

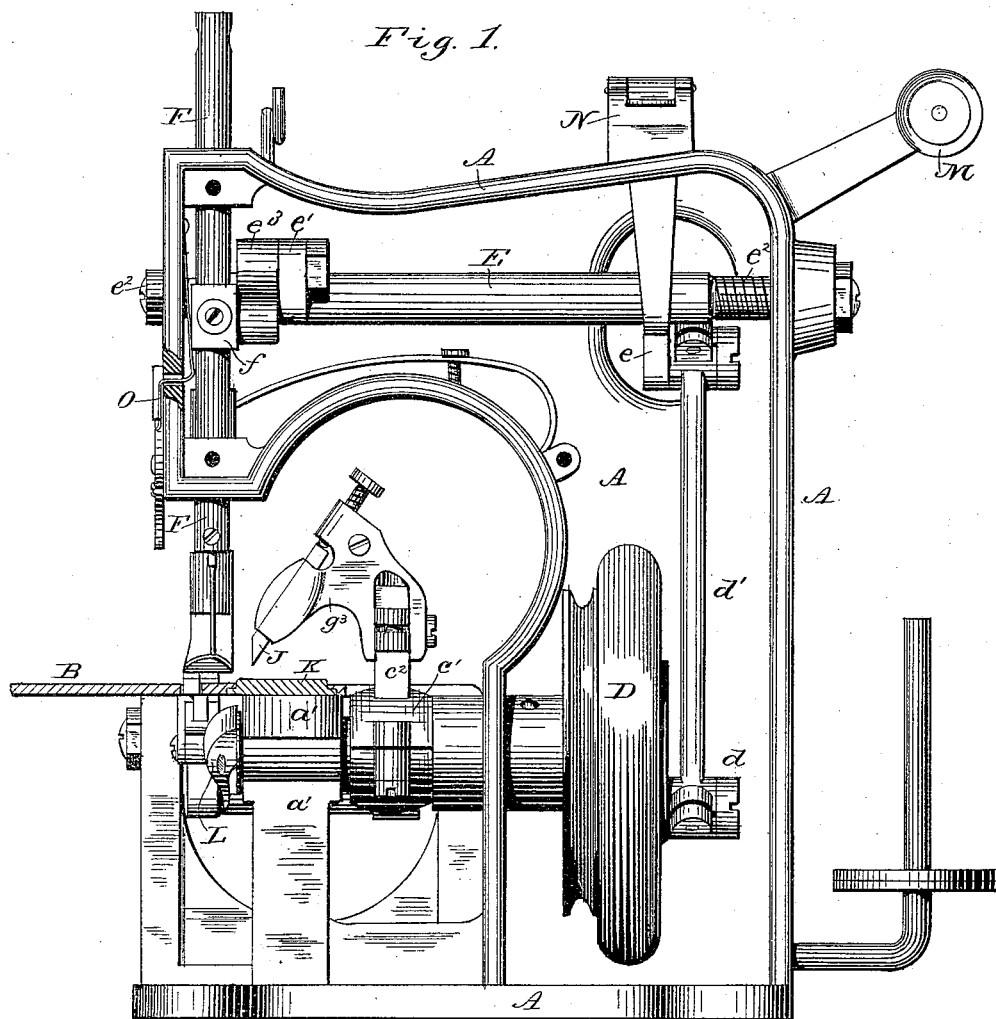
(Model.)

4 Sheets—Sheet 1.

P. DIEHL.
SEWING MACHINE.

No. 347,776.

Patented Aug. 24, 1886.



Witnesses:

E. D. Smith
C. E. Doyle.

Inventor:

Philip Diehl,
by Henry Calver, Atty.

