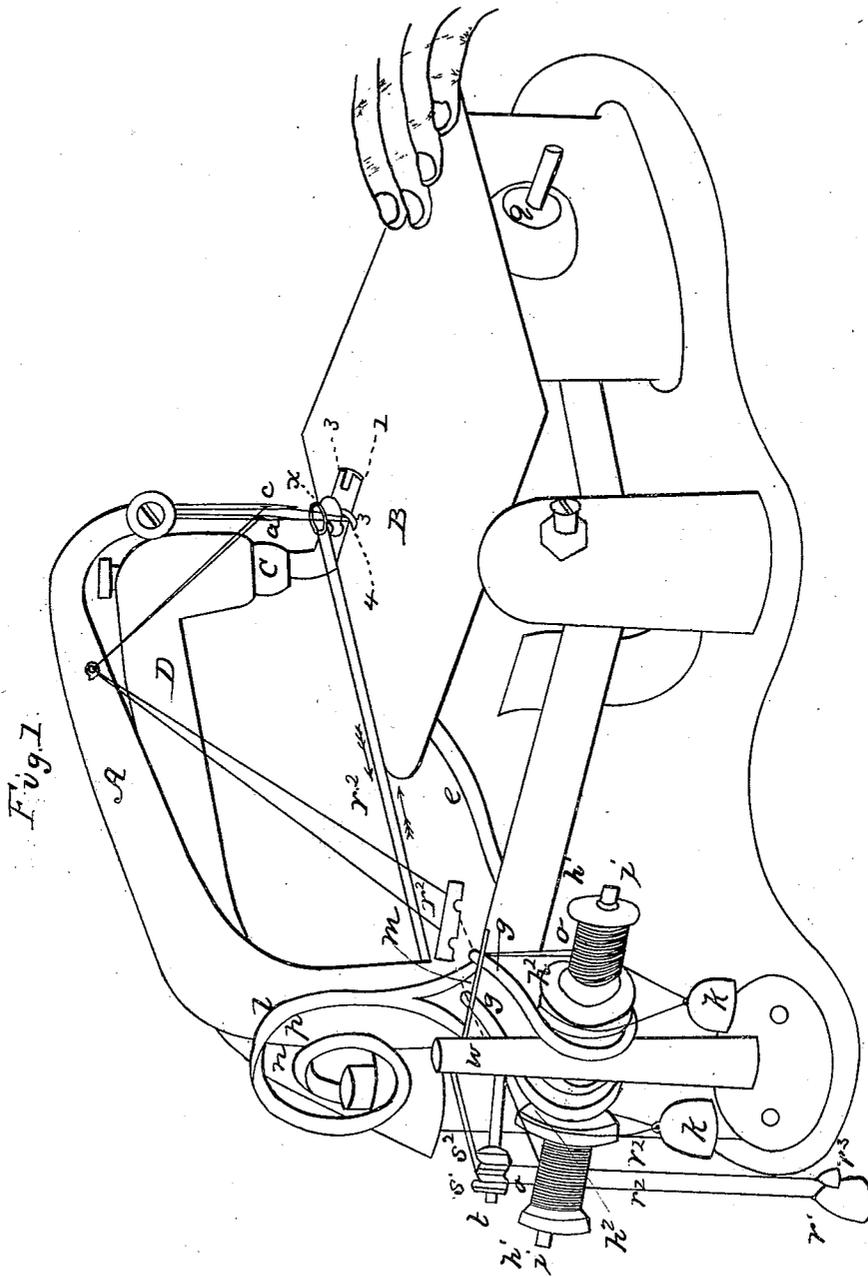


W. WEITLING.
Sewing Machine.

No. 33,619.

Patented Oct. 29, 1861.



