

No. 692,904.

Patented Feb. 11, 1902.

J. REECE, Dec'd.

M. REECE & F. A. SHEA, Administrators.

BUTTONHOLE SEWING MACHINE.

(Application filed Aug. 20, 1901.)

(No Model.)

2 Sheets—Sheet 1.

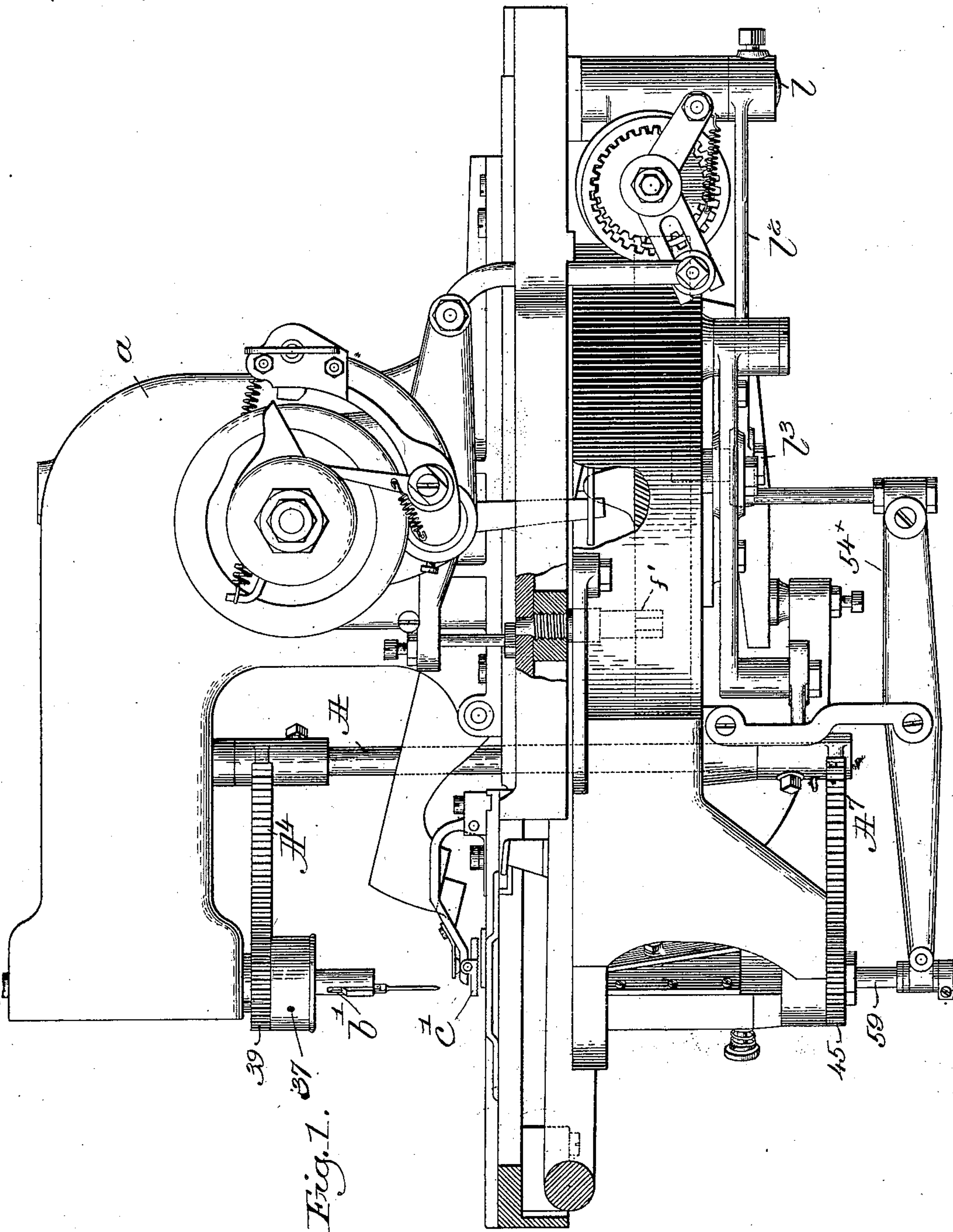


Fig. 1.

