate backward and forward, in combination with the grooved enlargement T, the arm V, and the ball-and-socket-joint connection with the rack S, substantially as herein described.

2. The vertically-reciprocating thread-carrying needle moving through the table from above, a hook having a double point and notch at its outer end and fixed to a shaft beneath the table, with mechanism for partially rotating said shaft, so as to alternately carry the hook from below the table through the thread of the reciprocating needle to a point above the edge of the fabric while the vertical needle is carried upward, so as to allow the point of the needle to again pass through the thread-loop before entering the fabric, and returning the hook to a point beneath the table while the vertical needle is again passed downward, in combination with the arm *a* and means, comprising the shank *b*, oscillating stud *c*, and crank *d*, whereby it engages and holds the bight of the thread-loop while the hook is passing above the table and releases it when the stitch is formed, substantially as herein described.

3. In a feed mechanism for sewing-machines, an arm or bar formed of a single piece having one end slotted to slide upon a guide-pin beneath the table and the opposite end divided into two diverging branches, one of which carries the feed-bar, while the other is fitted to a cam for elevating and depressing said arm, in combination with a centrally-fulcrumed lever and links by which the opposite ends of the same are connected, respectively, with the sliding bar and with an eccentric by which the horizontal motion is produced, as herein described.

MORRIS LACHMAN.

Witnesses:
HOLLAND SMITH,
ARTHUR STRAUSS.