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Fig. 2

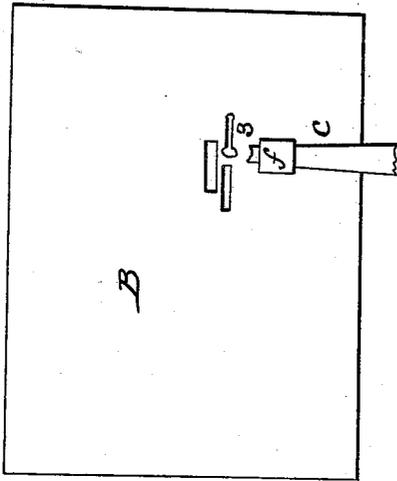


Fig. 3

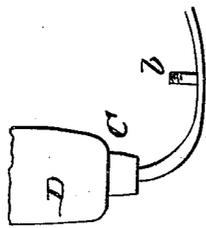


Fig. 6



Fig. 4



Fig. 8



Fig. 5

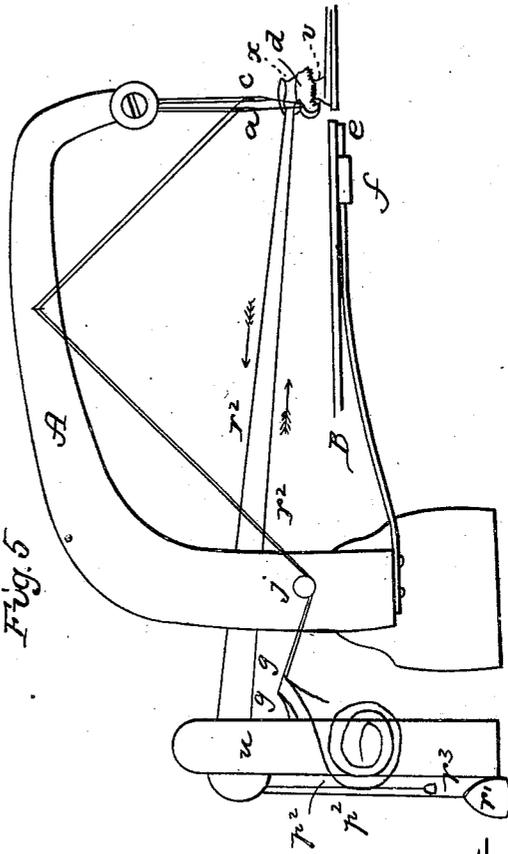
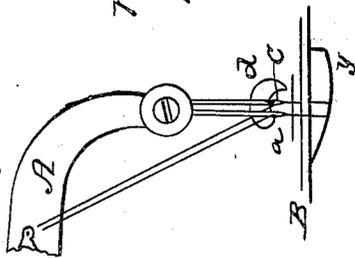


Fig. 7



UNITED STATES PATENT OFFICE.

WILLIAM WEITLING, OF NEW YORK, N. Y.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 33,619, dated October 29, 1861.

To all whom it may concern:

Be it known that I, WILLIAM WEITLING, of city and county of New York, State of New York, have invented certain new and useful Improvements for Making Button-Holes by Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure I represents a plan or top view of my machine, showing the position of the thread-holder *d* when checked from revolving by the threads being in their fullest tension. Fig. II represents the lower side of the plate B of my machine. Fig. III is a longitudinal vertical view of the cloth-presser C, showing the position of that special part of my invention described within as the axle *b* of the thread-holder *d*. Fig. IV is a plan view of the lower side of that special part of my invention described within as the thread-holder *d*, showing its hook and axle-hole and the position of the threads with respect to the hook at the time the point of the needle stitches through the upper loop. Fig. V is a longitudinal vertical view of my machine, showing the position of the threads with respect to the hook *v* after it (the hook) has taken up the upper loop. Fig. VI represents the stitch produced by my invention on the upper side of the button-hole. Fig. VII is a longitudinal vertical view of the needle-bar A, showing the position of the shuttle *y* when taking up the lower loops. Fig. VIII represents the stitch produced by my invention on the lower side of the button-hole.

Similar letters of reference indicate corresponding parts in the eight figures.

I construct the ordinary parts of my sewing-machine in any of the known forms by which the shuttle or its equivalent is moved across the stitching-line, so that when the feeder moves the cloth either from 1 to 2 or from 2 to 1, as shown by Fig. I, B, the shuttle or its equivalent, moves from 3 to 4, and vice versa.

