2 Sheets—Sheet 1.

J. BUTCHER.

SEWING-MACHINE.

No. 180,542. Patented Aug. 1, 1876.

Fig. 1.

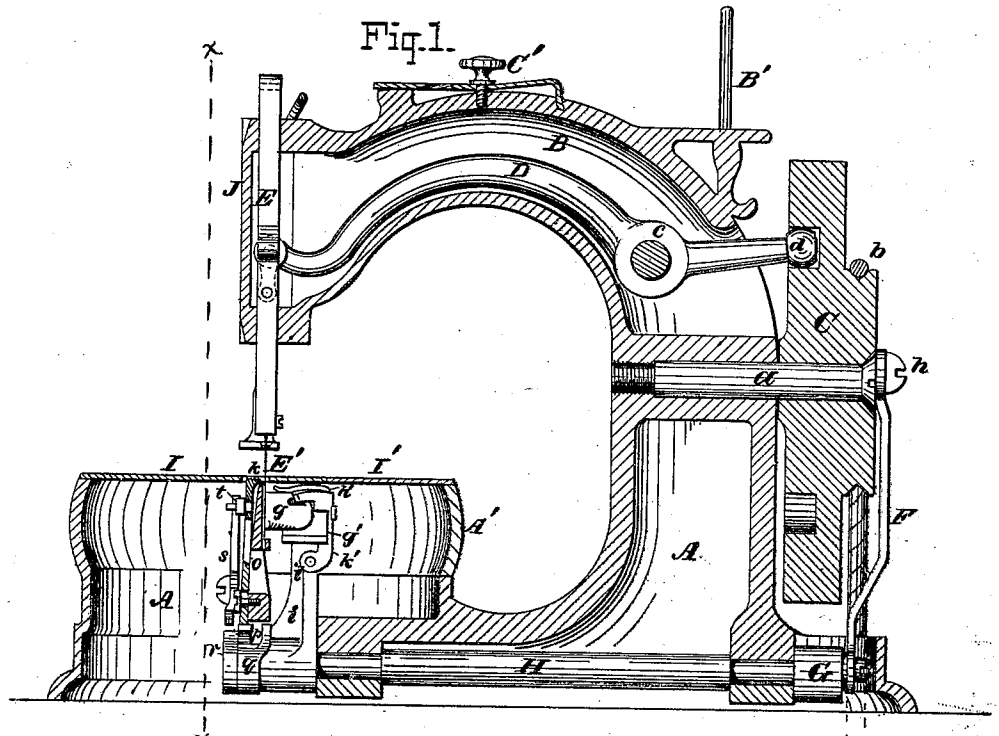


Fig. 2.

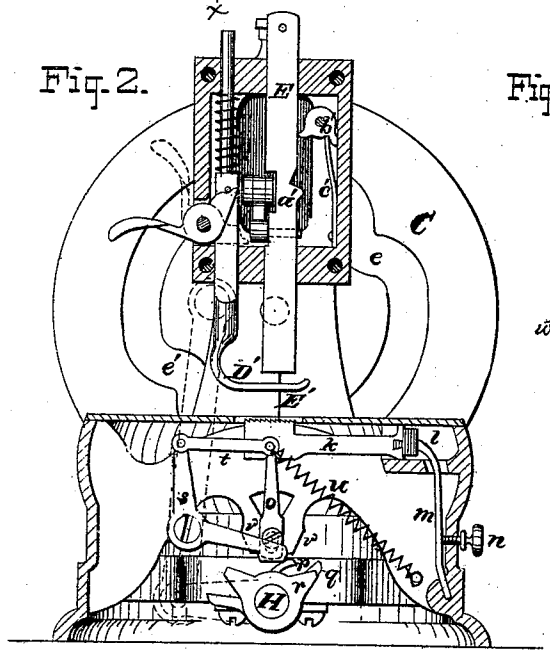
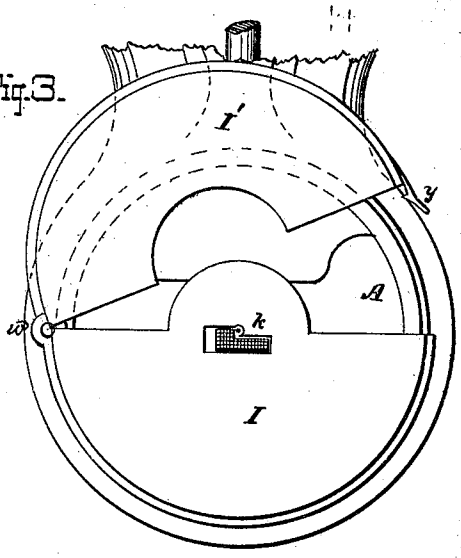


