E. J. BOYLER & W. KOHLER.

BUTTONHOLE SEWING ATTACHMENT FOR SEWING MACHINES.

APPLICATION FILED JAN. 3, 1910.

983,264.

Patented Feb. 7, 1911.

3 SHEETS—SHEET 1.

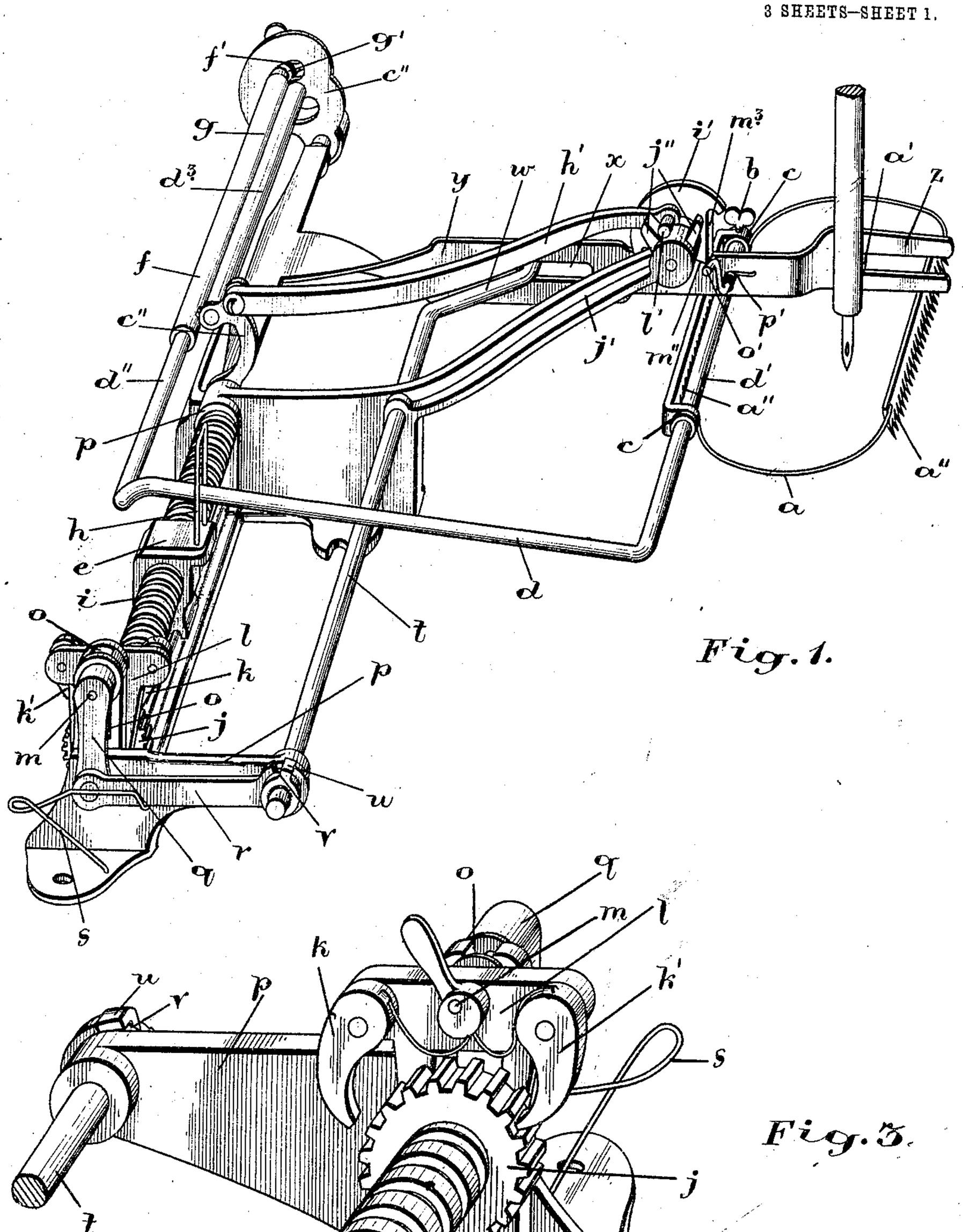

Fig. 1.