The special parts of my invention consist, first, of a thread-carrier carrying a thread down and up the opening of the button-hole, while the needle, in stitching, carries one down and up through the cloth; second, in a special opening in the plate for the passage of the thread-carrier; third, in a thread-holder revolving round an axle fixed in the cloth-press-

er, and provided below its base with a hook wherewith to take up the slackening of the threads above the plate and to hold them in the form of loops under the needle; fourth, in a thread-regulator for alternately opening and shutting the opening in the plate for the passage of the thread-carrier; fifth, in a take-up tension keeping the threads in a continual tension while running from the spools, so as to take up any slackening not taken up by the thread-holder; sixth, in a tension-regulator checking the take-up tension for the time the shuttle or its equivalent passes through the loops forming below the plate.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

My machine operates with three threads at once. One is worked in the ordinary manner by a common sewing-machine needle stitching through the cloth, the second by the thread-carrier moving down and up the opening of the button-hole while the needle stitches through and rises from the cloth, and the third by the shuttle loopchecking both the other threads on the lower side of the button-hole. The thread of the needle and that of the thread-carrier are fed from spools *o o*, secured on hollow axles *h' h'*, extending out of and secured with one end in rollers *h² h²*, (the tension-rollers.) These rollers turn on arms *i i*. Both arms are secured in standard *u*, as shown by Fig. I.

The thread-carrier *a*, having all the specialties of a sewing-machine needle but the point, which it has not, is secured, with the needle *e*, in the needle-bar A at a distance from the needle corresponding with the intended depth of the button-hole stitch, the eye-hole of the thread-carrier and that of the needle standing in the same direction and on a level with a line parallel with the plane of the plate.

The thread-holder *d* consists of a roller (the thread-holder roller) provided below its base with a hook, *v*, as shown by Fig. IV, and revolving horizontally to the plane of the plate B, Fig. I, on an axle, *b*, Fig. III, fixed perpendicularly in the base of the cloth-presser C, near its (the cloth-presser's) opening for the passage of the needle. The thread-holder *d* revolves by the action of a cord, *r²*, running over a groove, *x*, which groove encircles the thread-holder's top, and over rollers *s' s²*, which rollers turn on arm *t*, secured in stand-

ard u . The cord r^2 is moved either by a pend-
ing weight, r' , to be wound up by knob r^3 , or
by a connection with the main axle g , or by
any other mechanical device. The radius of
the thread-holder roller measured all round
from the center of its axle-hole is of different
length, so as to give this roller a protuberance
on one side of its axle-hole, by which the thread-
holder in revolving alternately covers and un-
covers the opening for the passage of the needle,
and by which, also, its revolving is alter-
nately checked by coming in contact with the
needle when in the cloth and with the threads
when in their fullest tension. Thus in the
first half of the descending of the needle-bar
the threads slacken and the thread-holder, tak-
ing up this slackening, revolves, and by its pro-
tuberance pushes the threads sideward, giving
them thereby such an inclined position below
the base of the thread-holder as to be easily
taken up by the thread-holder hook v and laid
in loop form before the needle. At this stage
of the operation the point of the needle stitches
through this loop form and through the cloth,
after having passed through an opening in the
edge of the protuberating side of the thread-
holder roller. (See the position of the threads
and of hook v in Fig. V, and their next follow-
ing position in Fig. IV.) In the latter half of
the descending of the needle-bar the needle
and the thread-carrier each draws the loop
formed by its thread from under the hook and
closely to the cloth. The thread of the needle,
following exactly its stitching-line, is thus
drawn out from its loop form, while that of the
thread-carrier is kept in it by the needle check-
ing, while in the cloth, the loop of the thread-
carrier's thread, and when out of it its thread
acting as loop-check to that of the thread-
carrier. Thus a stitch is produced on the up-
per side of the button-hole, as shown in Fig.
II, the red loops representing the thread of
the needle and the blue ones that of the
thread-carrier. During this latter half of the
descent of the needle-bar the thread-holder
remains stationary, being checked from rev-
olving by the needle and thread-carrier draw-
ing down the threads of the loop below the
plate from under the hook. In the first half
of the rising of the needle-bar the thread-
holder, being then freed from the action of the
threads on its hook, makes half of another
revolution, near the end of which it is checked
again by the ascending needle then still in the
cloth. At the same time both the thread of
the needle and that of the thread-carrier form
loops $w w$ below the plate B, Fig. VII. The
shuttle y , or its equivalent, passes a thread
(marked black in Fig. VIII) through both of
these loops. In the latter half of its rising
the needle-bar draws both of the loops $w w$
closely to the lower side of the button-hole,
the thread of the shuttle or its equivalent serv-
ing them as loop-check. Thus by the combi-
nation of both threads with that of the shut-
tle or its equivalent a stitch is produced on
the lower side of the button-hole, as shown by

Fig. VIII. In this latter half of the rising of
the needle-bar the thread-holder is checked in
revolving first by the needle, as stated above,
and then by the threads being in their fullest
tension, as shown by Fig. I. The needle-bar,
having now fully ascended, descends again,
and thus the operation begins anew, as here-
tofore described.