Fig. 3.



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2 Sheets—Sheet 2.

J. BUTCHER.

SEWING-MACHINE.

No. 180,542. Patented Aug. 1, 1876.

Fig. 4.

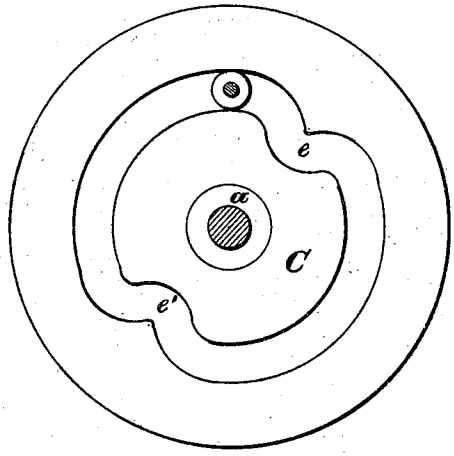


Fig. 5.

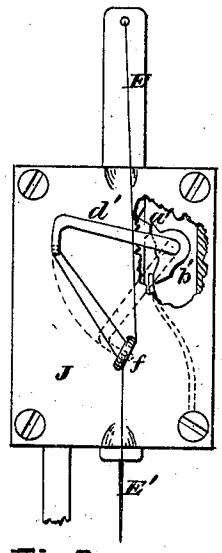


Fig. 7.

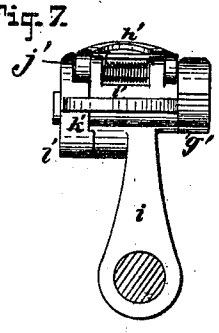


Fig. 8.

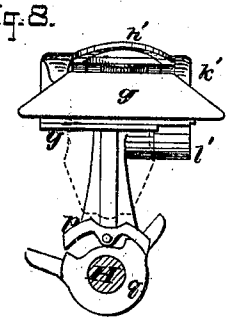
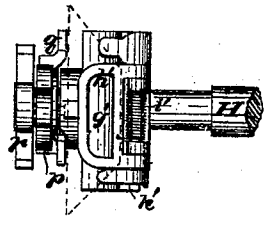


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOSEPH BUTCHER, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND GEORGE BUTCHER, OF SAME PLACE.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **180,542**, dated August 1, 1876; application filed April 22, 1876.

To all whom it may concern:

Be it known that I, JOSEPH BUTCHER, of the city, county, and State of New York, have invented certain Improvements in Sewing-Machines, of which the following is a specification:

This invention relates to that class of sewing-machines which are provided with a reciprocating shuttle, and make a lock-stitch. It consists essentially in the construction of parts whereby two complete stitch-movements of the needle, shuttle, and feed mechanism are produced by one rotation of the driving cam-wheel, thus completing two stitches at the said revolution. Although but two movements are contemplated, that number being thought best, two or more movements may be produced without essentially varying the construction of the cam-wheel.

The invention also consists in the peculiar construction and arrangement of the feed mechanism, the novel construction of the shuttle-carrier, and various combinations which will be more fully described hereinafter.

