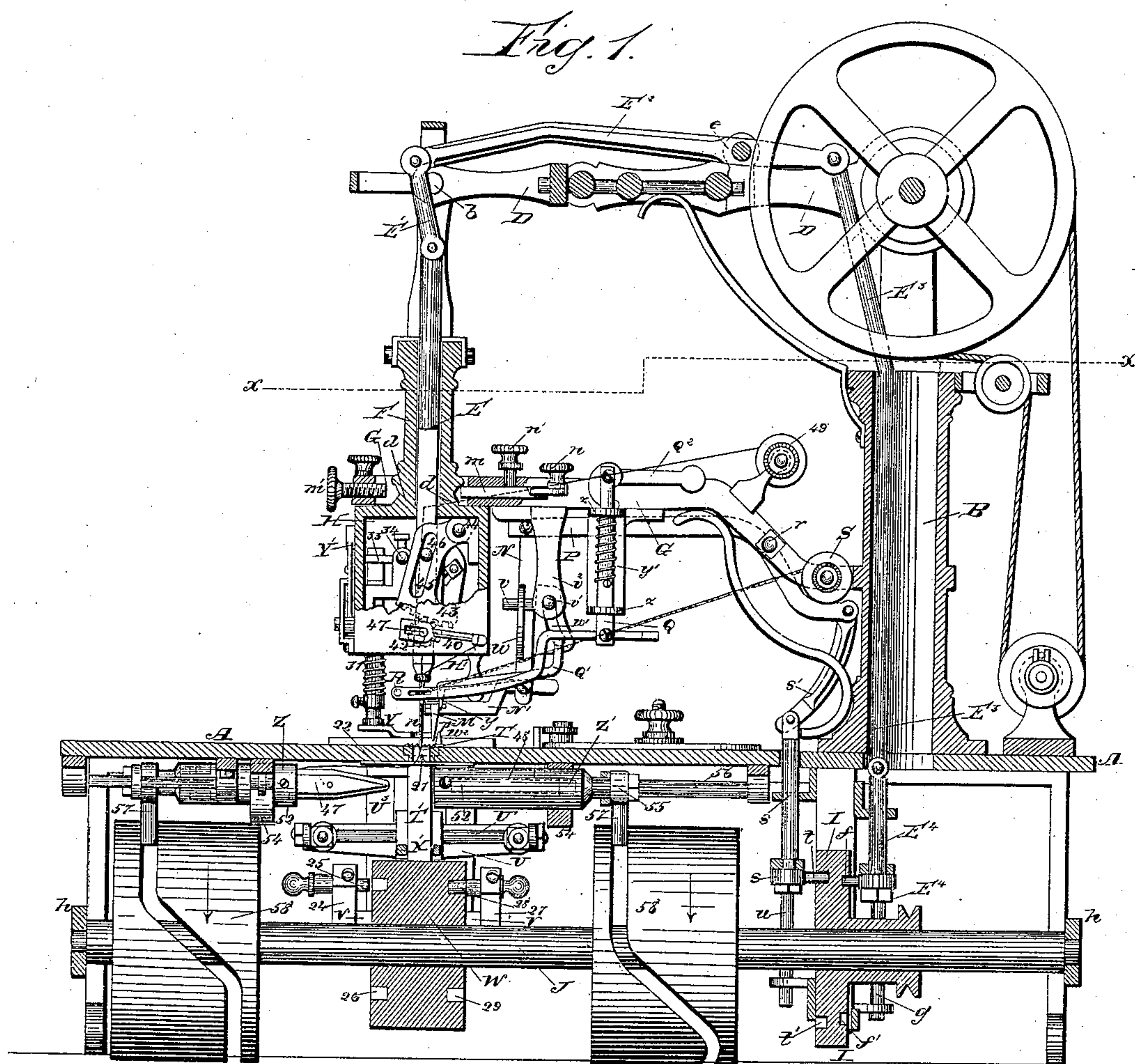


A. C. F. DEROCQUIGNY, D. GANCE & L. HANZO.

Embroidering Machine.

No. 34,748.

Patented March 25, 1862.



Witnesses:
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Inventor:
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Fig. 7.

