(No Model.) 3 Sheets—Sheet 1.

M. C. GRITZNER.

SEWING MACHINE.

No. 260,478. Patented July 4, 1882.

Fig. 2.

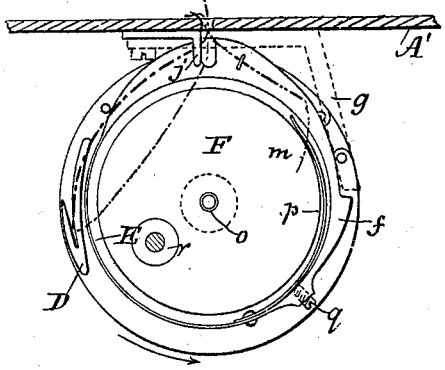


Fig. 3.

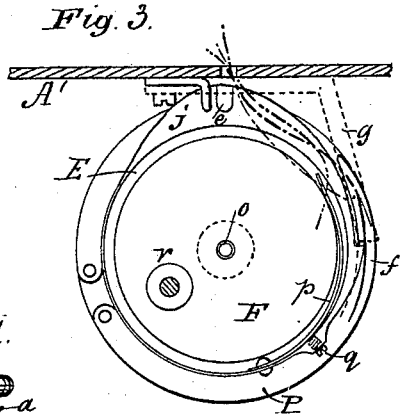


Fig. 1.

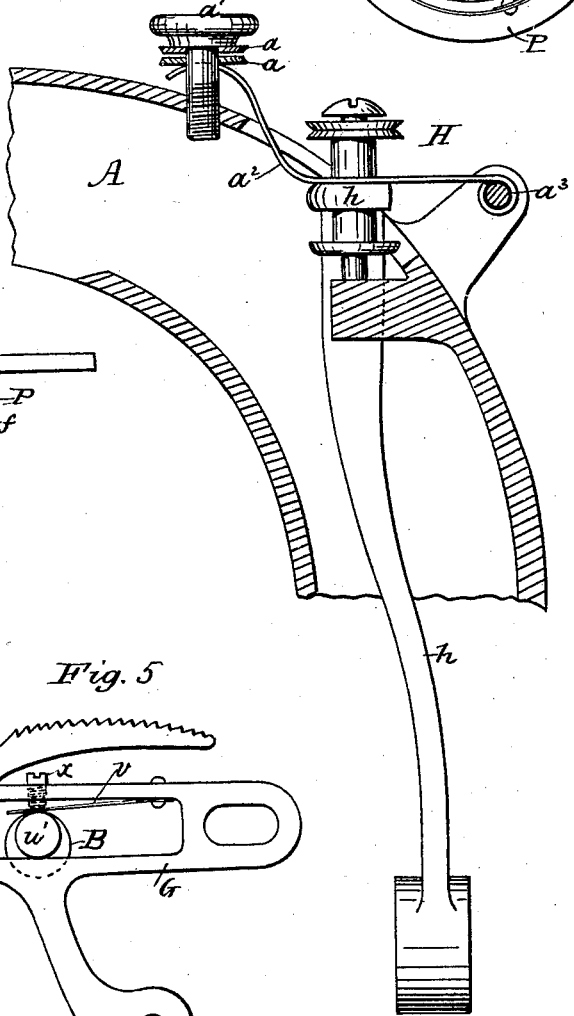


Fig. 4

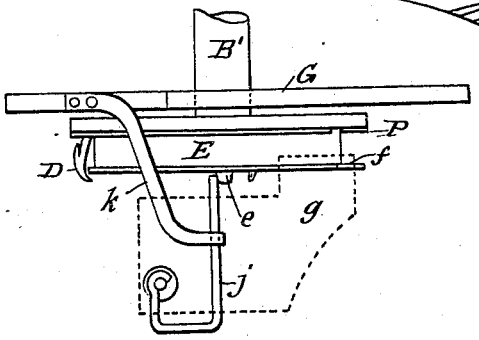
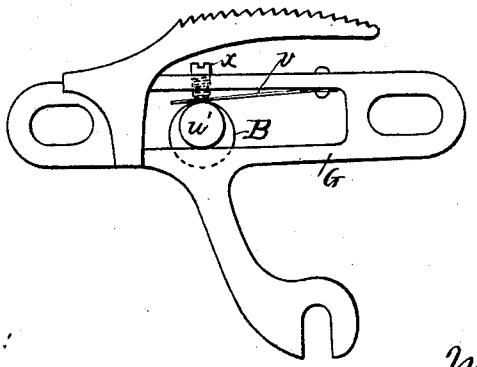


Fig. 5



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(No Model.) 3 Sheets—Sheet 2.