As by the shuttle working across the stitch-
ing-line 1 2 or 2 1, Fig. I, the threads are likely
to become entangled in the opening z by the
action of the shuttle, I provide my machine
with a thread-regulator, e , Figs. II and V.
The thread-regulator e consists of a small strap
of metal, fastened with one end to the base of
the axle of the needle-bar, the other end, by
the moving of this base, sliding to and fro
along the working-line of the shuttle, over a
bracket, f , fastened under the plate B. By
this operation the thread-regulator opens the
opening z when the thread-carrier descends
into it, and shuts it when it rises from it, pre-
venting thus the threads from being entangled
in this opening.

By the working together of two threads,
the one passing down and up the stitching
through the cloth, the other down and up the
opening of the button-hole, any one of them is
likely to slacken more than the other. To pre-
vent this I provide my machine with a take-
up tension consisting of a combination of roll-
ers, weights, and steel springs with a double
leader, by which combination the spools $o o$
are secured over hollow axles $h' h'$, extending
out of and secured with one end in tension-
rollers $h^2 h^2$. These tension-rollers are regu-
lated by tension-weights $k k$ (in order to pre-
vent the threads from running off too easily)
and by steel springs $g g$, (the tension-springs,) which
springs are secured in arms $i i$, closely
to standard u . The loose ends of the tension-
springs are provided with eye-holes for the
threads to run through before passing the
double leader j . The ends of the tension-
springs $g g$, reaching higher than the double
leader, are thus bent down somewhat by the
stretching tendency of the running threads,
and as any slackening of one thread or the
other is quickly taken up by the rising tend-
ency of the springs, until worked off again by
the feeding required for the operation of the
needle and the thread-carrier, a continuous
tension of the threads is kept up. This con-
tinuous tension cannot prevent the formation
of the upper loops, as its power is made less
than that produced by the action of the thread-
holder weight r' , or its equivalent, on the cord
 r^2 ; but in order that it may not stop the for-
mation of the lower loops I provide my ma-
chine with a tension-regulator.

The tension-regulator consists of a steel
spring, l , (the regulator-spring,) fixed in the
hind part, n , of the cloth-presser bar D, Fig.
I, and ending double in the tension-regulator
bar m , which it horizontally holds over and
presses on both the tension-springs $g g$, which
pressure thus suspends the take-up tension for

the time the lower loops are forming. The other end of the tension-regulator spring is so secured in the hind part, *n*, of the cloth-presser bar *D* as to be moved sideward by the motion of the needle-bar in the latter half of its rising. By this motion the tension-regulator bar *m* is removed from the tension-springs *g g*, which then resume again their take-up tension unto the latter half of the descent of the needle-bar, when the tension-regulator bar presses again on the tension-springs, thus alternately checking and freeing the take-up tension.

In behalf of Fig. V, I have yet to remark that the thread-holder *d* here appears broken off, in order to show better the position of the threads.

Having thus fully described my invention, I have to state that I do not claim the mechanism by which the shuttle *y*, or its equivalent, is moved, nor that by which the cord *r*² is made to act on the thread-holder *d*. I do not claim the ordinary parts and known forms of a sewing-machine. I do not claim the shuttle, nor the sewing-machine needle. Neither do I claim the thread-carrier's specialties of a sewing-machine needle.

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

1. The employment of a thread-carrier, *a*,

consisting of a sewing-machine needle having no point and operating through the opening of the button-hole, substantially as and for the purpose set forth.

2. The arrangement of laying the upper loops with the hook *v* by the revolution of the thread-holder *d*, substantially as and for the purpose described.

3. The arrangement by which the opening *z* in the bed-plate, provided for the passage of the thread-carrier, is alternately opened and shut by the employment of a thread-regulator, *e* and *f*, Figs. II and V, operating substantially as and for the purpose set forth.

4. The arrangement of the take-up tension, consisting of a combination of hollow axles, *h'* *h'*, with rollers *h*² *h*², weights *k k*, cord *r*², and double leader *j*, operating substantially in the manner and for the purpose specified.

5. The arrangement of alternately checking and freeing the take-up tension by the employment of a tension-regulator, *l* and *m*, Fig. I, substantially as and for the purpose set forth.

WILLIAM WEITLING.

Witnesses:

R. REICHEL,
JAMES PURDY.