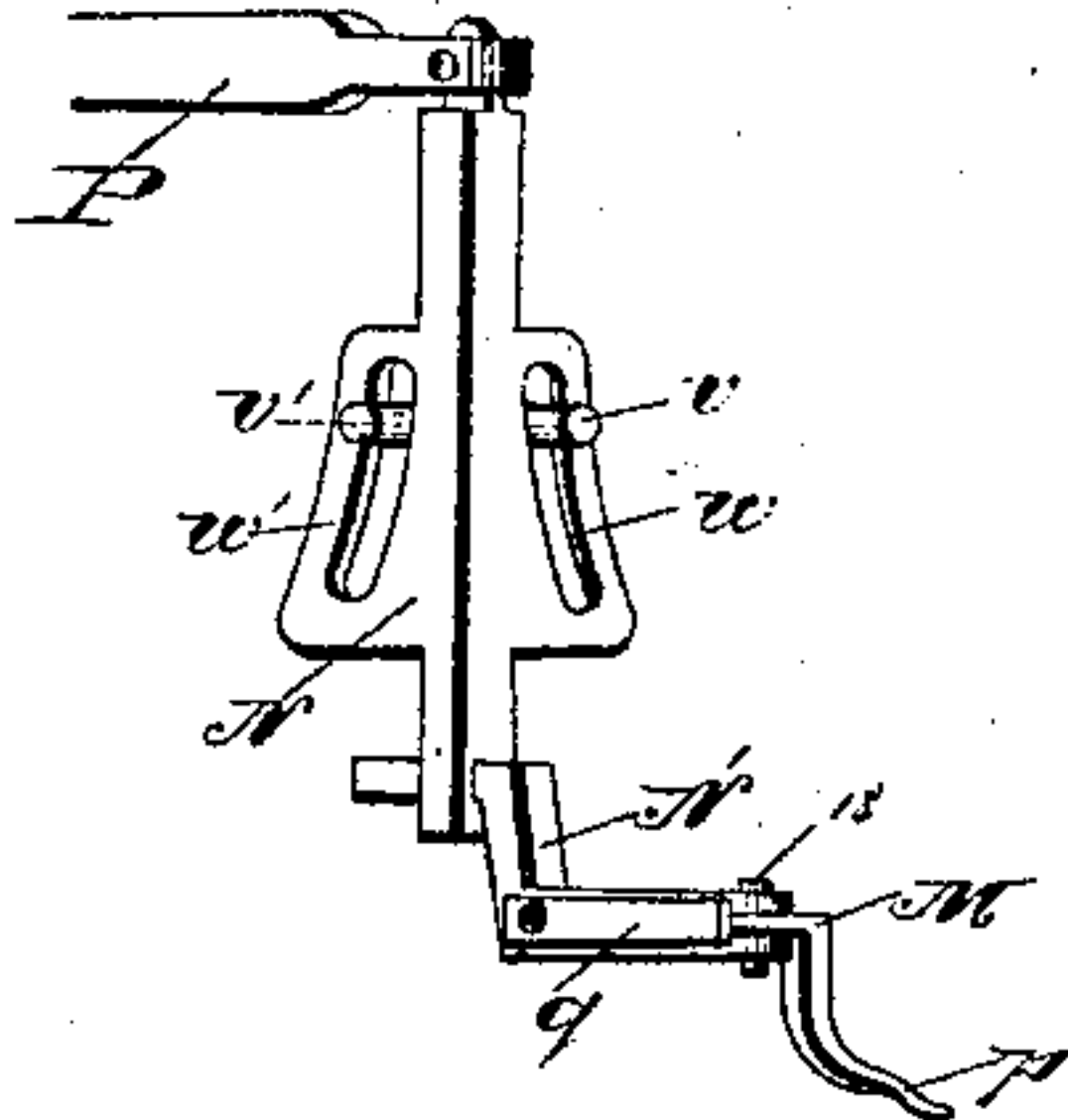


Fig. 2.

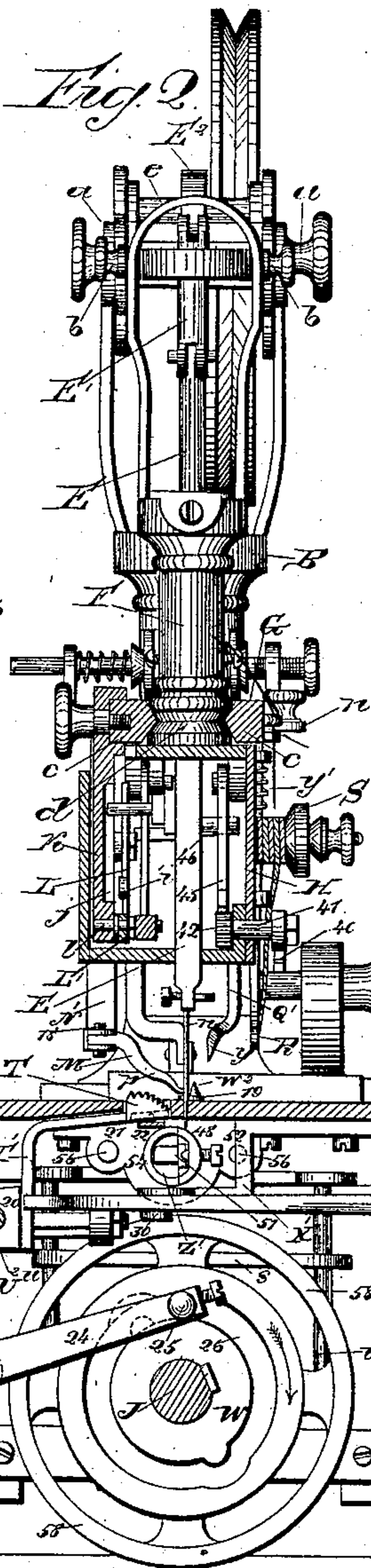


Fig. 9.

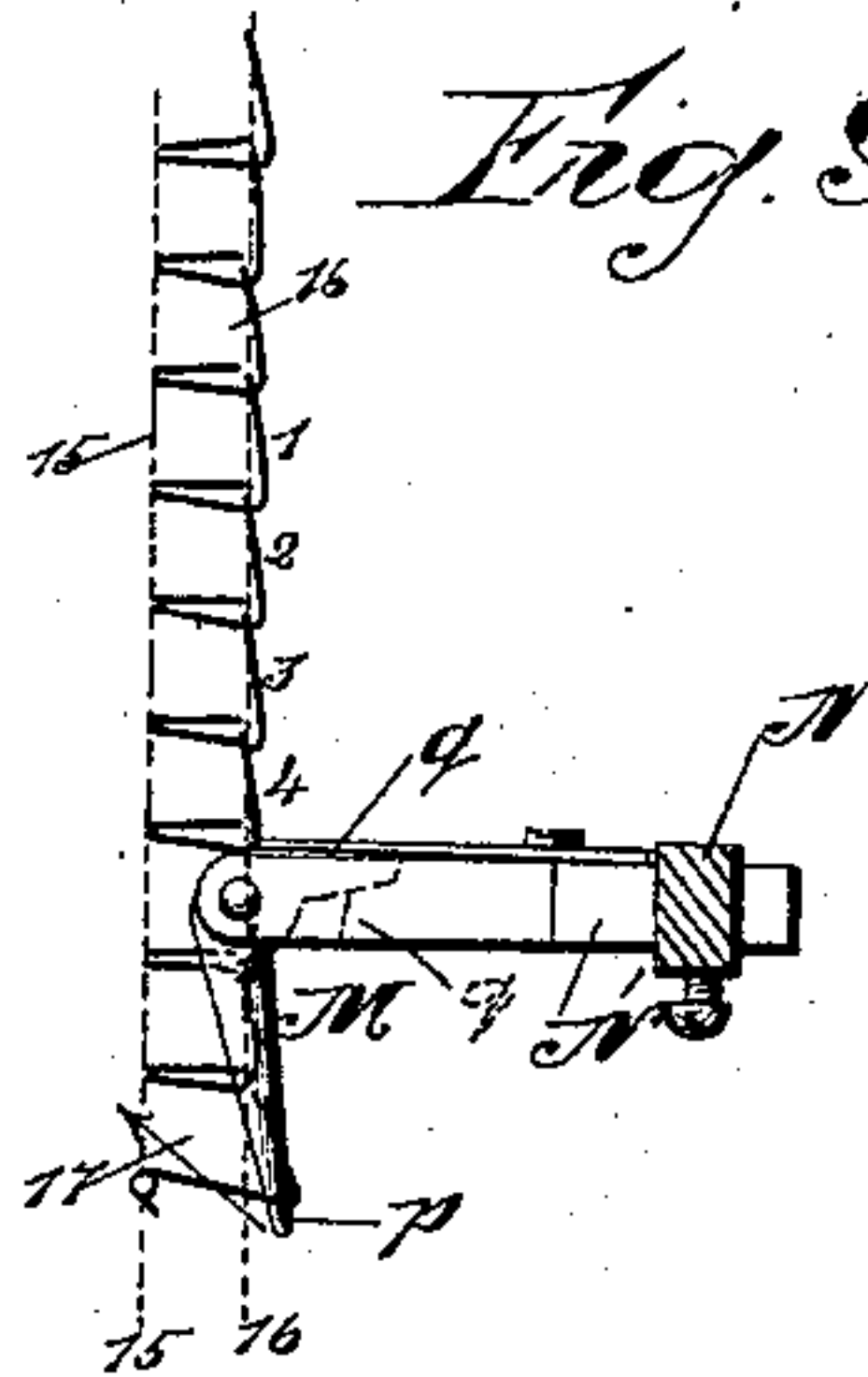


Fig. 8.