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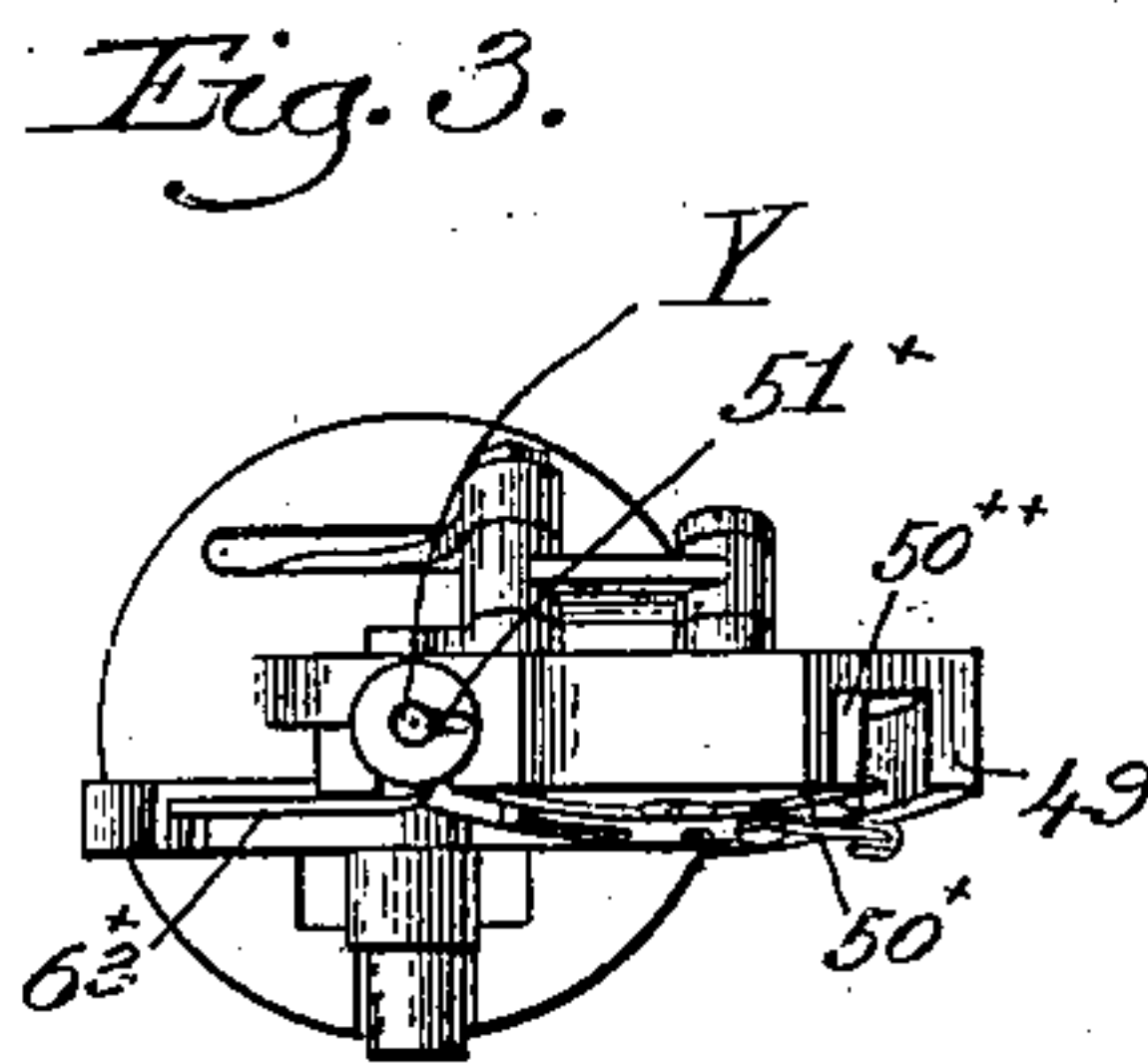