M. C. GRITZNER.

SEWING MACHINE.

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Fig. 6.

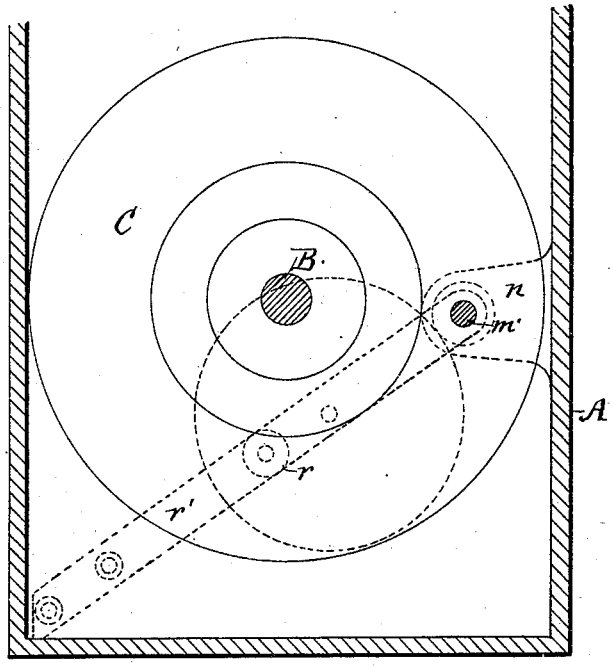


Fig. 8

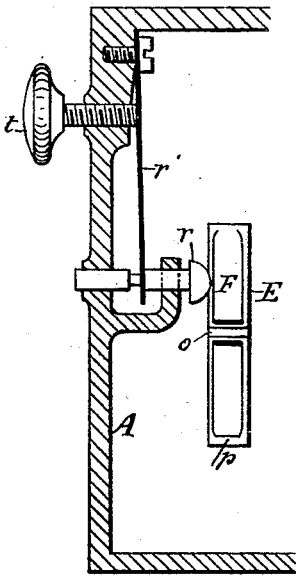
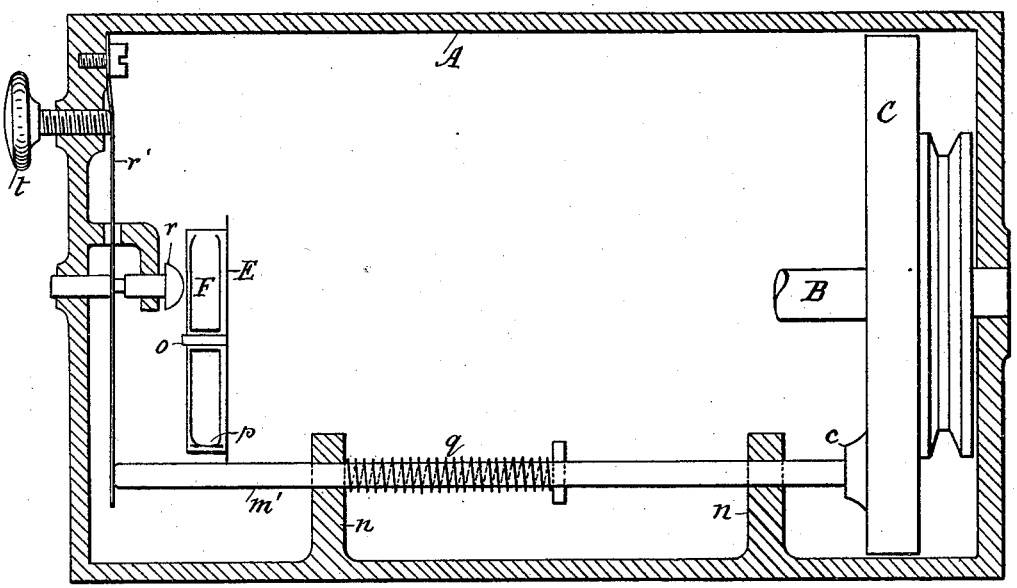


Fig. 7.



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(No Model.) 3 Sheets—Sheet 3.