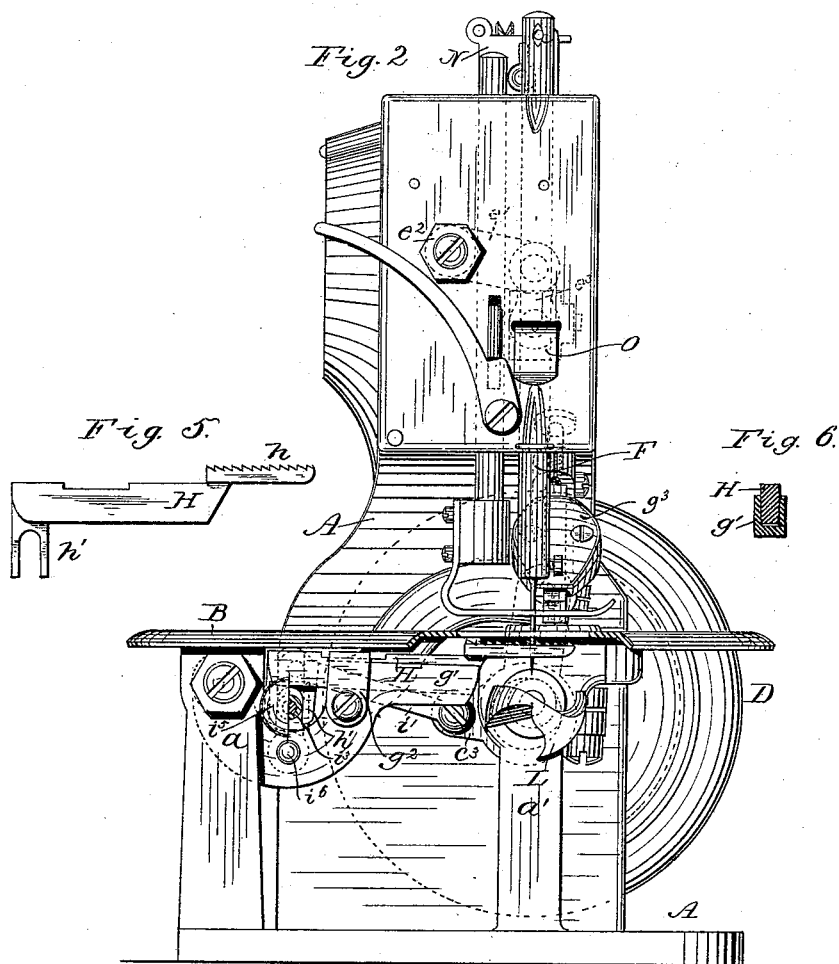
(Model.)

4 Sheets—Sheet 2.

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SEWING MACHINE.

No. 347,776.

Patented Aug. 24, 1886.



Witnesses:

F. D. Smith
C. E. Doyle

Inventor:

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By His Attorney

Mary Calver.

