3 Sheets--Sheet 1.

C. GULLMANN.

Sewing-Machines.

No. 136,057. Patented Feb. 18, 1873.

Fig: 1.

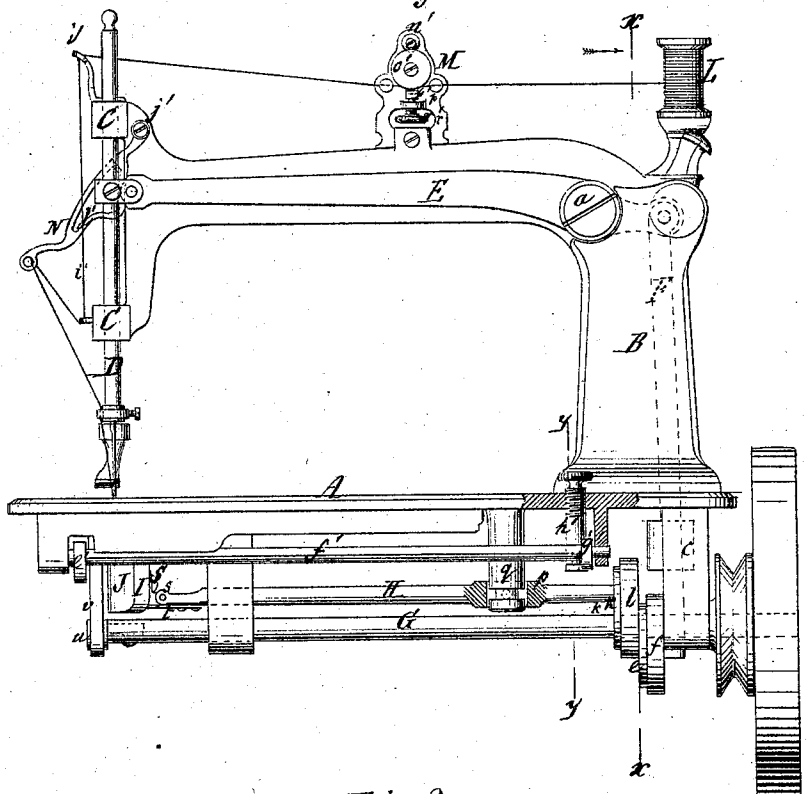
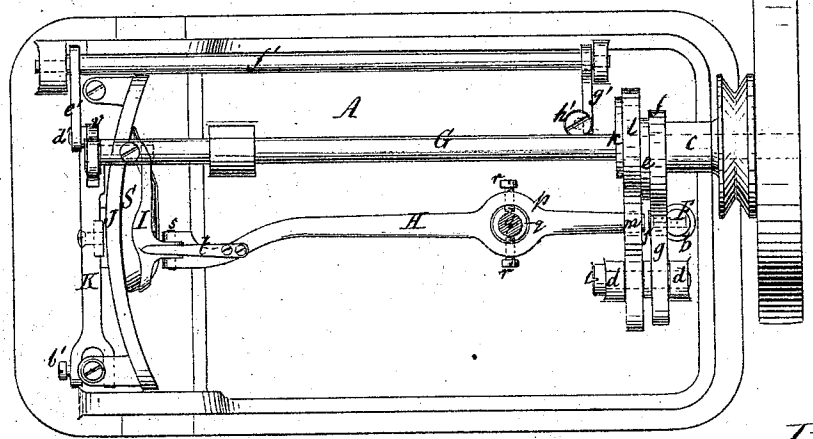


Fig: 2.



Witnesses:
Ernst Bilhuber.
Chas. Wahlers.

Inventor.
Christoph. Gullmann
by Van Santvoord & Hauff
Attys

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

3 Sheets--Sheet 2.

C. GULLMANN.

Sewing-Machines.

No. 136,057. Patented Feb. 18, 1873.

Fig: 3.