Fig. 3.

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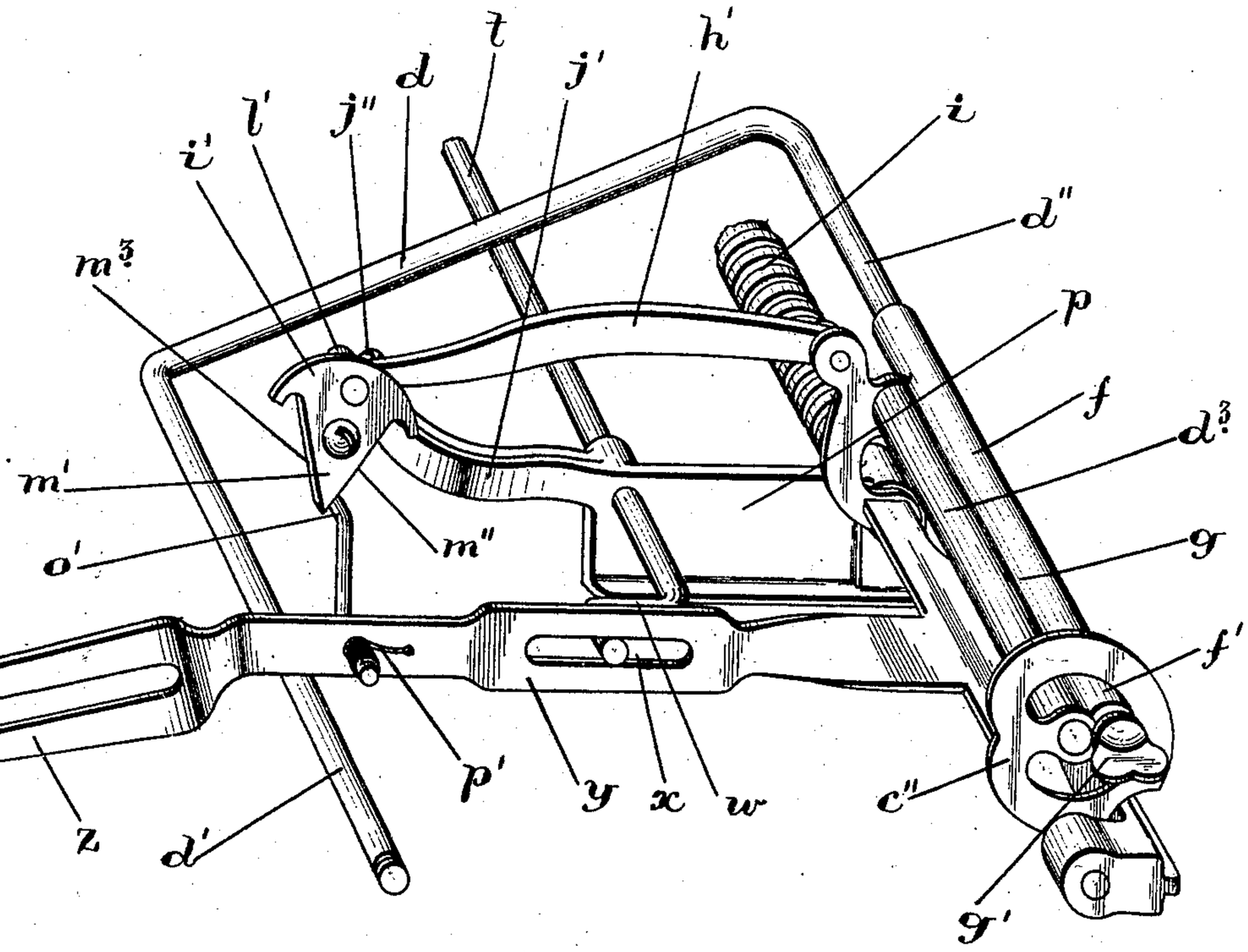

Fig. 2.

