(No Model.) 2 Sheets—Sheet 1.

F. LICHTFELDT.

SEWING MACHINE.

No. 523,361. Patented July 24, 1894.

Fig. 1.

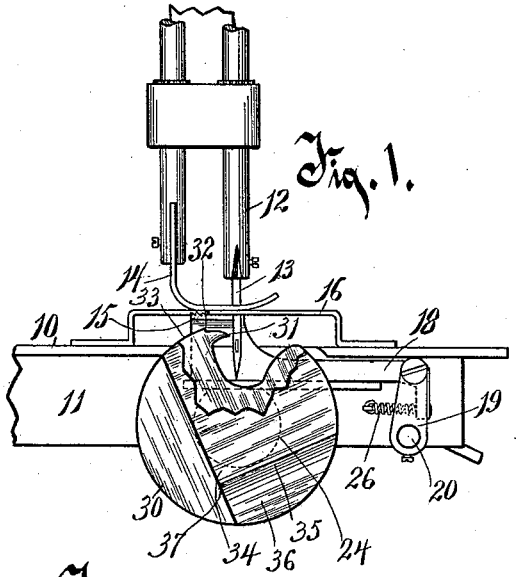


Fig. 2.

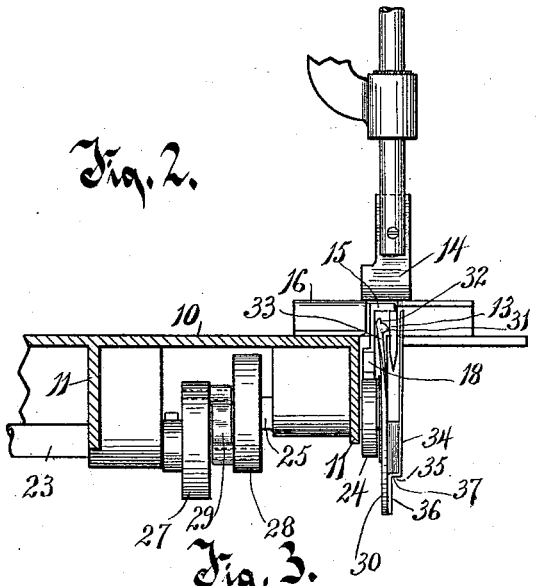


Fig. 4.

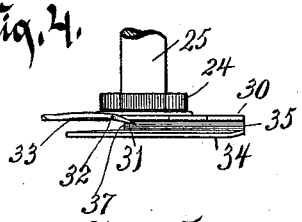


Fig. 3.

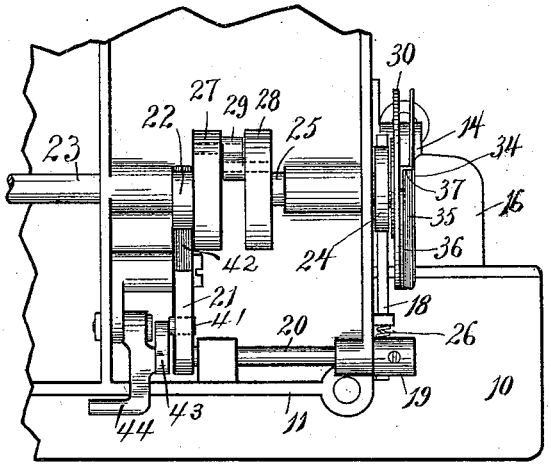


Fig. 5.

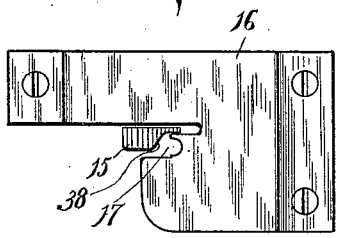
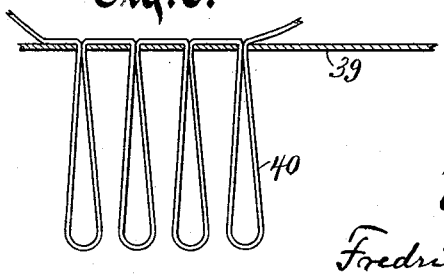


Fig. 6.