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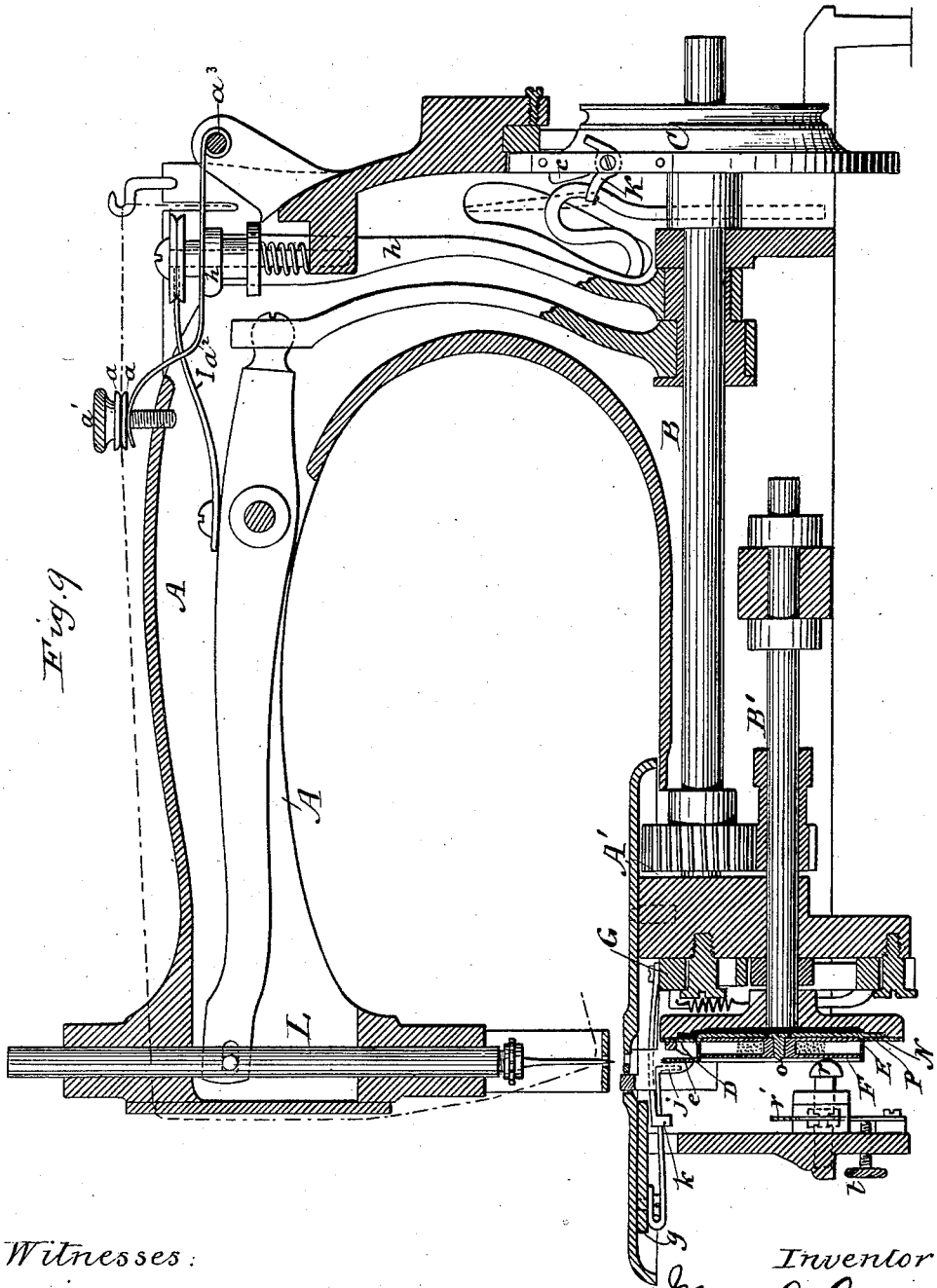

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UNITED STATES PATENT OFFICE.

MAX C. GRITZNER, OF BADEN, GERMANY.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 260,478, dated July 4, 1882.

Application filed January 20, 1881. (No model.) Patented in Spain December 18, 1878; in Germany December 20, 1878, No. 7,016, August 7, 1880, No. 12,629; in France January 17, 1879, No. 128,536, addition December 26, 1879, March 3, 1880, No. 136,504, addition June 19, 1880; in England August 25, 1879, No. 3,408; in Belgium September 1, 1879, No. 49,185; in Italy September 30, 1879, XIV, 11,246, XXII, 351; in Austria-Hungary May 5, 1880, No. 10,393 and No. 1,283.

To all whom it may concern:

Be it known that I, MAX CHARLES GRITZNER, a resident of Baden, Germany, have invented a new and useful Improvement in Sewing-Machines, which invention is fully set forth in the following specification.

This invention has reference more particularly to that class of sewing-machines which form a lock-stitch by the aid of a rotary hook and stationary bobbin, although portions thereof are applicable to other classes of machines.