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Fig. 6.

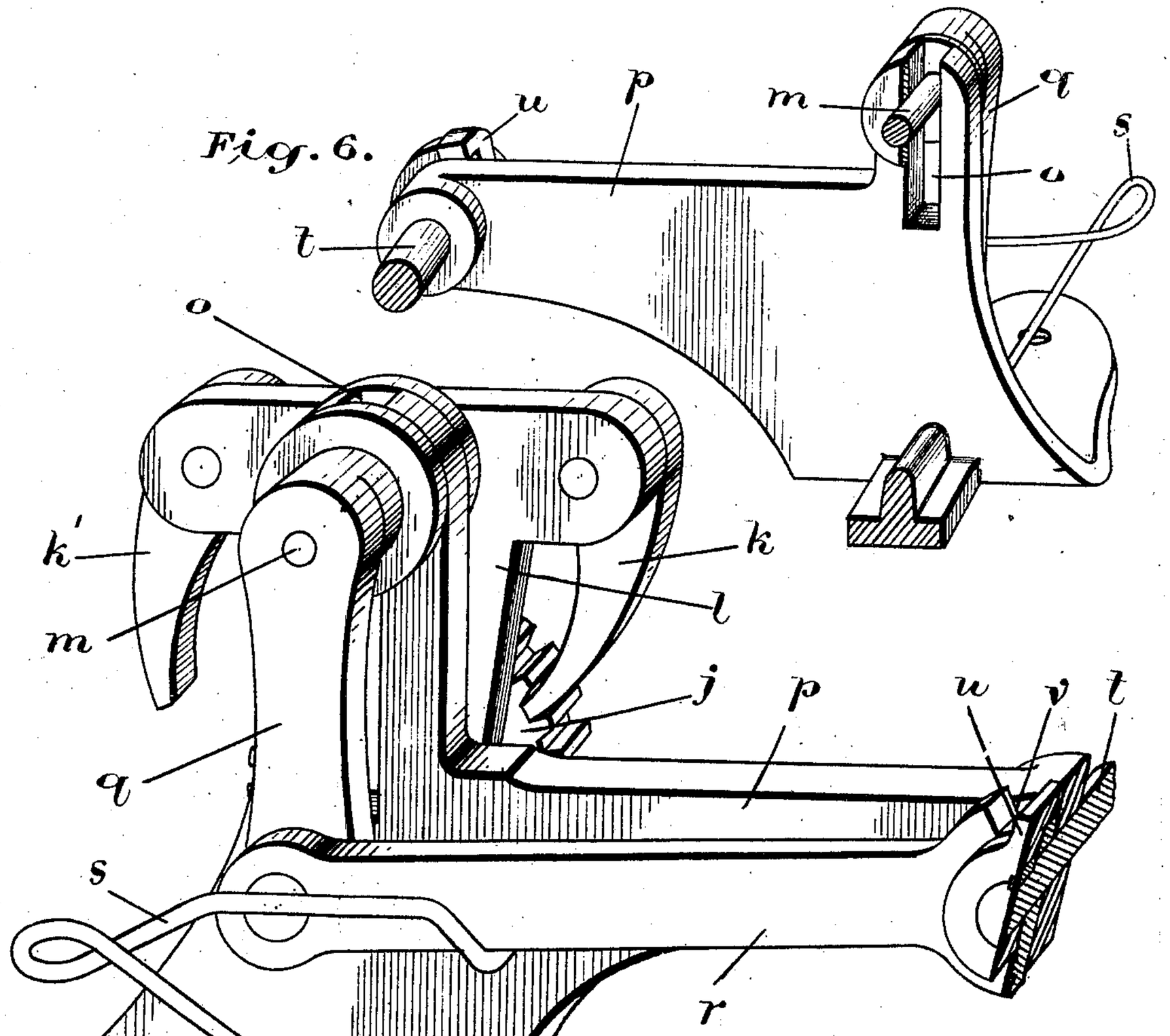

Fig. 4.