In the drawings, Figure 1 is a longitudinal vertical mid-section of my machine. Fig. 2 is a transverse section of the same, taken in the plane of the line *x x* in Fig. 1. Fig. 3 is a plan illustrating the improved cloth plate and bed. Fig. 4 is a detached elevation of the driving cam-wheel. Fig. 5 is an enlarged view, showing the take-up. Figs. 6 and 7 are, respectively, a plan and side elevation of the shuttle-carrier, detached and enlarged. Fig. 8 is a detached front view, showing the feed-cams and shuttle carrier.

Let A represent the base, and B an overhanging arm secured thereto, or forming a part of the same. This supports the operative mechanism, and may be cast hollow in the usual manner. C is a combined driving-cam, belt-wheel, and fly-wheel, which constitutes the only rotating part of the machine. This cam is mounted upon the cast arm B by means of a bolt, stud, or screw, *a*, on which it revolves as an axis. In the face of the cam a groove is cut to impart motion to the needle-arm D. This arm is pivoted at *c*, and bears on its rear end a convex-faced friction-roller, *d*, which engages the cam-groove in the cam C, as shown. At *b* is shown a groove in the cam to receive a driving-belt of the usual kind.

In the present construction, the groove in the cam is essentially dual—that is, the sweep or part *e* is an exact counterpart of *e'*, each serving to produce an up-and-down motion of the needle-bar E, which is linked to the front end of the needle-arm, and plays in vertical guides in the head of the fixed arm B. Those portions of the cam-groove connecting the sweeps *e e'* are concentric with the axis *a*, and produce no motion in the needle-arm; but permit it to remain at rest while the shuttle *g* passes through the loop of the upper thread.

By this arrangement, it will be seen that two stitches are made at each revolution of the cam-wheel C; but to produce this result it is necessary, in my construction, that the shuttle shall be double-nosed, and the feed make, also, two movements at one revolution of the cam-wheel C.

This construction I will now describe. To the cam-wheel C is attached, by means of a screw or wrist, *h*, a connecting bar or rod, F, which takes hold of a vibrating arm or crank, G, rigidly affixed to an oscillating shaft, H, having bearings in the base A, as shown.

Every revolution of the cam-wheel produces one complete oscillation or vibratory movement of the shaft H, to the front end of which are secured the arm *i*, bearing the shuttle-carrier, and the various cams for operating the feed-bar *k*. Thus each revolution of the cam-wheel communicates a reciprocatory vibration to the shuttle in the carrier, once forward and once back, making a stitch each way.

The feed-bar has four motions—up, forward, down, and back. The front end of the bar bears a serrated head, as usual, and the rear end has a bearing in a cavity in the casting at *l*, where it is acted upon by the stitch-regulator *m*, which is controlled by a thumb-screw, *n*. In the under side of the feed-bar head is a socket that receives the upper extremity of an upright vibrating lifter, *o*, which is slotted at the lower end, the slot engaging a pin or screw in the casting. The lower end of this lifter rests on a lifting-cam, *p*, pivoted to another cam, *r*, affixed rigidly to the extremity of the shaft H. This latter cam gives the

forward motion to the feed-bar through the medium of a bell-crank, *s*, and link *t*, which connects the upper arm of the bell-crank with the feed-bar, as shown. A simple spiral spring, *u*, attached to the feed-bar and to the base A, and arranged at a suitable angle, serves to draw the feed-bar down and back. Behind the lifting-cam *p* is a tappet-cam, *q*, mounted loosely on the shaft H, and provided with shoulders to catch under the wings of the lifting-cam, and tappets or arms to catch against the beveled faces or shoulders *v v* on the casting.