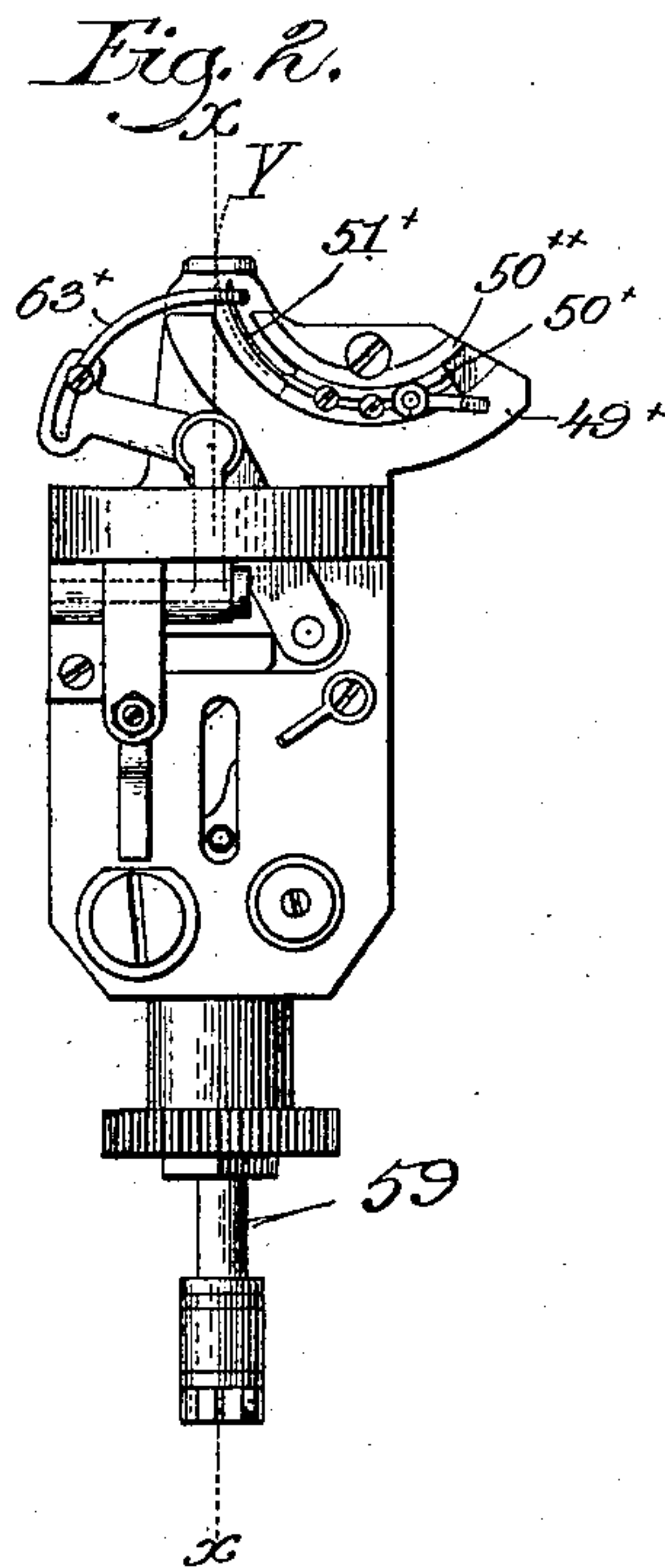
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