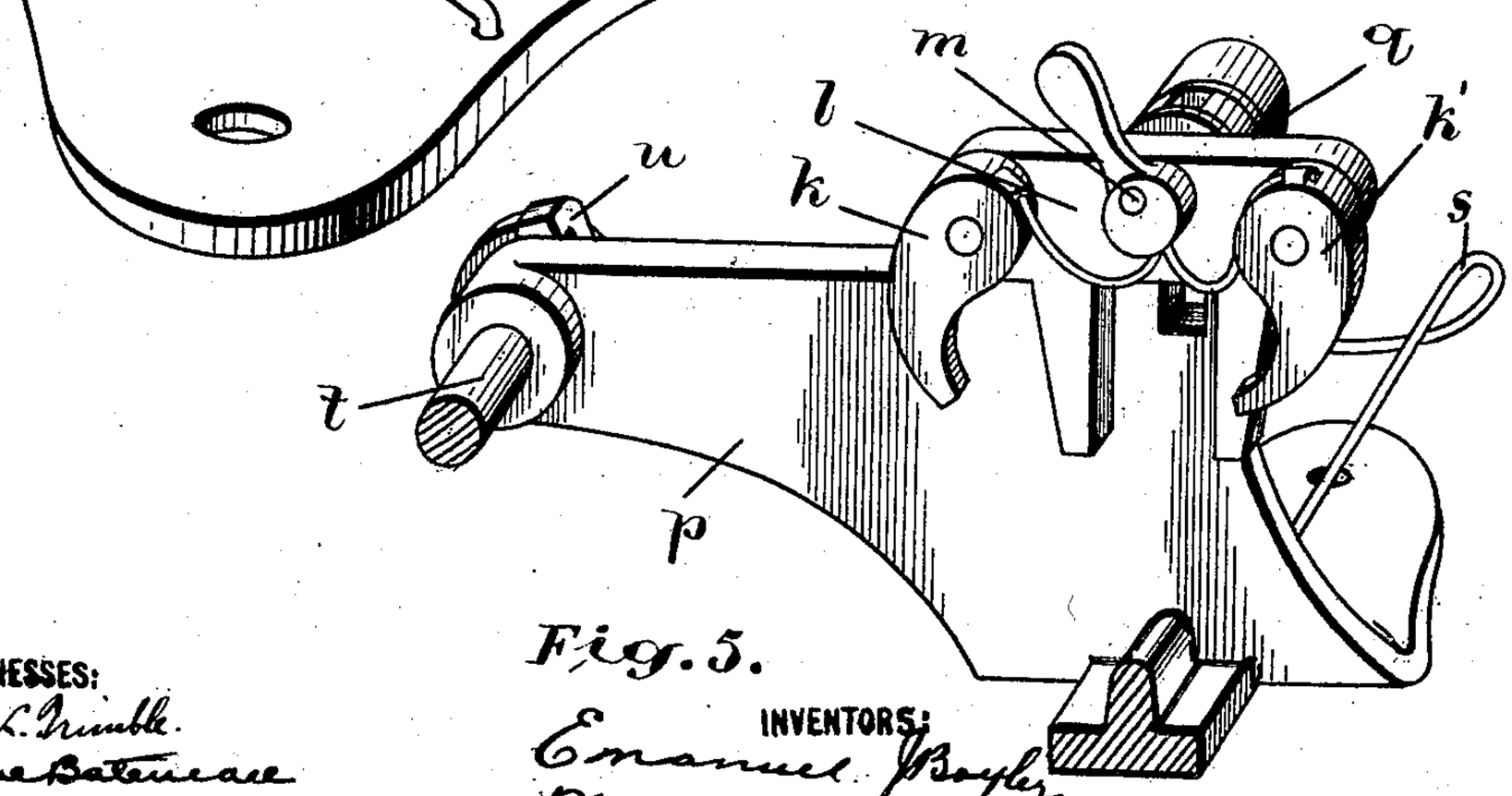

Fig. 5.