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(No Model.)

2 Sheets—Sheet 2.

F. LICHTFELDT.

SEWING MACHINE.

No. 523,361. Patented July 24, 1894.

Fig. 7.

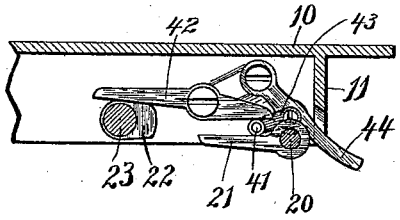
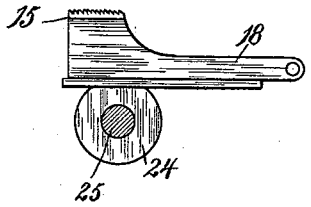


Fig. 8.



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UNITED STATES PATENT OFFICE.

FREDRICK LICHTFELDT, OF MILWAUKEE, WISCONSIN.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 523,361, dated July 24, 1894.

Application filed April 8, 1893. Serial No. 469,508. (No model.)

To all whom it may concern:

Be it known that I, FREDRICK LICHTFELDT, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Sewing-Machines, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention relates to improvements in that class of sewing machines, in which there are a vertically reciprocating needle, and a rotating hook for catching the thread in forming the stitch, which construction is common in the sewing machines known as the Wheeler & Wilson machine.

The object of my invention is to provide means in connection with such a machine, for forming a series of loops of the thread, on one side of the fabric or material to which the loops are secured, without making a stitch or otherwise fastening the thread or loops to the material.

My invention consists in the devices and combination of devices hereinafter described and claimed, or their equivalents.

Figure 1, is a fragment of a sewing machine including among other things the vertically reciprocating needle, the presser foot, the throat plate, the feed and the rotating hook, in which my improvements are involved. Fig. 2, is a view of the same devices, shown in Fig. 1 taken at a right angle thereto. Fig. 3, is an under side view of a corresponding fragment of the machine. Fig. 4, is a detail of the improved hook and shield. Fig. 5, is a plan view of the throat plate and feed plate of the machine, in which improved features are involved. Fig. 6, is a section of fabric or material, with loops therein as formed by my improved devices. Fig. 7, is a detail of the feeding mechanism. Fig. 8, is a detail of the feed elevating and dropping mechanism.

In the drawings 10 is the base plate or table of the machine, and 11 are flanges projecting therefrom providing bearings for operative parts of the mechanism.

12 is the vertical reciprocating needle bar carrying the needle 13 therein.

14 is the presser foot adapted to bear downwardly yieldingly against the fabric or material inserted between it and the feed plate 15 below it.

16 is the throat-plate, which rests on and is secured to the base plate 10. In the drawings this throat-plate is shown as elevated above the base plate, which form of construction was adopted in this instance to provide room vertically for the enlarged hook-disk hereinafter described. This throat-plate can be let down into the base plate 10 in the manner common in sewing machines, it being only necessary in such case to lower the shaft that carries the hook-disk, sufficiently, to provide room for the hook-disk below the throat-plate.

The plate 16 is provided with a suitable recess 17 for the passage of the needle through it, and for the feed plate 15 and its horizontal movement therein, to the extent required in feeding the fabric or material past the needle. The feed-plate 15 is located substantially in the plane of the throat-plate, it being so mounted as to be dropped slightly when moved rearwardly for engaging the fabric to feed it. The feed plate 15 is rigid on an arm 18 hinged to a crank arm 19 fixed on the rock-shaft 20. The rock shaft 20 is provided with an arm 21 that bears against a vertically movable and laterally adjustable pin or roller 41, interposed between this arm and one arm of the medially fulcrumed lever 42. The other arm of the lever 42 rides on the cam 22, fixed on the main driving shaft 23. The bearing roller 41 is mounted on one extremity of the arm 43 which arm is hinged on the swinging hand lever 44. By shifting the lever 44 the extent of the feed is adjusted. This construction provides for the reciprocation of the feed-plate at the proper time, and the feed-plate is suitably raised and lowered by a cam 24 on the hook-shaft 25, in connection with the expansion spring 26, interposed between an extension of the arm 18 and a fixed support. This spring 26 also serves to throw the feed plate 15 rearwardly and hold it there yieldingly, subject to the action of the feed-actuating mechanism hereinafter described.