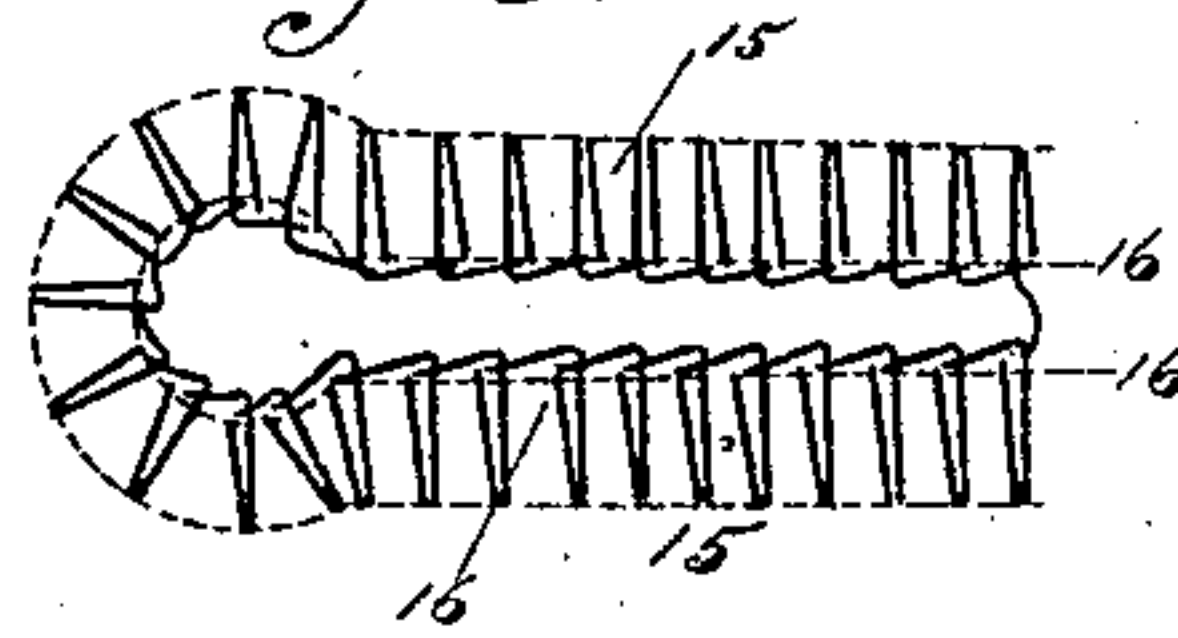
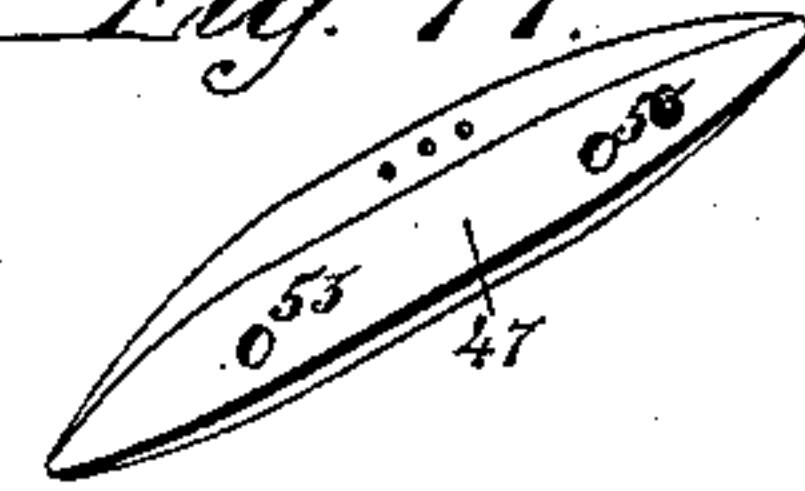


Fig. 10.



Fig. 11.