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UNITED STATES PATENT OFFICE.

EMANUEL J. BOYLER, OF HAMILTON, AND WILLIAM KOHLER, OF SHELBURNE, ONTARIO, CANADA.

BUTTONHOLE-SEWING ATTACHMENT FOR SEWING-MACHINES.

983,264. Specification of Letters Patent. Patented Feb. 7, 1911.

Application filed January 3, 1910. Serial No. 536,245.

To all whom it may concern:

Be it known that we, EMANUEL J. BOYLER, of the city of Hamilton, in the county of Wentworth and Province of Ontario, Canada, and WILLIAM KOHLER, of the village of Shelburne, in the county of Dufferin and Province of Ontario, Canada, have invented certain new and useful Improvements in Buttonhole-Sewing Attachments for Sewing-Machines; and we hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to a button hole sewing attachment which will advance the material lengthwise of the buttonhole, stitch by stitch, and, reciprocate it laterally of the button hole, at each operation of the needle bar, when the needle is withdrawn from the material, and which will hold the material stationary when the needle is in it. To prevent the material ridging against the needle during the lateral movement of the former, the attachment is provided with a stretcher mounted on a traveling arm, and this arm is moved lengthwise of the button hole by a traveling nut actuated by a feed screw, the feed screw being rotated, through the agency of a rock shaft and intermediate connections actuated by an operating lever, during the movements of the needle bar; the traveling arm being reciprocated laterally of the button hole by an oscillator actuated by the operating lever and intermediate connections co-incident with its lengthwise movement, as hereinafter set forth and particularly pointed out in the claims.

For an understanding of the invention, reference is to be had to the following description and to the accompanying drawings in which:

Figure 1, is a perspective view of the button hole sewing attachment. Fig. 2, is a detail view of the oscillator. Fig. 3, is a detail view of the actuating means for the feed screw. Fig. 4, is a perspective view partly in section of the actuating means for the feed screw. Fig. 5, is a perspective view, of the ratchet plate, ratchet dogs, and part of the supporting frame, from the opposite side to Fig. 4. Fig. 6, is a perspective view of part of the supporting frame, showing the guideway for the stud connecting the ratchet plate to the link of the feed screw actuating means.

Like characters of reference refer to like parts throughout the specification and drawings.

The stretcher *a* consisting of an open frame having teeth *a''* to engage the material at opposite sides of the button hole is provided with hubs *c* having a fastening device *b* by which the stretcher can be adjustably mounted on one end *d'* of the traveling arm *d*. The other end *d''* of the traveling arm is movable into and out of the sleeve *f* forming part of the oscillator *g*. Intermediate its ends *d' d''* the traveling arm is engaged by the carrier *h* forming part of the traveling nut *e* the carrier being formed, so that it moves the traveling arm lengthwise of the feed screw *i* as the latter revolves, and, permits the traveling arm to reciprocate transversely of the feed screw during such movement.