It consists mainly in improved means for securing the free passage of the needle-loop over the bobbin-case containing the bobbin with the under thread, and also for regulating the tension on the upper and lower threads effectively and readily; but it also comprises improvements in the construction and combination of parts, as hereinafter more fully set forth.

The invention is mainly intended as an improvement on the machine explained fully in my application filed June 11, 1880, and the present description will be confined so far as possible to the new parts.

The accompanying drawings, which form a part of this specification, illustrate the manner of carrying the invention into effect.

Figure 1 is a view in sectional elevation, showing the tension for the upper thread. Figs. 2 and 3 are end views, partly in section; and Fig. 4 a plan view, showing the rotary hook and bobbin-case and devices immediately connected therewith. Fig. 5 is a side view of the feed-bar and means for regulating the vertical movement thereof. Figs. 6 and 7 are end view and plan, respectively, showing the construction and operation of intermittent tension for the under or bobbin thread, adjustable while sewing, the views being simplified by the omission of parts; Fig. 8, a plan of a tension for the lower thread, adjustable while sewing, but not intermittent; and Fig. 9, a vertical longitudinal section of a complete machine constructed in accordance with the invention.

A represents the frame of the machine; A′, the cloth-plate; B, the main shaft; C, the fly-wheel; D, the rotary hook; E, the bobbin-case; F, the bobbin; G, the feed-bar; H, the automatic tension, and I a pull-off. These parts are constructed as described at length in my before-mentioned application. The fly-wheel C is fixed on the main shaft B and carries the take-up K, which acts upon the upper thread after it has passed the automatic tension on its way to the needle, the clamping-surfaces of said tension being released by means of the connecting-rod *h*, which encircles at the lower end an eccentric on the main shaft. The needle-bar L is reciprocated by a needle-lever operated by an eccentric on the main shaft. The feed-bar G is operated by two eccentric or crank pins on the end of the main shaft. The rotary hook is supported on an independent shaft, B′, geared to the main shaft, so as to revolve twice for each reciprocation of the needle-bar. The bobbin-case E is supported in the rotary hook by means of a flange, N, which fits in an undercut groove in the hook formed by the aid of strips or cap-pieces P, one of which is movable, so as to permit insertion into and removal of the bobbin-case from the hook. In connection with the automatic tension an additional intermittent tension is placed between the take-up and eye of the needle, and this tension operates to clutch the thread after the take-up ceases to act, so as to finish tightening the stitch. In my former application the additional tension is made to come into action while the hook is at its lowest point, and the diminutive loop of the preceding stitch left by the take-up is drawn tight by the rotary hook, the resistance offered by the tension producing the tightening of the stitch.

In the present invention an intermittent tension, additional to the automatic tension, and arranged between the take-up and the eye of the needle, is employed; but it is made to operate during the descent of the needle below the cloth-plate, so that the loop is tightened by the needle. This method is found more advantageous.

The improved device is operated by the connecting-rod of the automatic tension, and consists of two tension-disks, *a*, placed upon a pin, *a′*, which screws into the frame of the machine, and a lever, a^2, which is fulcrumed at

a^3, and, extending above the top of connecting-rod h, has its outer end below the lower tension-disk, a. The lever a^2 is made elastic; or it can be made stiff, and a spring be interposed between it and the tension-disk. Contact with the top of the goose-neck of the machine limits the downward movement of the lever.

The operation is evident. As the connecting-rod rises it acts against the lever a^2 and presses the disks a together, so as to clutch the thread between them. As the rod h descends the disks separate and the thread is released. The thread, during the action of the take-up, is not held by the disks a, but is clamped by the automatic tension H. The clutching of the thread by the disks a takes place as the needle-eye descends below the cloth-plate.

In my former application the bobbin-case is prevented from turning by a nose on the bobbin-case, which rests between a stationary fork fixed to the under side of the cloth-plate. During the movement of the machine this projection is pressed against the one side or other of said fork, and the loop of the upper thread, having to pass between, meets some difficulty in passing. In the present invention the bobbin-case E is provided not only with the nose e at the top, but also with a projection, f, at the side, which projection bears against a stationary arm, g, depending from the cloth-plate. The nose e does not, as formerly, bear against the fixed fork, which latter is done away with, but bears now against a wire spring, j, which is fixed to the cloth-plate. The loop of the upper thread, seized by the hook, passes partly in front and partly behind the bobbin-case. The loop arriving at the projection f of the bobbin-case, the spring j presses against the nose e in such a manner that the projection f looses its contact with the arm g. Thus the loop finds a free passage there. (See Fig. 2.) Now, the spring j is drawn back by the tongue k, fixed to the feed-bar G, and the bobbin-case being drawn by the tension of the under thread, m, the projection f comes again to bear against the arm g. The bobbin-case is thereby prevented from following the retiring movement of the spring j, and a space is left between it and the nose e, so that the needle-loop again obtains free passage around the bobbin-case.