The main driving shaft is provided with a terminal disk 27 and the hook-shaft 25 is provided with a terminal disk 28, which disks are located in adjacent parallel planes and are each provided with a crank pin, which crank pins are connected loosely by a link 29. This construction provides for the variable

revoluble speed of the hook-shaft 25 as compared with the driving shaft 23 and with the reciprocation of the needle and the movements of the feed-plate, which latter devices (the needle and the feed-plate) are operated directly from the main driving shaft.

The mechanism thus far specifically described is in its general features, in common use.

To provide for forming a series of loops on a fabric or other material, in connection with the mechanism hereinbefore specifically described, an enlarged disk 30, say three inches or more in diameter, is fixed on the extremity of the hook-shaft 25. At one side of this disk, a hook 31 is formed on the disk by cutting away adjacent parts of the disk. This hook 31 is made comparatively sharp at the extremity of its bill, and is turned outwardly obliquely to the plane of the disk. At the base of the hook a shoulder 32 is formed in the disk, projecting radially to the periphery in the radial plane of the disk and of the base of the hook, which shoulder is adapted to prevent the thread when caught by the hook from slipping beyond it on the hook or adjacent part of the disk. The outer surface of the disk 30 near its periphery for a distance rearwardly from the hook, is beveled or chamfered off at 33, whereby greater space is provided for the thread, which is sometimes a small twine, between the disk and the adjacent downwardly projecting needle. The loops formed in the thread by this enlarged hook-provided rotating disk are of considerable length, and would inevitably become tangled with the thread on that surface of the fabric on which they are formed, if they were not pushed away and held out of the line of the needle while making succeeding loops, and for this purpose I provide a shield 34 which is secured to and rotates with the disk. This shield is located parallel to and at a little distance from the disk opposite the hook, both in front and at the rear of the hook, and extends toward the opposite edge of the disk to a point beyond the axis of the disk, where it is offset at 35, and beyond the offset is provided with a foot 36, which fits against the disk and is secured rigidly thereto. The shield is preferably of substantially the same circular form as the disk, except that a segment of the shield is removed in the rear of the hook. The space between the disk and the shield, is sufficient to provide for the movement of the needle with the thread carried by it, therein. The shield is opposite to the hook and all that part of the disk that revolves alongside the needle during its travel beneath the bed plate, and protects the needle during all the time it is opposite to the disk.

In operation, the hook takes into the thread in the needle above the eye and retains its hold of the thread until the hook has traveled around nearly or quite to the lowest part of its line of travel, thus forming a loop as long as the diameter of the disk, when the loop being no longer pulled on by the hook, and by reason of the position of the hook as it starts on its travel upwardly, slips off the hook, and as the disk continues to rotate, is caught by the offset at 37, and on the main shaft 23 is by the further rotation of the disk, thrown out of the space between the shield and the disk, and is thereafter by the shield prevented from becoming entangled with the needle, or with succeeding loops as successively made. If for any reason the loop should at the proper time fail to slip off the hook, the loop will be caught by the offset at 37, and will be pulled off the hook. The mechanism of the feed-plate 15 is so adjusted that the feed-plate clamps the material and the thread already formed in a tight loop on the upper surface of the material, to the presser foot at just about the moment that the hook 31 takes into the thread above the eye of the needle, so that the pull of the hook draws down the unused thread through the eye of the needle, and if the loop is not thrown off the hook at the proper moment, the strain on the loop (held at one end by the feed-plate and at the other end by the hook) by the cross push of the offset at 37, will quickly pull it from the hook. The omitted segment of the shield provides ample space for the escape of the loop laterally beyond the shield.