The feed screw *i* is revolubly mounted in the supporting frame *p* and is provided with a ratchet wheel *j* with which the ratchet dogs *k k'* engage to rotate the feed screw. The ratchet dogs are pivoted to the ratchet plate *l* having a stud *m* vertically movable in the guideway *o* in the supporting frame *p*. Connected with the stud *m* is one end of the link *q*, the other end of the link being pivoted to the crank *r* tensioned by a spring *s* to prevent the movement of the crank, link, ratchet plate, and ratchet dog except when actuated by the rock shaft *t* oscillating under the influence of the operating lever and needle bar. The ratchet dog *k* is employed to rotate the feed screw in one direction and the other ratchet dog *k'*, is employed to rotate it in the opposite direction, these dogs being pivoted to the ratchet plate on opposite sides of the feed screw and being capable of disengagement from the teeth of the ratchet wheel, so that when one ratchet dog is engaged the other ratchet dog will be disengaged, the engaged ratchet dog being the operative one rotating the ratchet wheel and feed screw to move the traveling nut along the latter.

The crank *r* is loosely mounted on the rock shaft *t* and its hub is formed with a recess *v* in which engages the pin *u* connected with the rock shaft, the length of the recess being greater than the width of the pin to allow of a limited movement of the rock shaft before the latter actuates the

crank. During the oscillation of the rock shaft the pin *u* engages alternatively the opposite ends of the recess *v* and actuates the crank, link, and ratchet plate to bring the operative ratchet dog into and out of engagement with the teeth of the ratchet wheel *j*.

The rock shaft *t* is provided with a crank *w* engaging in an elongated slot *x* in the operating lever *y* fulcrumed at one end to the supporting frame *p*, and at the other end provided with a fork *z* to embrace the needle clamp *a'*. The upward movement of the needle bar raises the operating lever *y* and the latter by its engagement with the crank *w*, turns the rock shaft *t* bringing the pin *u* into engagement with one end of the recess *v*. The pin *u* when it engages the ends of the recess *v* oscillates the crank *r*, the hub of which, turning with the rock shaft *t*, causes the crank to move up and down in a fixed path. The downward movement of the crank, through its pivotal connection with the link *q* lowers the latter and the stud *m* and ratchet plate *l*, the guideway in the supporting frame causing the stud, link, and ratchet plate to move in a fixed path. As the ratchet plate descends, the operative ratchet dog is brought into engagement with the teeth of the ratchet wheel turning the latter and the feed screw a partial revolution to move the traveling nut and advance the material one stitch lengthwise of the button hole. The descent of the needle bar lowers the operating lever causing it to turn the rock shaft in the opposite direction to its upward movement bringing the pin *u* into engagement with the opposite end of the recess *v* and turning the crank *r* in an upward direction to raise the ratchet plate and ratchet dog into position where the latter will engage another tooth of the ratchet wheel on the next upward movement of the needle bar.

Pivoted to the supporting frame *p* is the oscillator *g* and journaled between the oscillator plates *c''* is the hub d^3 of the oscillator sleeve *f*, from which the oscillator rocks. The sleeve *f* is adjustable on an arc described from the center of its hub d^3, to vary the length of the reciprocal movement of the stretcher *a*, one of the oscillator plates being formed with a substantially semicircular slot *f'* for the set screw *g'* by which the sleeve is locked in its adjusted position. The oscillator plates *c''* forming part of the oscillator *g* are pivoted to the supporting frame *p* and rock from their pivotal connection therewith during the actuation of the link *h'*, the stroke of the oscillator plates never varying during their oscillation. When the set screw *g'* is adjusted in the semicircular slot to bring the sleeve *f*, nearer the pivotal axis of the oscillator, the length of the oscillating movement of the sleeve is shortened, and when the set screw is adjusted to move the sleeve *f* farther from the pivotal axis, the movement is lengthened, to respectively decrease or increase the length of the reciprocating movement of the traveling arm, and consequently the length of the stitch transversely of the button hole. The oscillator rocks back and forth and imparts reciprocal motion to the arm *d* and stretcher *a*, the arm during its reciprocal movement working through the carrier *h* when the latter is moving lengthwise of the feed screw. The end *d''* of the arm *d* works into and out of the sleeve *f* during the movement of the traveling nut as it feeds respectively away from and toward the ratchet wheel *j* this provision being necessary to compensate for the changes in the relative position of the traveling arm to the oscillator as the traveling nut moves from one end to the other of the feed screw.