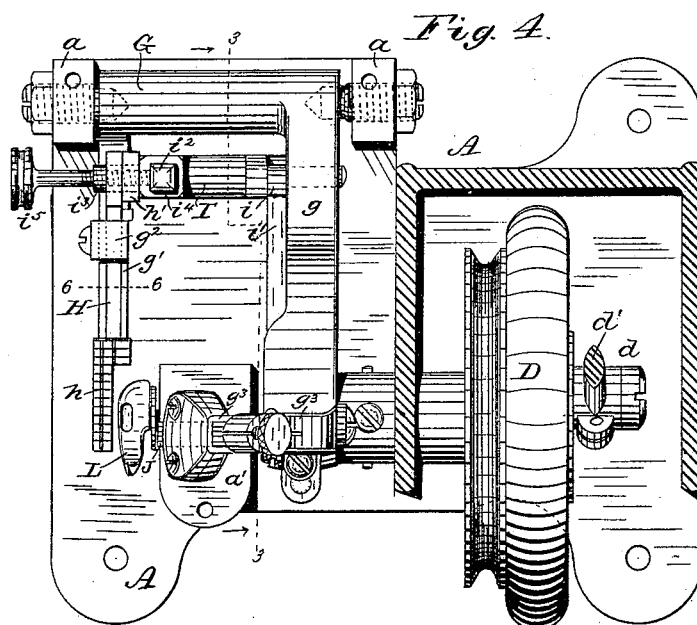
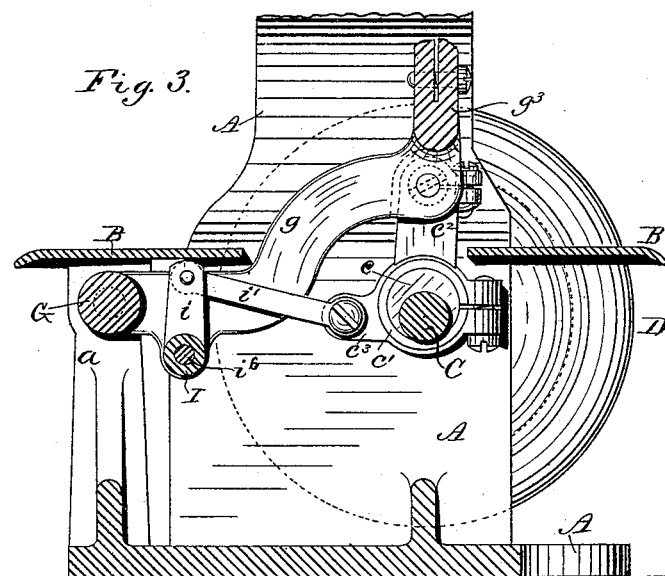
(Model.)

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E. D. Smith
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Inventor:

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Fig. 7.

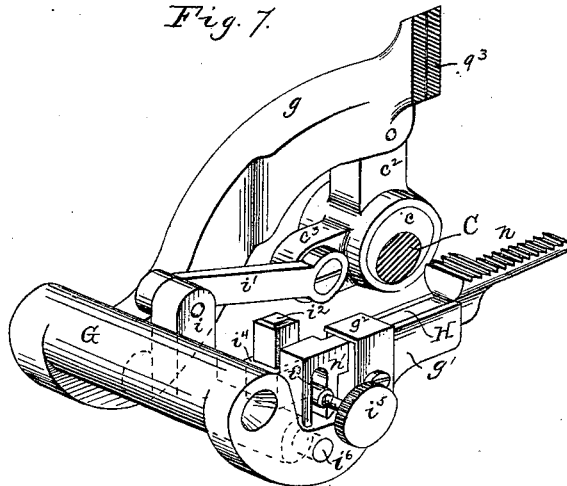
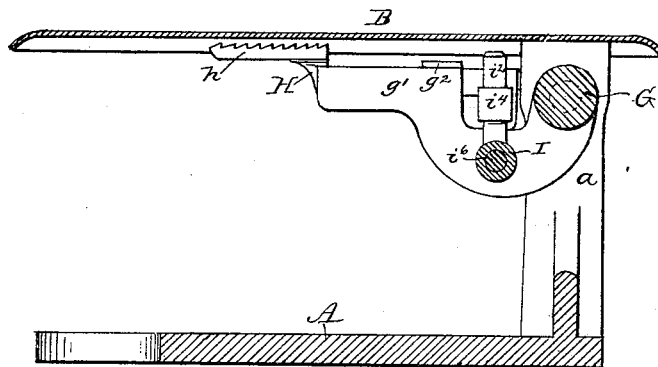


Fig. 8.



Witnesses:

E. S. Smith
C. L. Taylor

Inventor:

Philip Diehl,
by *Humphreys*
Atty.

UNITED STATES PATENT OFFICE.

PHILIP DIEHL, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE SINGER
MANUFACTURING COMPANY OF NEW JERSEY.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 347,776, dated August 24, 1886.

Application filed October 8, 1885. Serial No. 179,255. (Model.)

To all whom it may concern:

Be it known that I, PHILIP DIEHL, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of my invention is to provide a simple and compact sewing-machine capable of running at a very high speed, and also preferably capable of trimming off the edges of the work simultaneously with the sewing.