MARIETTA REECE, OF BOSTON, AND FRANCIS A. SHEA, OF BROOKLINE,
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BUTTONHOLE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 692,904, dated February 11, 1902.

Application filed August 20, 1901. Serial No. 72,725. (No model.)

To all whom it may concern:

Be it known that JOHN REECE, deceased, invented an Improvement in Buttonhole-Sewing Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to means for placing the stitches around the hole of an eyelet or around the eye or eyes of a buttonhole, the object being to provide for the regular and even placing and appearance of the stitches when the diameter of the eyelet-hole or eye of the buttonhole is of material size.

Since the invention relates entirely to those parts of the stitch-forming mechanism adjacent to the work being stitched, the various details of the machine and the operating parts being of well-known form adapted to the stitching of eyelets or buttonholes, it is unnecessary to illustrate or describe in detail the entire machine.

This invention, as will subsequently appear, is adapted to any form of eyelet or buttonhole sewing machine; but for convenience it is herein illustrated as applied to a machine similar to that shown in the patent to John Reece, No. 655,637, granted August 7, 1900, for a buttonhole sewing and cutting machine, and reference is hereby made to the said patent for fuller illustration and description of the other parts of the machine. In the machine shown in the said patent, as well as in prior patents to the same inventor referred to in said patent, and in which machine the stitch-forming mechanism rotated and had a bodily movement with respect to the work, the stitching around the eyelet-hole or eye of the buttonhole was positioned by giving to the stitch-forming mechanism a bodily movement consisting of a combined lateral and longitudinal movement, whereby the stitch-forming mechanism during its axial rotation traveled also in a circular curve around the edge of the eyelet or buttonhole. In other machines, as is well known, the same end has been attained by giving a similar movement to the work-clamp and in still others in different ways. In the case of pin-hole eyelets, such as used in shirt-bosoms, or in the case of buttonholes without an en-

larged eye it is of course unnecessary that there should be any relative movement between the stitch-forming mechanism and the work-holder for the purpose of enlarging the eyelet or buttonhole-eye. When, however, the diameter of the eyelet-hole or buttonhole-eye becomes material, it is necessary to give such a motion as last described to the parts or else to set the overedge-needle back into the fabric to the desired extent and rely upon the thread-controlling means to pull the purl up to the edge of the buttonhole or eyelet; but this in practice is difficult of accomplishment, and for this reason the movement such as shown in the Reece patent, No. 655,637, or other movements of the parts has hitherto been made use of.

In the present invention the slit-penetrating needle is offset from or eccentric to the axis of rotation of either the stitch-forming mechanism or the work-holder, or both, or, in other words, offset from or eccentric to the center of the eyelet or buttonhole being stitched, and thus upon the rotation of either the stitch-forming mechanism or the work-holder the slit-penetrating needle travels in a circular curve or in such curve as may result from the movement of the work-holder or stitch-forming mechanism close to the edge of the enlarged eyelet or buttonhole, thus allowing the stitches to be placed in a regular and even manner in the desired position and an eyelet or buttonhole of pleasing appearance and strong construction being formed.

Figure 1 of the drawings is a view in side elevation of a machine similar to the one shown in the said Patent No. 665,637. Fig. 2 is a side elevation of the lower stitch-forming mechanism and connected parts, and Fig. 3 is a plan view of the parts shown in Fig. 2.

This invention is herein illustrated as applied to the lower complemental stitch-forming mechanism—that is to say, the slit-penetrating needle in this type of machine is the lower needle and in accordance with this invention has been placed eccentric to the axis of rotation of the stitch-forming mechanism. It is needless to describe in detail the machine, since the same is fully described in the patent referred to.

In this machine the work-holder *c'* is sta-

tionary, and the stitch-forming mechanism carried by the stitch-frame *a* is given the necessary movement with respect to the workholder for the formation of the buttonhole, the stitch-forming mechanism itself by means of the gears 39 45, the segmental gears *a*⁴ A⁷, the shaft A, and operating means being rotated to position the stitches at the eye of the buttonhole, all in well-known manner.