Thus the bobbin-case is prevented from turning by alternating contacts, which permit the loop of the upper thread to pass without any impediment and close around the under thread.

The tension on the under thread is regulated in the present invention as follows: The bobbin F is suspended within the bobbin-case by the pin o. A flat spring, p, is fixed at one end to the bobbin-case, and presses with the other end upon the margin of the bobbin, thereby producing a certain tension on the under thread. This tension can easily be reduced or increased by turning the screw q, bearing against the spring p. This adjustment, however, necessitates the stoppage of the machine.

It being desirable to increase and regulate the tension of the under thread during the working of the machine, this result is accomplished by exerting a pressure upon the side of the bobbin by a device acting as a brake to the bobbin. The open side of the bobbin-case is placed away from the hook, so that the side of the bobbin is exposed, and the pressure is transmitted to the bobbin by a knob, r, which is pushed by a flat spring, r', fixed to the frame of the machine at its other end. By turning the screw t, the knob of which is outside of the frame, more or less pressure is transmitted by the spring r' to the knob r. This knob also serves to prevent the bobbin from falling out of the bobbin-case.

In carrying the needle-loop of the upper thread around the bobbin, it is obvious that it would be subjected to more or less friction as it passed the knob r if the pressure of the latter was continuous, as it would be with the construction shown in Fig. 8; and it is also obvious that this friction is much less by causing only a portion of the tension by means of the knob r. For other reasons, also, it is desirable to have tension devices carried by the bobbin-case similar to that furnished by the flat spring p.

In order to avoid entirely the friction on the needle-loop, the pressure of the knob is released at intervals to allow the loop to pass.

The spring r', which presses upon the knob r, is prolonged, and its end is subjected to the action of a bar, m', sliding in two supports, n n, fixed to the frame A. The other end of the sliding bar m', which, on account of the spiral spring q, has a tendency to withdraw from the spring r', bears upon the fly-wheel C. This wheel has at the proper place an elevation, c, which at every stitch pushes the bar m' against the spring r', so that the knob r is withdrawn from the bobbin and a free passage is left to the upper thread.

The feed-bar, as before stated, is operated by two eccentric or crank pins in the ends of the main shaft. In order to vary the height to which the feed-bar or feed-surface is raised, the pin u', which raises the feed-bar, is made to bear not upon the body of the feed-bar, but upon a flat spring, v, one end of which is fixed to the feed-bar, while the other end rests against a screw, x. The eccentric pin always bears upon the spring v, and by turning more or less the screw x the feed-bar, and with it the feed-surface, will be more or less elevated. The spring will also serve to obviate the wear on the feed-bar itself.

The additional intermittent tension for the upper thread can be used in connection with tensions of the usual form between the spool and take-up as well as with the automatic tension, and the improvements described, instead of being applied to the machine described in my former application, can be applied to any suitable machine.

Having now fully described the said invention and the manner of carrying the same into

effect, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with a bobbin-case and rotary hook, of means, as described, for holding the case stationary, comprising two projections, and devices for making alternately a free passage between said projections and the bobbin-case, substantially as set forth.

2. The bobbin-case, under-thread tension carried thereby, a stationary projection, a spring, and projections on the bobbin-case to fit between said spring and stationary projection, in combination with the feed-bar and arm attached thereto, substantially as described.

3. The combination, with the rotary hook, stationary bobbin-case, and bobbin, of a spring-brake carried by the frame of the machine and arranged to bear against the said bobbin, substantially as described.

4. The combination, with the bobbin and bobbin-case, of a tension device carried by said case, and an additional tension-brake carried by the frame of the machine, substantially as described.

5. The combination of the bobbin, the bobbin-case, a tension device carried by said case, and an additional intermittent tension device, substantially as described.

6. The combination of the rotary hook, the stationary bobbin-case having its open side away from the hook, the bobbin supported on a pin in said case, a friction-brake carried by the frame of the machine and arranged to bear against said bobbin, and devices for withdrawing at intervals the said brake, substantially as described.

7. The combination, in a sewing-machine with a tension for acting upon the upper thread between the spool and take-up, of an additional intermittent tension for clutching the thread during the descent of the needle below the cloth-plate, substantially as described.

8. The combination, with the connecting-rod of an automatic tension, of an additional intermittent tension operated by the movement of said rod, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

M. C. GRITZNER.

Witnesses:
J. ENGLERT,
EDWARD M. SMITH.