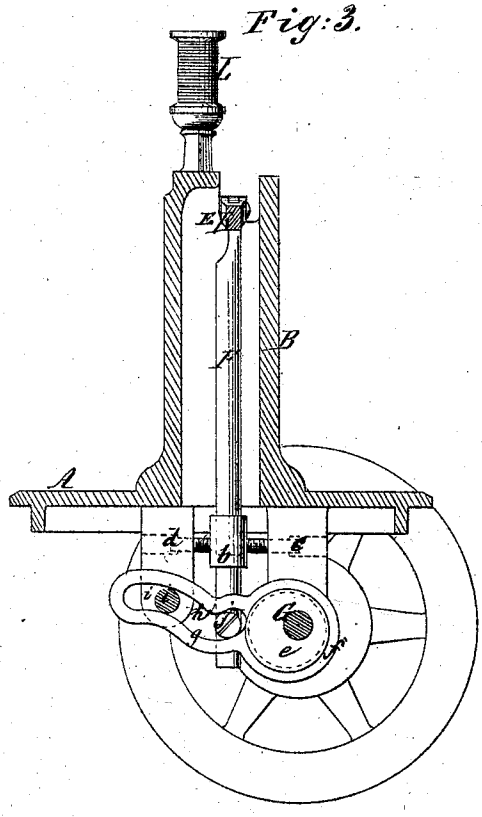
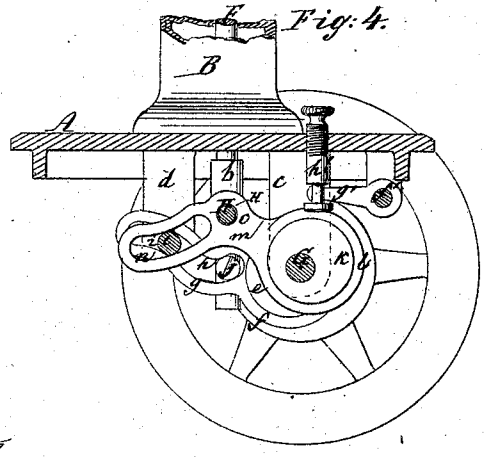


Fig: 4.



Witnesses:
Ernst Bilhuber.
Chas. Wahlers.

Inventor:
Christoph Gullmann
per
Van Santvoord & Hauff.
Attys

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

3 Sheets--Sheet 3.

C. GULLMANN.

Sewing-Machines.

No. 136,057. Patented Feb. 18, 1873.

Fig: 5.

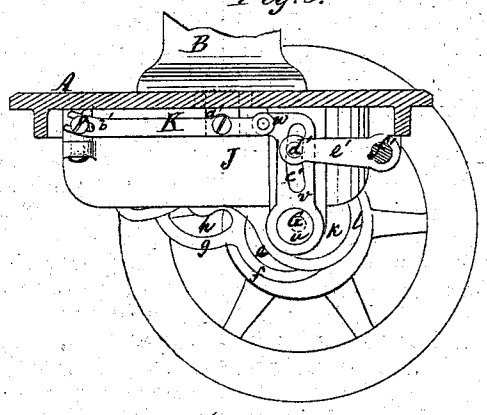


Fig: 6.

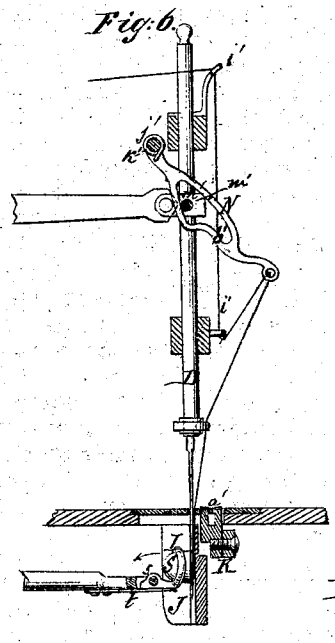


Fig: 9.

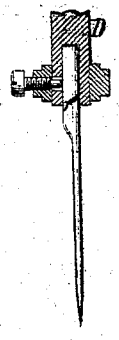


Fig: 7.

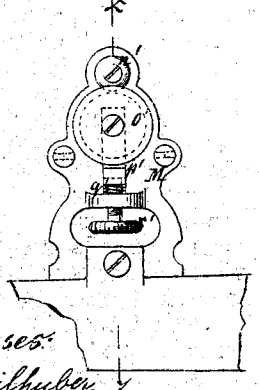
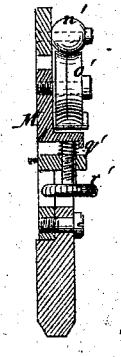


Fig: 8.



Witnesses:
Ernst Bilhuber.
Chas. Wahlers.

Inventor
Christoph Gullmann
per
Vis Sartorius & Haupt
attys

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

UNITED STATES PATENT OFFICE.

CHRISTOPH GULLMANN, OF PATERSON, NEW JERSEY.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **136,057**, dated February 18, 1873.