10 In Fig. 2 of the drawings connected herewith the line *x x* represents the axis of rotation of both the upper and lower complementary stitch-forming mechanism. The under-thread-carrying needle 51^x, which in this case is the slit-penetrating needle, is mounted upon a segment 50^x, sliding in a curved raceway 49^x and operated by the reciprocating hollow rod 59 by means of the lever 54^x and connected parts, all as described in the before-mentioned patent. The looper 63^x, which co-operates with the under-thread-carrying needle 51^x and the eye-pointed needle of the needle-bar *b'* in making the stitch, is given its proper movements also by the hollow rod 59 through the connected parts, all as described in said patent; but in the said patent the under-thread-carrying needle 51^x moved in a path which intersected the plane of the work at the axis of rotation of the stitch-forming mechanism, and the stitch-frame carrying the stitch-forming mechanism was given a longitudinal motion in the direction of the length of the buttonhole by means of the pin *f'*, working in a cam-slot, and a lateral motion by means of the lever *l*², working in a second cam-slot, all as described in the aforesaid patent.

In the embodiment of this invention herein illustrated the under-thread-carrying needle 40 is located to move in a path which intersects the plane of the work at a point offset from or eccentric to the axis of rotation of the stitch-forming mechanism, the difference between the path of the needle as herein constructed and its former path being shown by reference to Fig. 2, where the line *y* represents the path of the under-thread-carrying needle as it was in the machine of Patent No. 655,637. As illustrated, this offset or eccentricity is obtained by cutting the raceway in the block 49 to one side its former position; but it is obvious that the same result may be obtained by moving the needle in the needle-block 50^x or by varying the construction of the block 50^x itself, all that is necessary being that the parts shall be so constructed that the needle shall move in a path which shall intersect the plane of the work at a point eccentric to or offset from the axis of rotation of the stitch-forming mechanism. The degree of this offset or eccentricity may be adjusted according to the demands of the work by substituting different sizes of needle-blocks 50^x and varying the width of the part 50^x or in any other way which would be suggested to the ordinary mechanic, the looper 63^x being adjusted in position and move-

ments to correspond if the degree of adjustment renders the same necessary. It is found, however, that the slit-penetrating needle can be fixed at an average position and the thread-controlling means be relied upon for slight adjustments in increase of size of the eyelet-hole or buttonhole-eye.

In machines of the type described in the aforesaid Patent No. 655,637 the width of the binding of the edge of the buttonhole is practically determined by the distance between the paths of the slit-penetrating and the fabric-penetrating needles, and the width of the binding is adjusted by adjusting the fabric-penetrating needle transversely of the needle-bar. The fabric-penetrating needle is adjusted in the aforesaid patent, the casing to which is attached the gear 39 having two diametrically opposed screws, one of which is shown at 37 in Fig. 1. Upon turning these screws in opposite directions the block in the casing carrying the bearing for the needle-bar *b'* may be moved longitudinally in the casing in order to adjust the position of the needle a greater or less distance from the center of rotation. In the present invention the fabric-penetrating needle is adjusted in the same manner to the desired position from the edge of the fabric, and the slit-penetrating needle is then adjusted until it is either close to the edge of the fabric or at such a distance from it that when the thread is drawn up the purl will take its proper position along the edge of the fabric. The placing of the slit-penetrating needle offset from or eccentric to the axis of rotation of the stitch-forming mechanism and its slight adjustments in position do not affect the principle of the operation of the parts described in the aforesaid patent in the formation of the stitch. The looper 63^x and the under-thread-carrying needle 51^x are each adjustable in their holders, as shown, so that they may be properly adjusted to cooperate with each other. As in this type of machine, the looper 63^x takes the loop of the upper needle-thread, holds and spreads the same below the throat-plate in order that the under-thread-carrying needle 51, with its thread, may pass up through the loop of upper needle-thread held by the looper 63^x, the loop of the under-thread-carrying needle being in turn entered above the material by the upper needle in its next descent. As stated, to vary the size of the eyelet-hole or buttonhole-eye after the slit-penetrating needle has been set for an average position it will usually not be necessary to change it, but simply to adjust the upper needle in the needle-bar to the desired position and allow the thread to draw the purl up to the edge. If, however, the size or diameter of the eye is materially increased, the position of the slit-penetrating needle should be changed so as to be offset to a greater distance from the center of rotation. This construction renders unnecessary the longitudinal and lateral movements of the stitch-forming mechanism relative to the