The operation of the feed mechanism is as follows: As the shaft H oscillates in one direction one end of the cam *p* (now resting on the shoulder of the cam *q*) passes under the end of the lifter *o*, and lifts the head of the feed-bar *k*. At this instant one branch of the cam *r* passes under the arm of the bell-crank *s*, and drives the feed-bar forward. Just before the bar reaches the end of its stroke one arm or tappet of the cam *q* engages the fixed shoulder *v* on the casting, and the cam is detained while the lifter-cam *p* is carried on until the end of the same drops off the shoulder, thus permitting the spring *u* to draw down the feed out of contact with the goods. The return oscillation of shaft H now begins, and produces precisely the same series of motions in the feed, as above described, the opposite sides of the cams being provided with like arms, shoulders, and surfaces, as shown.

The shuttle-carrier (shown in detail in Figs. 6, 7, and 8) is mounted rigidly on the extremity of the vibrating arm *i*, and consists of a bed, *g'*, to which is hinged a cover, *h'*, habitually thrown into an upright position by means of a spring, *i'*, as shown. One shoulder of the cover is squared at *j'*, and a spring-catch, *k'*, pivoted at *l'*, and habitually thrown forward by some form of spring, is arranged to catch beneath the squared shoulder *j'* of the cover, and holds the said cover when pressed down over the shuttle.

When the shuttle is in place, and the cover is pressed down to keep it there, the catch is maintained in its position beneath the squared shoulder of the cover, and the latter cannot fly up until the catch is pressed back. When the cover is pressed down, the catch slips into its place of itself, and no further manipulation is necessary.

By this simple device I supply a means of readily removing and replacing the shuttle, and prevent the possibility of its flying out when the machine is in operation.

To get at the shuttle and other mechanism beneath the cloth-plate, it has been customary to provide a sliding plate in the same, or to make the entire plate removable, or both. In my improved machine, with reference particularly to Fig. 3, I I' is the cloth-plate, divided centrally into two parts, the part I being fixed to the immovable base A, and the part I' fixed to a movable part, A', of the base, hinged to the latter at *w*, and arranged to be thrown open as in the figure, so as to give access to the interior. When closed, it may be secured by a spring-catch, *y*, or some equivalent device. The central part of the cloth-plate is perforated for the reception of the feed, and this portion of the plate may form part of the section I, as shown.

The above-described device is not new with me, but as it is well adapted to my machine I have described it thus minutely.

In Figs. 2 and 5 is shown my improved take-up. The needle-bar E is provided with a shoulder or projection, *a'*, which engages, as the said bar moves up, an arm of a bell-crank, *b'*, pivoted to the face-plate J, and resting in a cavity behind the same. This crank is provided with a spring, *c'*, as shown, and its pivot is carried through the said face-plate and provided with a take-up wire, *d'*, the hooked extremity of which is perforated to receive the upper thread, and arranged to operate in connection with the staple *f*, as shown in Fig. 5. This forms a simple and convenient take-up mechanism, which is not liable to wear or become easily deranged. B' is the spool-wire; C', the upper tension; D', the cloth-presser, and E' the needle, none of which possess special novelty. The upper thread passes from the spool through the upper tension, thence, through an eye and an aperture in the upper extremity of the needle-bar, to the take-up, and thence to the needle, as usual.

Having thus described my invention, I claim—

1. The cam-wheel C, having a cam-groove constructed as described, in combination with the needle-arm D, oscillating shaft H, and link or rod F, all arranged to operate substantially as set forth.

2. The combination of the cam-wheel C, grooved as described, the needle-arm D, oscillating shaft H, and the feeding mechanism, constructed as herein set forth.

3. The combination of the feed-bar *k*, cams *p*, *q*, and *r*, lifter *o*, bell-crank *s*, or its equivalent, and spring *u*, to form a feeding device for a sewing-machine, when constructed and arranged to operate substantially as herein shown and specified.

4. The described combination of the shuttle-bed *g'*, hinged cover *h'*, having a squared shoulder, *j'*, the spring *i'*, and the catch *k'*, pivoted at *l*, and habitually pressed forward by a spring, all arranged as and for the purposes herein set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOSEPH BUTCHER.

Witnesses:
HENRY CONNETT,
GEORGE BUTCHER.