To all whom it may concern:

Be it known that I, CHRISTOPH GULLMANN, of Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Improvement in Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which drawing—

Figure 1 represents a side view of my invention, partly in section. Fig. 2 is an inverted plan of the same. Fig. 3 is a transverse vertical section of the same taken in the plane indicated by the line *x x*, Fig. 1. Fig. 4 is a similar section in the plane *y y*, Fig. 1. Fig. 5 is a sectional front view of the same. Fig. 6 is an elevation of the needle-bar and take-up mechanism. Fig. 7 is a front view of the tension device in a larger scale than the previous figures. Fig. 8. is a transverse vertical section of the same in the plane *z z*, Fig. 7. Fig. 9 is a detached sectional view of the needle-bar and needle in a larger scale than the previous figures.

Similar letters indicate corresponding parts.

This invention consists in the combination of an eccentric and cam lever with the lever that serves to impart motion to the needle-bar in such a manner that the motion of the needle-lever is rendered easy at every point, and at the same time the requisite changes in the motion of the needle are obtained; further, in the arrangement of a lever which has a compound oscillating motion, and which carries the shuttle in such a manner that the shuttle in going back is moved below the point of the needle, while the same in going forward passes through the loop of the needle-thread in a horizontal direction, and thereby the needle is effectually prevented from striking the shuttle, and the thread of the shuttle-bobbin is held taut so as to prevent the needle from catching in the same.

In the drawing, the letter A designates the cloth-plate of my sewing-machine, from which rises the arm B that supports the guides C C for the needle-bar D, and also the fulcrum-pin *a* of the needle-lever E. This lever extends beyond its fulcrum, (see Fig. 1,) and to its rear end is pivoted a rod, F, (best seen in Fig. 3,) that extends down through the cavity of the arm B, and through a tubular guide, *b*, which is secured between standards *c d*, extending from the under side of the cloth-plate. The standard *c* forms the bearing for the rear portion of the main shaft G, and on this shaft is mounted an eccentric, *e*, embraced by a strap, *f*, from which extends a lever, *g*, provided with a cam-slot, *h*. This cam-slot catches over two pivots, *i j*, the pivot *i* being firmly secured in the standards *d d*, (see Figs. 2 and 3,) while the pivot *j* projects from the rod F that is connected to the needle-lever. When the main shaft G is revolved, a compound motion is imparted to the lever-strap *g*, causing the same to slide and to oscillate on its fulcrum-pin *i;* and the cam-slot *h* in said strap is so shaped that the needle obtains the requisite motion to penetrate the fabric, recede to form the loop, remain stationary to allow the shuttle to pass through the loop, and, finally, to rise again ready for the subsequent stitch.

By referring to Fig. 3, it will be seen that, during the entire stroke of the needle, the cam-slot *h* acts directly on the stud *j*, and the rod F is not subjected to lateral strain, so that it requires comparatively little power to keep my machine in motion.

Heretofore a cam-groove has been used to impart to the needle the requisite motion, and in some parts of its motion this cam-groove is the cause of a great waste of power, and of much wear of those parts of the machine which are in connection with said cam-groove or depend upon it for motion.

On the main shaft G is mounted a second eccentric, *k*, which is embraced by a strap, *l*, from which extends a lever, *m*, (best seen in Fig. 4.) This lever is provided with a curved slot, *n*, that straddles the pivot *i*, and in said lever is an opening, *o*, in which the end of the shuttle-driving lever H enters. This shuttle-lever is provided with a hub, *p*, having an opening large enough to pass freely over a stud, *q*, which extends from the under side of the cloth-plate. In said stud is an annular groove (see Fig. 1) to receive the ends of two screws, *r r*, Fig. 2, which extend through the hub *p*, so that a universal joint is produced, allowing the shuttle-lever to swing freely in a vertical and also in a horizontal or oblique direction.

The construction of the lever H and of this

universal joint might, however, be changed in various ways, and I do not wish to confine myself to the precise construction shown in the drawing.