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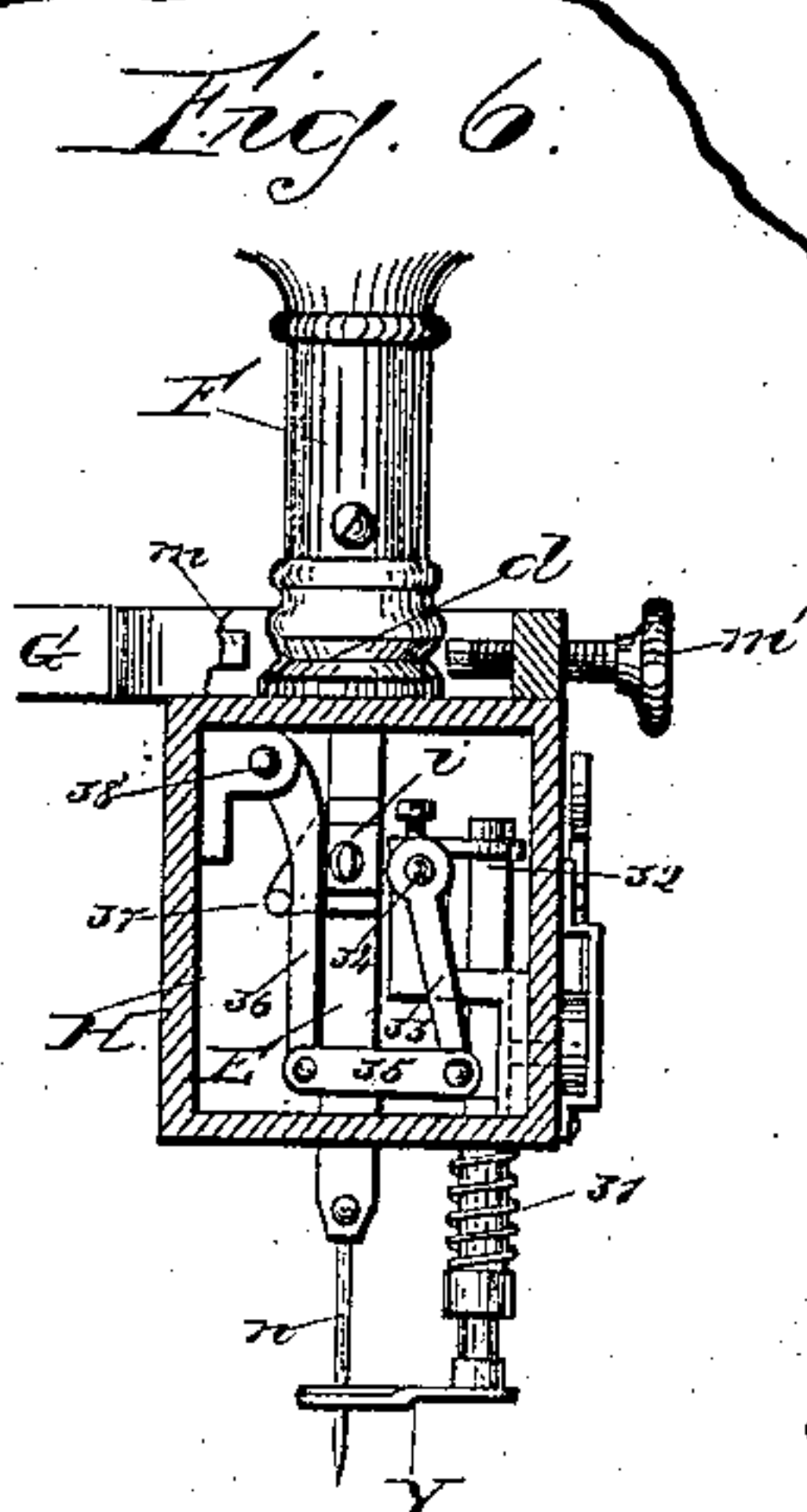
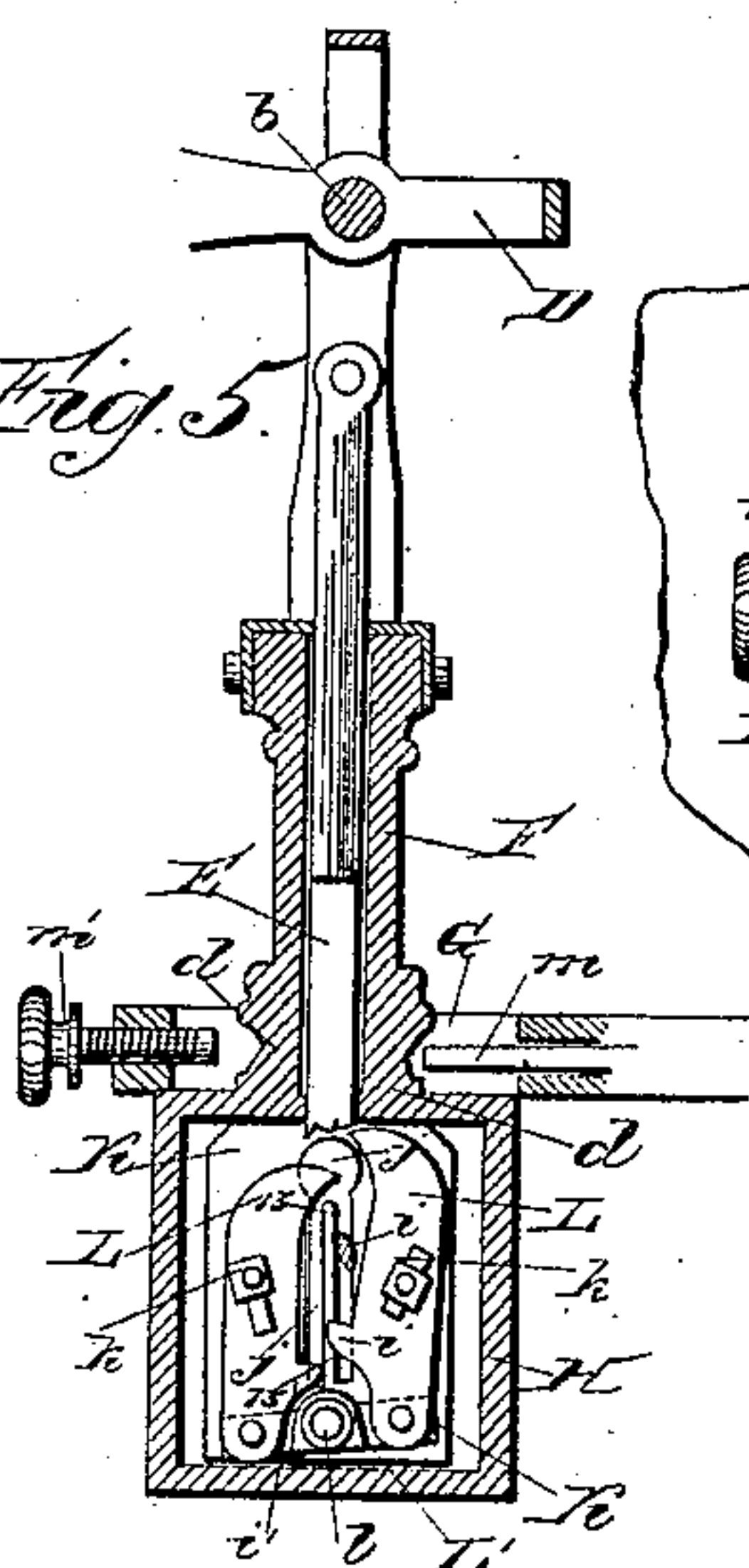