The feed plate 15 is beveled off laterally at 38 so that as the feed plate is thrown back beneath the material with reference to moving it forward, the inclination of the edge of the plate will push the recently completed loop aside, rather than engage it and push it under the needle. In Fig. 6, I show a section of the material 39, in which the loops 40 are formed, the figure also showing the manner in which the loops are constructed.

The cams 22 and 24, while they are in a general way such as have heretofore been in use, are specifically of different form than any used before, in that the cam 22 on the main shaft 23 is so shaped as to actuate the feed plate suddenly and quickly, being circular except on one side, at which side it is elongated radially so as through lever 42 to depress the arm 21 quickly and briefly, thereby rocking shaft 20 and forcing the feed plate 15 forward with a corresponding quickness, while the cam 24 on the hook-shaft 25 being circular except a removed segment on one side, supports the feed plate flush with the throat plate and against the presser foot, except for a brief period when the straight side of the cam is directly beneath the arm 18.

It will be understood that the needle being actuated directly from the main shaft 23, reciprocates regularly with the revolution of the shaft, and that the feed plate being held up to the presser foot by the cam 24 (on the hook-carrying shaft 25, which shaft is linked to, and is rotated at variable speed with the

hook-disk thereon, by the main shaft), clamps the fabric and thread loops thereto, except for the brief period that the feed plate is by spring 26, brought down on the straight face of the cam 24 and away from the presser foot, during which period said spring also throws the feed plate rearwardly, which is just at the time that the needle is near and at the highest point of its movement, and that cam 22 on the main shaft acting through lever 42 and the rock shaft 20 and its arm, feeds the plate 15 forward quickly just as the needle starts downwardly from its highest point of travel and before the needle reaches the fabric. The several parts of the mechanism are properly adjusted relatively therefor. This construction, adjustment and action, adapt the machine for forming the loops on the fabric in the manner hereinbefore stated successfully and without danger of overlapping or entangling the thread in the manufacture thereof.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a sewing machine, the combination with a reciprocating needle, of a rotating disk provided at its periphery with a thread-catching hook, and a disk or plate shield located opposite to and at a little distance from the face of the disk, which shield is attached to the disk substantially diametrically opposite to the hook and rotates therewith, said shield being so disposed as to be opposite to and cover and protect all that portion of the needle that is opposite the hook disk during the travel of said needle below the bed plate, and being cut off or omitted segmentally at a part opposite the hook disk and in rear of the hook, whereby the thread can escape laterally from the plane of the needle space between the hook disk and the shield, substantially as described.

2. In a sewing machine, the combination with a reciprocating needle, of a rotating disk provided at its periphery with a thread-catching hook, and a shield located opposite to and at a little distance from the face of the disk, which shield is of such extent and is so disposed as to be opposite to and protect the needle during its travel beneath the bed plate alongside the disk, said shield being attached to the disk by an offset, which offset and attachment are at a distance from the hook being substantially on the opposite side diametrically of the disk, the offset being adapted as the disk revolves to engage the loops of the thread and throw them out of the space between the disk and the shield, substantially as described.

3. In a sewing machine of the character described, the combination of a reciprocating needle, a rotatable thread-catching hook, a movable feed-plate, a feed-plate-dropping cam adapted by having a small part of one side only of a circular disk omitted to briefly and suitably drop the feed-plate, a feed-plate-actuating cam adapted by having a small portion of one side only of a circular disk projected outwardly radially to quickly and at proper time throw the feed-plate forward, and a spring adapted to retrieve the feed plate when released by said cams, the parts being arranged substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FREDRICK LICHTFELDT.

Witnesses:
C. T. BENEDICT,
A. L. MORSELL.