In order that my invention may be fully understood by others, I will now describe the same in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a front view of the same. Fig. 3 is a sectional elevation on line 3 3, Fig. 4, looking in the direction indicated by the arrows adjacent to said line. Fig. 4 is a plan view of the lower part of the machine with the work-plate removed and the frame in section. Fig. 5 is a detail view of the feed-bar; and Fig. 6 is a detail cross-section of the feed-bar and rock-shaft arm on line 6 6, Fig. 4. Fig. 7 is a detail perspective view of the feeding mechanism, and Fig. 8 is a partial section of the same on line 3 3, Fig. 4, looking in the direction opposite to that indicated by the arrows adjacent to said line.

A denotes the frame of the machine, said frame being compact, as shown, and preferably cast in one piece.

B is the work-plate, secured to the frame, and C is the driving-shaft, journaled in the lower part of the frame and having thereon a fly and pulley wheel, D, provided with a crank-pin, *d*, connected by a pitman, *d'*, with the rear arm, *e*, of a rock-shaft, E, pivoted by center screws, *e*², to the upper part of the frame A. The shaft E is provided at its forward end with an arm, *e'*, on the side of said shaft opposite to the arm *e*, so that said shaft will be evenly balanced, the said arm *e'* being connected by a link, *e*³, to a block, *f*, attached to the needle-bar F. The arms of the rock-

shaft E are preferably formed integral therewith, and the said shaft is of less length than the distance between the inner sides of the end walls of the frame A, so that said shaft, with its integral arms, may be readily placed in its working position in assembling the parts of the machine. To give steadiness to the shaft E the frame A is provided with thickened portions, through which the center screws, *e*², pass.

Secured to the driving-shaft C is an eccentric, *c*, surrounded by a strap or yoke, *c'*, said yoke having vertical and horizontal arms *c*² and *c*³, respectively.

G is a rock-shaft, pivoted by center screws to standards *a* on the frame A, said shaft having an arm, *g*, jointed to the vertical arm *c*² of the eccentric yoke *c'*, and a second arm, *g'*, which is grooved (see Fig. 6) to receive the feed-bar H, provided with the feed-dog *h*.

To the arm *g'* is attached a small hook, *g*², extending across the feed-bar H, and serving to hold the latter in the groove of the said arm, so that the downward movements of the latter will be imparted positively to said bar.

Between depending lugs on the arms *g* and *g'* of the rock-shaft G is pivoted a feed-rocker, I, having an arm, *i*, connected by a link or pitman, *i'*, to the horizontal arm *e*³ of the yoke *c'*, said rocker having a second arm, *i*², provided with a pin, *i*³, which is engaged by a hook, *h'*, on the feed-bar H. The rocker I is preferably pivoted on a small rod, *i*⁴, passing centrally through said rocker and supported by the arms *g* and *g'* of the rock-shaft G. Thus as the arm *i*² vibrates horizontally its movements will be imparted to the feed-bar to give horizontal or feeding movements to the latter.

To provide means for regulating the horizontal movements of the feed-bar the pin *i*³ may be carried by a yoke, *i*¹, vertically adjustable on the arm *i*², and secured in any desired position by thumb-screw *i*⁵, passing through the pin *i*³, and impinging against the arm *i*². By moving the pin and yoke upward or away from the rocker I the horizontal throw of the feed-bar will be increased, and by moving said pin and yoke in the opposite direction the throw of the feed-bar will be lessened, as will be obvious.

In connection with the mechanism above described I prefer to use a trimming mechanism actuated from the feed-operating eccentric. To this end I provide the arm *g* of the rock-shaft G with a head, *g*³, carrying a knife, J, which is adjusted to cut against a bed or cutting-block, K, resting on a solid support afforded by the post *a*' of the frame A.