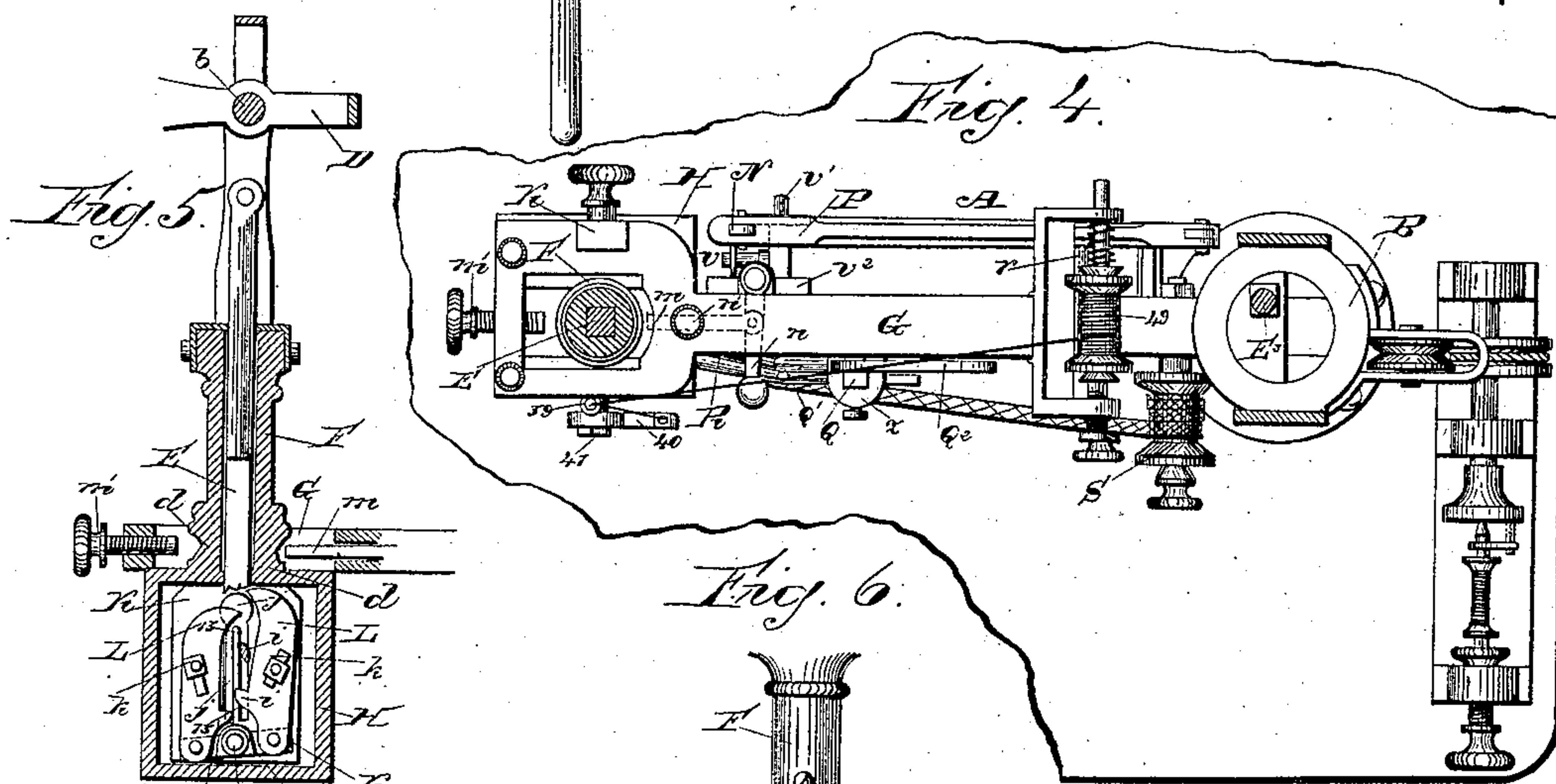
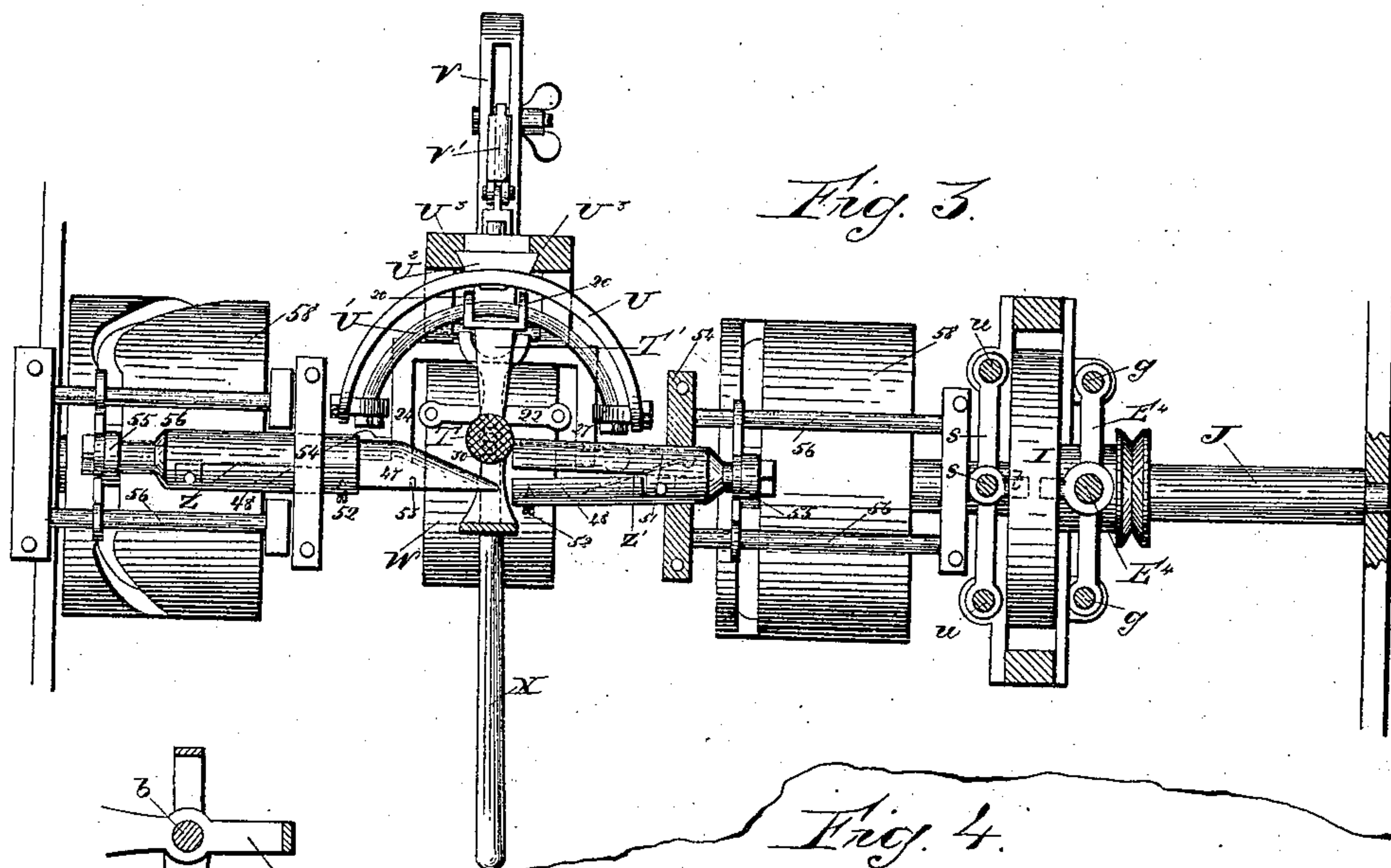
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UNITED STATES PATENT OFFICE.