To the forward end of the shuttle-lever is connected, by a hinge-joint, *s*, (see Figs. 1, 2, and 6,) the shuttle-carrier I, which is provided with a projection that extends into the bifurcated end of the shuttle-lever, (see Figs. 2 and 6;) and this projection is flat at its under surface and subjected to the action of a spring, *t*, that has a tendency to retain the shuttle-carrier in the position shown in Fig. 6, causing the shuttle S to bear against the shuttle-race J. When the shuttle-carrier is turned back on its pivot in the direction of the arrow, shown near it in Fig. 6, the shuttle can be readily taken out or inserted; but if the shuttle is in its working position the spring *t* allows the same to accommodate itself to the surface of the shuttle-race during the motion of the shuttle-lever, and to prevent the shuttle from flying out. The shuttle-race J forms the segment of a circle described from the fulcrum of the shuttle-lever, or, in reality, it ought to form a section of the inner surface of a hollow globe described round said fulcrum; and as the shuttle-lever passes through its evolutions the shuttle in going back is depressed below the lowest point reached by the needle, and in going forward the shuttle moves in a horizontal direction through the loop of the needle-thread. By depressing the shuttle in going back all danger of the needle in its descent striking the shuttle is avoided, and at the same time the shuttle-thread is kept taut, so that the needle is not liable to become entangled in the same. On the front end of the main shaft G is formed an eccentric, *u*, (see Fig. 5,) which is embraced by a lever-strap, *v*, the upper end of which is connected by a pivot, *w*, with the feed-bar K. On this feed-bar is secured the feed-dog *a'*, and its end is bifurcated and made to straddle two pins, *b'*, (see Figs. 2 and 5,) which are secured in the sides of a stud fastened to the under side of the cloth-plate. The lever-strap *v* is provided with a slot, *c'*, that catches over a pin, *d'*, secured in a lever, *e'*, which is attached to an arbor, *f'*. The pin *d'* forms the fulcrum of the lever-strap *v*, and, by turning the arbor *f'*, this fulcrum can be adjusted so as to regulate the motion imparted to the feed-bar, and consequently the length of the stitches. On the inner end of the arbor *f'* is mounted a lever, *g'*, (see Figs. 1, 2, and 4,) which engages with a groove turned in a screw, *h'*, that extends up through the cloth-plate. By turning this screw up or down the stitches are decreased or increased, as may be desired. When the main shaft revolves the lever-strap *v'* assumes an oscillating and a sliding motion on its pivot, and the feed-dog is successively raised, pushed forward, depressed, and moved back. The needle-thread, which is taken from the spool L, is carried through the tension mechanism M, thence through eyes *i' i'* to the take-up lever N, and from this lever down to the needle. The take-up lever swings on a pivot, *j'*, secured in the side of the arm B, Fig. 1, and it is subjected to the action of a spring, *k'*, which has a tendency to carry the same up to its highest position. In said take-up lever is a cam-opening, *l'*, which straddles a pin, *m'*, (see Fig. 6,) secured in the side of the needle-bar, so that, as the needle-bar moves up and down, an oscillating motion is imparted to the take-up lever. The cam-opening in said take-up lever is of such a shape that, while the shuttle passes through the loop of the needle-thread, the take-up lever has a certain play, allowing the same to recover the thread, which otherwise would become slack as the shuttle passes out of the needle-thread, while said lever assumes a positive upward motion, and becomes firmly locked when the needle has reached its highest position, and, consequently, every stitch is drawn up tight with a uniform force.

The tension mechanism consists of two rollers, *n' o'*, (see Figs. 7 and 8,) one of which is mounted on a fixed bearing, while the axis of the other is secured in a slide, *p'*, which is subjected to the action of a spring, *q'*, and screw *r'*. By means of this spring and screw the faces of the two rollers can be pressed up against each other, and if the needle-thread is wound round the lower roller *o'* its tension is regulated by increasing or decreasing the pressure of the two rollers against each other. To prevent the thread from running off from the roller *o'*, I prefer to make the face of this roller concave and that of the other roller convex, as shown.

By referring to Fig. 9 of the drawing it will be seen that the shank of the needle is set off on one side of its head *r'*, so that the front of the needle is flush with the head, and if the needle is changed it will always retain its proper relation to the throat of the pressure-foot and to the shuttle-race.

If the shank of the needle is situated in the center of its head, and a coarse needle is introduced instead of a fine one, or vice versa, the position of the point of the needle in relation to the throat and to the shuttle-race is changed, and the correct operation of the sewing mechanism is disturbed.

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

1. The combination of the slotted lever-strap *g*, operated by the eccentric *e* and sliding on pin *i*, with the rod F, connected with the needle-bar E, and with the strap, substantially as and for the purpose described.

2. The horizontal shuttle-driving lever H, operated substantially as described, so that the shuttle travels in an elliptical orbit, passing through the loop close up to the under side of the cloth-plate, and returning in a plane below that occupied by the point of the needle, thus holding the needle-thread taut, substantially as set forth.

3. The shuttle-carrier hinged to a shuttle-lever, H, which moves on a universal joint, said shuttle-carrier being subjected to the action of a spring, *l*, which enables the shuttle contained in the carrier to accommodate itself to the shuttle-race during the evolutions of the shuttle-lever, substantially as described.

This specification signed by me this 19th day of December, 1872.

CHRISTOPH GULLMANN.

Witnesses:
W. HAUFF,
E. F. KASTENHUBER.