Connected to the oscillator *g* is one end of a link *h'* the opposite end of the link being pivoted to a wrist plate *i'* oscillatingly connected to the supporting arm *j'* forming part of the supporting frame *p*. The supporting arm *j'* is provided with two stops *j''* with which engages a pin *l'* projecting from the link *h'* to limit the motion of the link and oscillator and prevent the overthrow of the latter when the needle bar is running at a high rate of speed. The wrist plate is formed with a triangular projection *m'* the sides *m''* m^3 of which are engaged by a crank arm *o'* rockably connected to the operating lever *y* and tensioned by a spring *p'* which maintains the crank arm in a fixed relative position to the operating lever when the former is disengaged from the triangular projection. The crank arm *o'* alternately engages the opposite sides *m''* m^3 of the triangular projection *m'* during the upward movements of the needle bar. When the crank arm *o'* engages the side *m''* it moves the wrist plate to rock the oscillator away from the needle bar, and when it engages the side m^3 it rocks the oscillator toward the needle bar, thus moving the stretcher back and forth at each alternate stroke of the needle bar.

By utilizing the feed screw and traveling nut to move the stretcher in one direction and the oscillator to move it transversely thereto, we have succeeded in producing an attachment for sewing button holes by which the material is advanced lengthwise of the button hole and moved transversely to the length of the button hole at each operation of the needle bar.

The construction and arrangement of the parts hereinbefore described may be modified and varied within the scope of the appended claims without departing from the principle of the invention, the essential feature of which is to move the material

lengthwise of the button hole stitch by stitch, so that the stitches may follow each other in proper sequence and to move the material transversely to the length of the button hole so that the material may be stitched at the edge of the button hole and again at a selected distance therefrom to obtain a secure foundation for the stitches, and to utilize the needle bar, and a suitable intermediate mechanism for creating the lengthwise and transverse movements which are timed to occur coincident with each other.

Having thus fully described our invention what we claim as new and desire to secure by Letters Patent is:

1. In a button hole sewing attachment, a feed screw, a traveling nut movable on the feed screw, a ratchet wheel for the feed screw, a movable ratchet plate, a ratchet dog pivoted to the ratchet plate, a stud for the ratchet plate, a link connected to the stud, a crank pivotally connected to the link, a rock shaft for the crank operable by the needle bar, and a cloth holding means moved by the traveling nut.

2. In a button hole sewing attachment, a feed screw, a traveling nut movable on the feed screw, a ratchet wheel for the feed screw, a movable ratchet plate, a ratchet dog pivoted to the ratchet plate, a stud for the ratchet plate, a link connected to the stud, a crank pivotally connected to the link, a rock shaft, a lever actuating the rock shaft, and a cloth holding means moved by the traveling nut.

3. In a button hole sewing attachment, a feed screw, a traveling nut movable on the feed screw, a ratchet wheel for the feed screw, a movable ratchet plate, a ratchet dog pivoted to the ratchet plate, a stud for the ratchet plate, a link connected to the stud, a crank pivotally connected to the link, a rock shaft, a lever actuating the rock shaft, a cloth holding means moved by the traveling nut, an oscillator actuating the cloth holding means, an arm for the oscillator, a triangular wrist plate pivoted to the arm, and a crank for the lever actuating the wrist plate to cause the movement of the arm.

4. A button hole sewing attachment comprising an oscillator consisting of two oscillator plates and a sleeve adjustably journaled between them, a wrist plate having a triangular projection, a link connecting the wrist plate and oscillator, an operating lever, and a tensioned crank arm rockably connected to the operating lever engaging with the triangular projection of the wrist plate.

Toronto, December 11th, 1909.

EMANUEL J. BOYLER.
WILLIAM KOHLER.

Signed in the presence of—
CHAS. H. RICHES,
OLIVE BATEMAN.