A. C. F. DEROCQUIGNY, D. GANCE, AND LOUIS HANZO, OF NEW YORK, N. Y.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 34,748, dated March 25, 1862.

To all whom it may concern:

Be it known that we, ALFRED C. F. DEROCQUIGNY, DOMINIQUE GANCE, and LOUIS HANZO, all of the city, county, and State of New York, have invented a new and useful Improvement in Machines for Plain Sewing, Embroidering, and Working Button-Holes; and we 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 1 is a front view of a machine with our improvements partly in section. Fig. 2 is a vertical section at right angles to Fig. 1. Fig. 3 is a plan of the working parts below the bed-plate. Fig. 4 is a horizontal section in the line *xx* of Fig. 1. Fig. 5 is a front view of the mechanism for producing a lateral movement of the needle. Fig. 6 is a back view of the mechanism for lifting the presser during the formation of each stitch. Fig. 7 is a back view of a device used in making button-hole stitches and part of the mechanism for operating it. Figs. 8, 9, 10, and 11 are detail views, which will be hereinafter explained.

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

This invention consists in an improved mode of obtaining and controlling a lateral or side-to-side movement of the perforating-needle of a sewing-machine in working button-holes, in doing that kind of embroidery known as "scallop," and in any other kind of work in which such movement is necessary or desirable; also, in a peculiarly-applied hook and the mode of operating the same, in combination with the laterally-moving perforating-needle and a shuttle for causing the needle-thread to take a turn round the said needle on the face or at the edge of the cloth in working embroidery or in making button-holes; also, in an improved feed-motion for moving the cloth in various directions; also, in an improved mode of lifting the presser to permit the turning of the cloth between successive stitches; also, in certain means of operating the shuttle, whereby the necessity of a raceway or of any fixed shuttle-guide is entirely obviated.

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

A is the bed-plate of the machine, supported in a suitable stand and having erected upon it a pillar, B, to the upper part of which is attached, by pivots *a a*, an arm, D, from one end of which is suspended, by pivots *b b*, a tube, F, to the bottom of which is secured a box, H, in which and the said tube there are guides for the needle-bar E. Near the box H there is provided in the tube F a V-shaped groove, *d*, which fits to two horizontal V-shaped guides, *c c*, (see Figs. 2 and 4,) provided in the forked end of an arm, G, which is rigidly secured to the pillar B. The groove *d* and guides *c c* are for the purpose of guiding in a horizontal direction the swinging movements which are given to the tube F and box H for the purpose of giving a lateral movement to the perforating eye-pointed needle *n* between every two succeeding perforating movements, that it may perforate the cloth alternately in two parallel lines, or, in the case of working button-holes or working the edge of a piece of cloth, may alternately perforate the cloth at a distance from the edge and pass over or by the edge. The arm D, swinging from the pivots *a a*, permits the necessary movement of the pivot *b b* to accommodate the horizontal movement of the lower part of the tube F. The box H contains the mechanism shown in Fig. 5, through which the reciprocating longitudinal movement of the needle-bar is made to produce its lateral movement, and also contains the mechanism (shown in Fig. 1) for operating the take-up and the mechanism (shown in Fig. 6) for lifting the presser to permit the cloth to be turned upon the bed-plate A in embroidery or in sewing the circular ends of button-holes.

The needle-bar E is connected, by a link, E', at its upper end, with one end of a lever, E², which works on a fulcrum, *e*, secured in the arm D, and whose opposite end has suspended from it a rod, E³, at the lower end of which is a stud, *f*, working in the groove *f'* of a cam, I, on the horizontal main shaft J of the machine, which shaft is supported in suitable bearings, *h h*, below the bed-plate, and may be driven by a treadle or any other suitable means. The stud *f*, at the lower end of the rod E³, is carried by a cross-tail, E⁴, which is suspended from the rod E³, and which works upon fixed vertical guides *g g*, and so prevents the stud *f* from moving in any other than a vertical di-

rection, but permits the said stud to be moved in that direction by the cam I, which thus through the rod E³ imparts to the lever E² and needle-bar E the necessary movement to carry the needle *n* through and withdraw it from the cloth. This movement of the needle-bar and needle is essentially the same as in many other sewing-machines. The lateral movement of the needle-bar E is produced by the following means and in the following manner: The said bar has secured to it and projecting from its rear side a stud, *i*, (shown in section in Figs. 5 and 6, and shown also in Fig. 2,) and this stud works in a groove, *j*, in a stationary plate, K, (see Fig. 5,) which is secured to the arm G, and which is situated within the back part of the box H, in the upper part of which there is a slot for the reception of the said plate, such slot being long enough to permit the oscillating movement of the box and the tube F, which is necessary to the lateral movement of the needle. The groove *j* above mentioned has a central partition, 13, above which it is open, but below which it is closed, and there are attached to the said plate, by screws *k k*, two sliding switch-plates, L L, which have their lower ends connected with opposite ends of a lever, L', which is attached at the middle of its length by its fulcrum-pin *l* to the plate K. The stud *i* is caused by the reciprocating longitudinal movement of the needle-bar to pass up and down the groove *j* on opposite sides of the partition 13, alternately being directed from one to the other side of the said partition every time it arrives at the top thereof by means of one or other of the switch-plates L L, which are shifted to make each operate in its turn by the pin *i* striking projections *i' i'*, provided on each plate near the bottom of the groove *j*. The pin *i* in passing over the top of the partition 13 of the groove causes the needle-bar and needles, the box H, and the tube F all to receive a lateral motion, the tube and box swinging from the pin *b* and the needle-bar from the link E'. This lateral movement takes place every time the needle is withdrawn from the cloth, and it will be understood to cause the needle to pierce the cloth in one and the other of two lines alternately, and the grooved plate K and its appendages above described regulate the said lateral movement and the distance between the two lines of perforation, keeping such distance uniform, which is very desirable in working button-holes and in some kinds of embroidery. The said lateral movement may be varied by providing the machine with two or more plates like K, but having grooves *j* and partitions 13 of different widths. In some kinds of embroidery, where the work is not regular, as it is in working button-holes and in plain scalloping, we propose to discard these mechanical means of giving the needle-bar a lateral movement, and produce the said movement by the application of the right hand to a handle, H', at the bottom of the box H. The movement thus produced may be con-

trolled by two stops, *m m'*, provided for the purpose in the bar G, the stop *m'* being a screw which is furnished with a large head, by which it may be turned back and forth by the left hand while the box is moved back and forth between the stops by the right hand.

The stop *m* consists of a slide attached to a lever, *n*, by which it can be easily moved out of the way to permit the operation of the mechanical means of producing the lateral movement, and a set-screw, *n'*, is screwed into the arm to secure the said slide.

p is the hook by which the needle-thread is caused to take a turn round the needle in the formation of each stitch, and consequently the portion of the needle-thread forming part of one stitch is caused to pass round the portion of the same thread forming part of the next stitch, as shown in Fig. 8, which represents a face view of a button-hole, the stitching being shown in red color. The only thread visible in this figure is the needle-thread, which is alternately passed through the cloth in the line 15, and passed by the edge 16 of the hole and locked by the shuttle-thread in each case, two movements of the needle up and down and two lockings of the thread being required to make a complete stitch. For the sake of perspicuity the stitches are represented farther apart than they would be in working button-holes. Fig. 9 represents a similar stitch made entirely in the body of the cloth, the needle passing through the cloth every time it descends instead of passing once through and once over the edge, and in this figure the operation of the hook is illustrated by its being represented as having caught the thread between the points in the lines 16 and 15, where the last two perforations were made, and having formed therein a bend which it holds in such position that the needle *n* in the next descent which takes place in the line 16 will pass into and be partly surrounded by the said bend, which when the needle is withdrawn again will surround the neck of the loop just left in the cloth. The said hook *p* is formed at the extremity of a small elbow-lever, M, of which Fig. 10 is a perspective view. The said lever is pivoted at its elbow by a pin, 18, to an arm, N', which is rigidly secured to a nearly-upright bar, N, (see Figs. 1 and 7,) and has applied to it a spring, *q*, which holds it against a stop, *q'*, within the said arm, as shown in Fig. 9, which exhibits a section of the said arm. The said spring allows the hook to yield when it passes the needle in the direction of the arrow 17, (shown in Fig. 9;) but the stop *q'* prevents it yielding in the opposite direction. The bar N is suspended from one end of a lever, P, which works on a fixed fulcrum, *r*, at the back of the arm G, and from whose opposite end is suspended by a rod, *s'*, a cross-tail, *s*, which carries a stud, *t*, which works in a groove, *t'*, in the opposite side of the cam I to that in which the groove *f'* is formed. The cross-tail is fitted to vertical guides *u u*, which prevent