L is an ordinary Willecx & Gibbs rotary hook or looper co-operating with the needle to form chain-stitches, and when this hook is used I prefer to employ a light check-tension, M, an automatic tension, N, and a light automatic check-tension, O. These tension devices need not be herein particularly described, as they are not herein claimed, but are embraced by my application No. 179,287, filed simultaneously herewith.

The trimming mechanism herein shown is not claimed in this application, excepting in combination with the feeding mechanism, this trimming mechanism being embraced by my application No. 179,286, of even date herewith.

The operation of my machine will be readily understood from the foregoing. Motion being imparted to the driving-shaft, the needle-bar rock-shaft E, connected therewith, will impart vertical movements to the needle-bar, and the needle carried by the latter with the co-operating rotary hook L will form chain-stitches in the usual manner. As the driving-shaft C rotates, the eccentric *c* thereon will impart a circular movement to the yoke *c*', the vertical movements of said yoke being imparted to the arm *g* of the rock-shaft G, and through the latter to the arm *g*', which carries the feed-bar H. Thus the feed-bar will be positively raised and lowered, and between each up-and-down movement the said bar will be caused to slide horizontally in its grooved carrying-arm *g*' by reason of the vibrating movements of the feed-rocker I, with which said bar is connected, as above described. As the feed-rocker I is connected to the horizontal arm *c*² of the yoke *c*', which is at a right angle, or nearly so, to the part of said yoke to which the arm *g* of the rock-shaft G is jointed, it results that the said rocker is nearly stationary during the intervals when the said yoke is operating the rock-shaft G to impart vertical movements to the feed-bar, so that horizontal movement of the latter is nearly suspended momentarily, and likewise the rock-shaft G is nearly stationary (causing the vertical movement of the feed-bar to be nearly suspended) during the intervals when the feed-rocker is vibrating to move the said feed-bar horizontally.

It will thus be apparent that by the above-described connections of the feed-bar with the eccentric *c*, I am enabled to impart positive

"four-motioned" movements to the latter in all directions and to regulate these movements as may be desired. As the trimming-knife J, which receives movements from the feed-operating eccentric, is caused to descend simultaneously with the feed-bar, it follows that the trimming will be effected between the feeding movements of the feed-bar.

By virtue of the compact arrangement of the parts herein shown, the evenly-balanced needle bar-operating rock-shaft and the positive feeding mechanism, my machine is adapted for very high rates of speed, having been tested to sew at a speed exceeding four thousand stitches per minute.

I claim as my invention—

1. In a sewing-machine, the combination, with a driving-shaft carrying an eccentric, of a yoke surrounding the latter, a rock-shaft having two arms, one of which is connected with said yoke, a feed-bar supported by and adapted to slide on the other of said arms, a feed-rocker supported by the arms of said rock-shaft and connected with said feed-bar, and a link jointed to an arm of said feed-rocker and to the said yoke, substantially as set forth.

2. In a sewing-machine, the combination, with a driving-shaft provided with an eccentric, of a yoke surrounding the latter, a rock-shaft and a feed-rocker having connections with said yoke, said connections being at a right angle, or approximately so, to each other, and a feed-bar connected with said rocker and adapted to slide on an arm of the said rock-shaft, substantially as set forth.

3. In a sewing-machine, the combination, with a driving-shaft provided with an eccentric, of a yoke surrounding the latter, a rock-shaft having two arms, one of which is connected with said yoke, and the other of which is grooved, a feed-bar adapted to slide in the latter arm, and provided with a hook, a feed-rocker having two arms, a link connecting one of said arms to the said yoke, and an adjustable pin carried by the other of said arms and engaged by the said hook on the feed-bar, substantially as set forth.

4. In a sewing-machine, the combination, with a feeding mechanism and a trimming mechanism, of a single eccentric serving to operate both of said mechanisms, and a shaft by which said eccentric is carried, substantially as set forth.

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

PHILIP DIEHL.

Witnesses:

JAMES G. GREENE,
WM. H. DUSLEE.