work-holder in traveling about the eyelet-hole or buttonhole-eye, since it has been found that by positioning the slit-penetrating needle, as described herein, and between the axis of rotation and the edge being stitched, the entire overedge-stitch-forming mechanism when rotated will move in a path of sufficient amplitude to stitch the eye of the buttonhole. In the former machines the overedge-stitch-forming mechanism during its rotation was given a bodily movement in a somewhat-circular path by reason of this combined lateral and longitudinal movement. In the present invention the rotation of the stitch-forming mechanism with the slit-penetrating needle offset from the axis of such rotation gives the same result. Hence the cam-slot in which the pin f' rides must be changed, so as to abolish the longitudinal movement at the eye of the buttonhole and either the cam in which the pin l^3 rides be correspondingly changed or else this pin and crank l^2 and connected parts be disconnected from the machine or abolished entirely, the latter course being preferable in the construction of the new machine.

While the invention is herein illustrated as applied to a machine of the Reece type, it is obvious that it is equally applicable to any type of machine in which there is a relative rotation of the stitch-forming mechanism and the work-holder and in which there is a slit-penetrating needle, the essence of the invention consisting in such case of the placing of the slit-penetrating needle offset from or eccentric to the axis of rotation of the parts.

The invention having been thus described, what is claimed as new, and desired to be secured by Letters Patent, is—

1. In a buttonhole-sewing machine, the combination of overedge-stitch-forming mechanism comprising a slit-penetrating needle, a work-holder, means for giving a relative rotary movement to said slit-penetrating needle and said work-holder, the said slit-penetrating needle being located to move during said rotation in a path that intersects the plane of the work between the axis of said rotation and the edge being stitched.

2. In a buttonhole-sewing machine, the combination of overedge-stitch-forming mechanism comprising a slit-penetrating needle, a

work-holder, means for giving a relative rotary movement to said stitch-forming mechanism and work-holder, the said slit-penetrating needle being located to move during said rotation in a path that intersects the plane of the work between the axis of said rotation and the edge being stitched.

3. In a buttonhole-sewing machine, the combination of overedge-stitch-forming mechanism comprising a slit-penetrating needle, a work-holder, means for giving a bodily rotation to said stitch-forming mechanism relatively to the work-holder, the said slit-penetrating needle being located to move during said rotation in a path that intersects the plane of the work between the axis of said rotation and the edge being stitched.

4. In a buttonhole-sewing machine, the combination of overedge-stitch-forming mechanism comprising an under-thread-carrying slit-penetrating needle, a work-holder, means for giving a relative rotary movement to said stitch-forming mechanism and work-holder, the said slit-penetrating needle being located to move during said rotation in a path that intersects the plane of the work between the axis of said rotation and the edge being stitched.

5. In a buttonhole-sewing machine, the combination of overedge-stitch-forming mechanism comprising an under-thread-carrying slit-penetrating needle, a work-holder, means for giving a rotary movement to said stitch-forming mechanism, the said slit-penetrating needle being located to move during said rotation in a path that intersects the plane of the work between the axis of said rotation and the edge being stitched.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

MARIETTA REECE,
FRANCIS A. SHEA,

Administrators of the estate of John Reece, deceased.

Witnesses to signature of Marietta Reece:

JOHN C. EDWARDS,
AUGUSTA E. DEAN.

Witnesses to signature of Francis A. Shea:

GEO. W. GIBBS,
GEO. D. DESHIELDS.