it and the stud t from working in any other but a vertical direction, and the cam consequently operates upon the stud to produce an upward and downward movement of the lever P. The needle-operating lever E^2 receives two complete movements up and down, and so gives two complete strokes to the needle for every revolution of the main shaft J; but the lever P only receives one complete movement up and down for every revolution of the shaft. The said bar N does not rise and fall vertically, but obliquely, moving backward and away from the pillar B as it rises and forward and toward the pillar as it descends. The movement of the said bar N is directed thus obliquely by means of two stationary horizontal pins, v v' , which are secured in a hanger, v^2 , that is rigidly attached to the arm G, and which enter curved oblique slots w w' in wings provided on the said bar, said pins being at right angles to each other and the said wings at right angles to each other. Fig. 7 is a view of this bar as it would be seen by a person looking obliquely from the back of the machine. The movement of the bar N, carrying the hook p , is so timed with reference to the movement of the needle n and feeding device that as the needle is rising from the cloth after having passed a loop through it in the line 16, which is the edge of the hole in the case of a button-hole, or is rising after having enchainned its thread with the shuttle-thread at the edge of the cloth in embroidering over an edge, the said hook passes, descends obliquely across the path of the needle below the point thereof, and catches the thread between the eye thereof and the cloth, and the extremity of the said hook is brought down firmly upon the cloth at a point in front of where the needle left the last loop, the feed-movement having taken place in the interval between the needle leaving the cloth and the hook coming in contact with it. This is the stage in the operation of the needle and hook represented in Fig. 9, before referred to. The needle, in completing its upward movement, is moved laterally to the line 15, and is shown in the latter figure as ready to enter the cloth in that line. The hook remains in the same position, holding the needle-thread in a bent form above the cloth while the needle is descending through and rising again from the cloth, and leaving a loop of its thread enchainned with the shuttle-thread in the line 15, and until it has again descended after a return lateral movement to pass through or over the edge of the cloth in the line 16, and just as the point of the needle enters the cloth in that line close to the point of the hook p the said hook rises, leaving the thread bent round the needle, and when the needle rises again the new loop in its thread remains in the bend which was formed by the hook p and preserves the said bend, making a stitch of the form indicated by the numbers 1, 2, 3, and 4 in Fig. 9. In the descent of the hook it is intended not to strike the needle; but in its ascent it comes in

contact with the needle, but is allowed by the spring p to yield sufficiently to pass it.

To provide for the lateral movement of the needle in operating as above described the opening provided in the bed A for the passage of the needle has to be elongated. At the end of this opening, nearest the pillar B, there is attached to the plate a short pin, w^2 , which, in working button holes, serves to keep the sides of the hole apart, and which serves as a pivot around which to turn the work in working the circular end of a button-hole or in working eyelet-holes. On the back part of this pin there is a shoulder, 19, which, in working button-holes, serves as a resting-place for the point of the hook p after it has caught and bent the thread as before described. This shoulder is necessary to prevent the hook entering and catching in the button-hole.

y is a pointed finger attached to an arm, Q' , which is adjustable longitudinally in an upright bar, Q , that is fitted to fixed guides Z Z attached to the stationary arm G. The purpose of this finger is to press upon the cloth to form a center about which it may be moved by the feeding device for the purpose of working in circles or parts of circles. The longitudinal adjustment of the arm Q' enables this finger y to be brought nearer to or farther from the needle, and thus to vary the length of the radii of the circles in which the work is performed. The bar Q has a spring, y' , applied to it to press the finger down upon the cloth; but a cam-lever, Q^2 , is so applied in connection with the said bar and in relation to the upper guide, z , as to enable it to raise and hold up the said bar and hold the finger out of contact with the cloth when straight work is being done, or in any case when it is not desired to use the said finger. The same bar Q carries a longitudinally-adjustable guide-bar, R , which may contain guides of various forms and sizes, to conduct a cord or braid from a spool, S , to the point where the work is performed, said cord or braid to be stitched over, and serving to fill up and give body and prominence to the work in embroidery and sewing, and for what is known as a "bar" to the button-hole in button-hole working. In button-hole working it is desirable to use also a fixed guide, consisting of a simple eye placed on the bed very near where the work is done.

T is the feed-dog, (shown with its operating mechanism in Figs. 1, 2, and 3.) attached to or formed upon the end of an arm, T' , which is furnished with cheek-pieces 20 20, having holes drilled in them to fit easily to a horizontal bar, U' , of semicircular form in its longitudinal and of round form in its transverse section, said bar being rigidly secured at its ends to a second horizontal semicircular bar, U , which is secured rigidly to a vertical slide, U^2 , which is fitted to move up and down in a fixed vertical guide-frame, U^3 , secured under the bed A. The bar U' is only made separate from U

to allow the feed-arm T' to work along it from end to end. The said arm is radial to the semi-circle of the said bar U'. The feed-dog T is grooved on its under side to fit a conical point, 21, secured in a bar, 22, which is bolted to the under side of the bed A at a short distance behind the needle, said pin supporting the dog and keeping it up to its work. The slide U² is connected by a rod, V', with a forked lever, V, which works on a fixed fulcrum, 23, secured in the lower part of the guide-frame U³, and one prong, 24, of the fork of the said lever carrying a pin, 25, to work in a groove, 26, in one side of a cam, W, on the main shaft J, and the other prong, 27, carrying a pin, 28, to work in a groove, 29, in the opposite side of the said cam, but the said prongs and pins being set so far apart that only one can be in its respective groove at a time. The said pins are, however, made movable in their respective prongs of the lever to allow either one to be placed into or out of its respective groove. The revolution of the cam produces an oscillating movement of the lever V upon its fulcrum, and so gives a reciprocating vertical movement to the slide U² and bars U U', and the latter, by imparting a vertical movement to its attached end of the feed-arm T', while the dog T is held up by the point 21, causes the dog to have a movement back and forth horizontally, or nearly so, upon the said point, by which movement it is made to feed the cloth. The said movement may be varied, according to the amount of feed required, by shifting the connection of the rod V' nearer to or farther from the fulcrum of the lever V. The feed-arm T' is connected with one end of a lever, X, which works horizontally on a fixed fulcrum, 30, secured in a rigid hanger, X', secured to the bottom of the bed A, the said fulcrum being directly under the point 21, on which the feed-dog is supported. By moving the lever X the arm T' is moved along the bar U', to which it is always radial, and consequently the direction of said arm is changed by such movement, and as the feed movement is always parallel with the length of the said arm and radial to the bar U the direction of the feed is changed. It will thus be seen that according as the length of the bar U forms a greater or less portion of a circle it provides for a greater or less variation in the direction of the feed. The cam-groove 26 is constructed to operate on its respective pin 25 to produce but one feed movement after every second complete movement of the needle and shuttle, and it is intended to be used more particularly in working button-holes, but may be used in some kinds of embroidery. The cam-groove 29 is constructed to operate on its respective pin 28 to produce a feed movement after every complete movement of the needle and shuttle, and is to be used in ordinary sewing and most kinds of embroidery.

Y is a presser having applied to it a spring, 31, and a lifting-lever, Y', for lifting it by hand, substantially like the pressers of sewing-ma-

chines in common use. To provide for its being lifted automatically at the proper stage in the making of each stitch to allow the work to be turned easily when desired by the operator, the upper end of the presser is connected, as shown in Fig. 6, with the arm 32 of a lever of the first class, which works on a fulcrum, 34, secured within the box H, and the other arm, 33, of the said lever is connected by a rod, 35, with a lever, 36, of the third class working on a fulcrum, 38, and the latter lever has one edge so operated upon by a pin, 37, attached to the needle-bar that as the needle rises it gives the said lever such a movement that it causes the former lever to lift the presser.

49 is the spool which supplies the needle-thread, supported upon the arm G near the pillar B.

39 is a guide in front of the arm G, near the top of the box, through which the needle-thread passes on its way to the take-up. The take-up consists of a short arm, 40, with an eye at its extremity attached to a short horizontal shaft, 41, which is fitted to turn in a bearing in the front of the box H. Within the said box the said shaft has secured to it a toothed pinion, 42, which gears into a toothed sector, 43, which is arranged to vibrate on a fixed pin, 44, secured in the upper part of the box. This sector contains a slot, 45, which receives a pin, 46, carried by the needle-bar. The movement of this pin 46 with the needle-bar takes it up and down the slot 45, and so produces a vibratory movement of the sector, which imparts through the pinion 42 the necessary movement to the take-up, causing it to rise with but more rapidly than the needle, and thus draw up the slack of the loops of the needle-thread. To enable the operation of the take-up to be properly regulated, the arm 40 is made adjustable on the shaft 41 to vary its sweep.

47 is the shuttle, made with two points to enable it to pass through a loop of the needle-thread in its movement in either direction, and having the middle of its body of nearly cylindrical form, being a little flattened on one side only.

The shuttle-operating mechanism is best shown in Figs. 1 and 3.

Z Z' are two shuttle-holders, consisting of sockets having their interiors of a form corresponding with the shuttle, and their exteriors cylindrical, and having each a movable jaw, 48, on the side whose interior is flattened to fit the flat side of the shuttle which works next the needle, said jaw being hinged to the body of the socket, and the socket being furnished inside with a spring, 51, which exerts a tendency to open the jaw. The jaw is fitted with a short screw, 52, to form on the inside a small teat, 52, to enter one of two holes 53 53 in the flattened side of the shuttle. These holes are represented in Fig. 11, which is a perspective view of the shuttle. The shuttle has the bobbin completely inclosed, and to provide for the insertion of the bobbin it is

made in two pieces, secured one into the other.

The shuttle-holders, constructed as above specified, are arranged in line with each other, and with their mouths facing each other in two fixed guides, 54 54, secured to the under side of the bed, such guides being only just large enough to admit the movable jaws of the holders when the latter are closed, and each holder is furnished with a cross-head, 55, which works on guides 56 56 under the bed, and which has standing at right angles to it a pin, 57, which works in a groove in one of two cams 58 58 upon the main shaft, said cams being in form precisely the reverse of each other, and that form being such that each shuttle-holder in turn will recede from and advance against toward the other, while the other is stationary, each commencing to recede just before the other completes its advance, but making the greater portion of its rear movement while the other is stationary, one of them making this movement during one movement of the needle into and from the cloth and the other during the next movement of the needle into and from the cloth. By this movement the said holders are made to give and take the shuttle to and from each other, and in so doing to pass it through the loops of the needle-thread that are protruded through the cloth. The giving and taking of the shuttle is effected in the following manner: As each shuttle-holder completes its advance the hinge of its movable jaw moves beyond its guide 54, and so permits it to open, as shown in the holder Z' in Fig. 3, and as it retires the jaw is closed by passing into its guide 54. Each holder in its advance deposits the opposite end of the shuttle within the other holder, and as it opens in continuing its advance, while the other closes in commencing its retreat, the teat 52 on the jaw of one is removed from its respective hole 53 in the shuttle and the teat 52 on the jaw of the other is made to enter its respective hole 53. The teats prevent any longitudinal slipping of the shuttle in the holder, and the flat side of the shuttle and corresponding form of the interiors of the jaws of the holders prevent the shuttles turning. By this mode of operating

the shuttle and so dispensing with the race-way and with the use of all fixed shuttle-guides we are enabled not only to obviate the oiling or otherwise soiling of the thread in the machine, but to use much larger and looser thread for the needle than is commonly used in sewing-machines, which is of great advantage in some kinds of embroidery.

The machine represented is capable of ordinary plain sewing. To put it in condition for this purpose it is necessary to remove the plate K and its appendages, and to secure the tube F and box H in a stationary condition by means of the stops *m m'*.

We do not claim giving the perforating-needle a lateral movement; but

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, with the swinging tube F and box H, or other equivalent swinging guides for the needle-bar, of a grooved plate, K, a lever, L', two switches, L L, and a pin, *i*, the whole applied and operating substantially as herein described.
 2. The combination, with a laterally-moving needle and a shuttle, of a hook, *p*, applied to operate substantially as herein described with reference to Figs. 8 and 9.
 3. The feed mechanism composed of the grooved dog T, supporting-point 21, arm T', and curved bar U', the said bar deriving a reciprocating motion perpendicular to the bed of the machine, and the said arm being adjustable along the curved bar, substantially as and for the purpose herein specified.
 4. The within-described mechanism for lifting the presser.
 5. Operating the shuttle by means of two reciprocating holders, Z Z', which deliver it from one to the other, and in so doing pass it through the loops of the needle-thread, substantially as herein described, without the use of any fixed guide in contact with the shuttle.
- A. C. F. DEROCQUIGNY.
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